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 Boiler Modernisation Programme" from **Bank Ochrony Srodowiska S.A (BOŚ Bank)**

Version: 05

Date: 08/06/2011

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 protocol
Version 03	07/12/2010	Revised version after first loop of Determination
Version 04	15/04/2011	Revised version after internal check of auditor
Version 05	08/06/2011	Revised version after CB check of auditors

The CDM-sectoral scope of this JI-project is *"Energy industries (renewable - / non-renewable sources)"* (Scope Number 1).

A.2. Description of the JI PoA:

The programme of activities (PoA) encourages replacement of existing heating systems **in the commercial and industrial sector**, which are not covered by the EU-Emissions Trading Scheme (installations with thermal input below 20 MW). The aim of the programme is to reduce GHG emissions by conversion to either a less CO_2-intense fossil fuel, e.g. from coal to natural gas, by conversion to biomass or by replacement of low efficient boilers. Table 3 in section A.4.2.1 gives a detailed overview of considered programme activities.

Currently, there is no incentive to replace inefficient existing systems in this sector and most of the operators do not plan to modernise existing boilers as long as they are technically and legally eligible, because pre-term boiler exchange means additional investment. The programme is implemented as loan incentive programme, revenues from the selling of carbon credits shall be utilized to lower interest rates and offer attractive conditions for financing. The conceptual design of the programme guarantees that it is only attractive for companies which need to apply for loans to finance new equipment whereas it is not attractive for companies which have enough capital and might invest in new systems anyway. Thus the baseline scenario is the continuation of the 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. 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.

Every JPoA participant who wants to join the programme has to agree on the programme conditions. The legal basis is constituted by the agreement between the JPoA participant and the coordinating/managing entity. It includes:

- JPoA participation;
- collection and transfer of the relevant installation data before and after the activities implementation and the actual consumption data,
- disposability of the generated project emission reductions from the programme to the coordinating/managing entity;
- commitment not to sell the generated emission reductions to any other project or purpose.

The proposed JPoA is a voluntary action implemented by the coordinating entity, BOŚ Bank.

A separate document **"Supplementary agreement"** is submitted along with this PDD. By signing the Supplementary agreement 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.

With regard to sustainable development the programme contributes in several ways, addressing:

1. **Social well-being:** In case of fuel switch to biomass, the use of biomass will provide additional business opportunities for local equipment & fuel suppliers. Setting up of collection and delivery points will also generate employment of the local and non-local communities.

2. **Environmental well-being:** The programme uses less CO_2 intensive fuels such as natural gas and biomass. Such fuels cause less CO_2-emissions to the atmosphere, as compared to other fuels, which have net positive emissions to the atmosphere. So the programme activity will result in lower emissions to the surrounding environment contributing to environmental well-being on a regional as well as global level. Furthermore, the programme activity shall contribute towards achieving the targets and objectives of the country's policy regarding emission reductions.

3. **Economic well-being:** The programme activities shall create job opportunities for local people during the construction, operation, and later maintenance period. Furthermore, the programme provides business opportunities for local stakeholders such as suppliers, manufacturers, contractors etc. It will also help to conserve the fast depleting natural resources, thereby contributing to the economic well being of country as a whole.

4. **Technological well-being:** Moreover, implementing a new type of technology shall create and strengthen local know-how and experience in this new technology. Thus, the programme activities have the potential to encourage other industries to implement this type of technology.

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

In the following table are listed the coordinating entity as well as the participants of the JI PoA.

Table 2: 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 (BOŚ Bank)	No
Germany	Kfw Bankengruppe	No

Please find contact data details in **ANNEX 1**.

A.4. Technical description of the JI PoA:

A.4.1. Location of the JI PoA:

Map 1: Location of the programme[1]

A.4.1.1. Host Party(ies):

Host country of the JPoA 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 border of the programme of activities corresponds with the physical borders of Poland. The overall programme is not restricted to any region, but will be carried out nationwide.

A.4.2. Description of each type of JPA:

Under the **"BOŚ Boiler Modernisation Programme"** there will be four different categories of programme activities. According to that the individual programme activity shall have the following unique name to be identified (see table 3 in A.4.2.1 for details about different categories):

1. Replacement of low efficient heating systems (hot water or steam) with fuel switch to biomass: **JPA-biomass-X.**
2. Replacement of low efficient heating systems (hot water or steam) with fuel switch to natural gas: **JPA-gas-X.**
3. Replacement of low efficient heating systems (hot water or steam) with fuel switch to oil: **JPA-oil-X.**
4. Replacement of low efficient gas or oil heating systems (hot water or steam) without fuel switch: **JPA-modernization-X.**

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

Table 3: Technology to be employed by each type of JPA

Technologies		Brief description
Boiler replacement:		
JPA-biomass X	**With fuel switch from coal to biomass**	Replacement of low efficient steam and hot water systems with fuel switch from coal to biomass.
	With fuel switch from oil to biomass	Replacement of low efficient steam and hot water systems with fuel switch from oil to biomass.
	With fuel switch from natural gas to biomass	Replacement of low efficient steam and hot water systems with fuel switch from natural gas to biomass.
JPA-gas-X	**With fuel switch from coal to natural gas**	Replacement of low efficient steam and hot water systems with fuel switch from coal to natural gas.
	With fuel switch from oil to natural gas	Replacement of low efficient steam and hot water systems with fuel switch from oil to natural gas.
JPA-oil-X	**With fuel switch from coal to oil**	Replacement of low efficient steam and hot water systems with fuel switch
JPA-modernization-X	**Without fuel switch oil/coal/natural gas**	Energy efficiency increase through replacement of low efficient steam and hot water natural gas/oil/ or coal systems to new more efficient natural gas/oil/ or coal systems without fuel switch;

- Measures that will be implemented by the programme will lead to fuel switch and/or an improvement of energy efficiency and therefore to a reduction of the energy demand and emissions.

Energy efficiency increase shall be achieved through exchange of old boilers with new more efficient boilers. The following effects will lead to higher efficiency depending on the boiler category:

1. Steam Boilers

In case of steam boilers, efficiency increase can be achieved by the replacement of old boilers combined with some of the following measures:

- Installation of an economizer;
- Continuous burner control;
- Oxygen control, etc. in industry and manufacturing, the difference between the efficiency of modern process steam boilers and of older boilers is obtained mostly due to the decrease of the flue gas temperature and improvements in operation on the part load.
- There is also the possibility to replace only the burner from the boiler system and thus to implement a fuel switch to gas. In this case no efficiency increase is expected.

2. Hot Water boilers

In case of hot water boilers, efficiency increase can be achieved through the following measures:

- Adoption of more efficient heating boilers leads to a higher annual efficiency factor. In contrast to the conventional constant temperature boilers, low temperature boilers are operating at lower or varying temperatures. Operating on the partial load leads to significantly higher efficiency levels, which is mostly the case for heating systems.
- Condensing boilers are even more efficient, as part of the steam enthalpy contained in the water vapour in the flue gas can be used by condensation.
- There is also the possibility to replace only the burner from the boiler system and thus to implement a fuel switch to gas. In this case no efficiency increase is expected.

In order to obtain the emission reductions through the described efficiency measures it is mandatory for the participants to guarantee that the further operation of the existing installation under technical aspects is possible.

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

Eligibility criteria for participation:

In order to take part in the programme, every JPoA participant has to meet the following criteria:

1. The applicant is belonging to one of the following target groups:
    1.1. small and medium-sized private enterprises, natural as well as legal persons, which are registered according to the Polish Commercial Code. The enterprises should on the date of application:

- have less than 250 employees and
- either less than EUR 50 million annual turnover or less than EUR 43 million total assets (in the annual balance sheet) as well as
- fulfil EU´s criterion of independence (i.e. owned with 25 % and more by an enterprise not complying with EU´s definition of an SME)

1.2. large enterprises (enterprises which do not meet anymore the definition for SME) and public enterprises (e.g. enterprises owned by a public entity with 25 % and more).[2]

1.3. other private sector (e.g. foundations, micro Businesses)

1.4. 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 .

Facilities relating to gambling, real estate, banking, insurance or financial intermediation and arms production are excluded.

2. The implemented activities must include a new fossil fuelled or biomass-fuelled heating system (boiler for hot water production, steam boiler); biomass in the context of the project follows the definition in CDM methodology AM0036[3] but excludes utilisation of biogas or liquid biofuels that is not produced from biomass residues;
3. The old system was run on fuel oil (heavy and light fuel oil), liquid gas, coal (lignite and anthracite) or natural gas and was not run on electricity or biomass;
4. All installations taken into account must not be participating in the "*European Emissions Trading Scheme;* this requirement excludes the following activities from participation:

4.1. replacement of boilers at plants covered by the National Allocation Plan in Poland

4.2. installation of boilers that substitute heat from installations covered by EU-ETS

5. There are no further legal or other binding requirements, which would require the implementation of those activities. In case new relevant legislation or binding requirements will enter into force during the time frame of the programme, those will be taken into account (see **ANNEX 5**, "Supplementary agreement")
6. Generally, there is no specific restriction regarding the technical lifetime of the old installation. However, the remaining lifetime[4] for old installation will be proven by checking the operational status and permits of the old installation.

[2] However, the conceptual design of the programme guarantees that it is only attractive for companies which need to apply for loans to finance new equipment. This limits the applicability mainly in the sector of large companies.

[3] Definition of AM0036: "Biomass is non-fossilized and biodegradable organic material originating from plants, animals and microorganisms. This shall also include products, by-products, residues and waste from agriculture, forestry and related industries as well as the non-fossilized and biodegradable organic fractions of industrial and municipal wastes. Biomass also includes gases and liquids recovered from the decomposition of non-fossilized and biodegradable organic material."

[4] 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*

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[5] 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.

If replacement of boilers is not legally required, 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:

According to a statistical survey, the age characteristics of water boilers in Polish heating sector is as follows[6]:

- 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

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."

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

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

- 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).

7. Any public subsidies for implementation of those activities regarding fuel switch are not used;[7]
8. Financing of projects already started (ex-post financing) and substituting other financing (rescheduling) are excluded.
9. The JPoA participant confirms that the installation is neither registered as a JPA nor included in another registered JPoA nor in another single JI project or JI bundling project.
10. The old heating systems are to be used either as back-up plants and the emissions are carefully monitored. However, if the systems are no longer to be used, they will be professional disposed and not reused.
11. The JPA satisfies de-bundling rules for PoA. Further detail information is provided in Section A.4.5.1.

All installations that are in line with those eligibility requirements will be considered as additional (see section E.2), meaning that the continuation of the operation of the existing boiler is the most likely scenario, as for those installations:

- There is no technical requirement to replace the boiler (criteria 6)
- There is no legal requirement to replace the boiler (criteria 5)
- There is a need for investment (criteria 2) and the participant faces investment barriers as by the conceptual design of the programme he has to apply for a loan (see section E.2)
- There are no public subsidies used which might help to overcome such investment barriers

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 GHG reductions are achieved due to:

- lower fuel demand due to new more efficient and optimised heating system;

[7] This restriction is limited only to subsidies that are directly related to the project activity (boiler replacement); subsidies for other measures outside of the project boundary are not critical in terms of participation at the JI programme

- fuel switch to a CO_2 less intensive fuel such as natural gas or oil;
- fuel switch to a CO_2 neutral fuel such as biomass.

In the absence of the programme, further usage of the old steam and hot water installations, would be the only realistic alternative for the heating supply (status quo).

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 4: Emission reduction of the exemplary JPA in t CO_2 eq (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)
2010	449	None	1,099	650
2011	1,796	None	4,396	2,600
2012	1,796	None	4,396	2,600
Sum for the crediting period 2010-1012	**4,041**	**None**	**9,892**	**5,851**

Table 5: Emission reduction of the exemplary JPA in t CO_2 eq (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	1,796	None	4,396	2,600
2014	1,796	None	4,396	2,600
2015	1,796	None	4,396	2,600
2016	1,796	None	4,396	2,600
2017	1,796	None	4,396	2,600
2018	1,796	None	4,396	2,600
2019	1,796	None	4,396	2,600
2020	1,347	None	3,297	1,950
Sum for the	**13,919**	**None**	**34,072**	**20,153**

period 2013-2020				

Table 6: Overview of emission reduction of the exemplary JPA in t CO_2 eq 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)
2010	449	None	1,099	650
2011	1,796	None	4,396	2,600
2012	1,796	None	4,396	2,600
Sum for the crediting period 2010-1012	**4,041**	**None**	**9,892**	**5,851**
2013	1,796	None	4,396	2,600
2014	1,796	None	4,396	2,600
2015	1,796	None	4,396	2,600
2016	1,796	None	4,396	2,600
2017	1,796	None	4,396	2,600
2018	1,796	None	4,396	2,600
2019	1,796	None	4,396	2,600
2020	1,347	None	3,297	1,950
Sum for the period 2013-2020	**13,919**	**None**	**34,072**	**20,153**
Sum 2010-2020				**26,004**

Further information regarding the emission reduction of exemplary JPA is provided in Annex 2.

It is conservatively assumed that about 60 heat and steam boilers shall participate in the JPoA Project over the entire crediting period 2010-2012 whereas a replacement of an intensive CO_2 fuel with a less intensive one will take place. Following estimations are done for the whole crediting period for the JPoA.

Table 7: Emissions reductions t CO_2 per Year

	Participants number	tCO_2 Reductions 2010	tCO_2 Reductions 2011	tCO_2 Reductions 2012 and following years
New Participants 2010	30	21,264	42,528	42,528
New Participants 2011	30		22,596	45,192
New Participants 2012	0	0	0	0
$C0_2$ Reduction per Year	0	21,264	65,124	87,720

Table 8: Emission reduction units for the period 2010-2012

Year	New boilers	Boilers cum	ERUs
2010	30	30	21,264
2011	30	60	65,124
2012	0	60	87,720
Sum for the crediting period 2010-1012			**174,108**

Table 9: ERUs for the period 2013-2020

Year	New boilers	Boilers cum	ERUs
2013	0	60	87,720
2014	0	60	87,720
2015	0	60	87,720
2016	0	60	87,720
2017	0	60	87,720
2018	0	60	87,720
2019	0	60	87,720
2020	0	60	87,720
Sum for the period 2013-2020			**701,760**

Table 10: Summary of ERUs for the whole crediting period (2010-2020)

Year	New boilers	Boilers cum	ERUs
2010	30	30	21,264
2011	30	60	65,124
2012	0	60	87,720
Sum for the crediting period 2010-1012			**174,108**
2013	0	60	87,720
2014	0	60	87,720
2015	0	60	87,720
2016	0	60	87,720
2017	0	60	87,720
2018	0	60	87,720
2019	0	60	87,720
2020	0	60	87,720
Sum for the period 2013-2020			**701,760**
Sum 2010-2020			**875,868**

Further information regarding the emission reduction of JPoA is provided in Annex 6.

Most of the operators do not plan to modernise existing boilers as long as they are technically and legally eligible, because pre-term boiler exchange means additional investment. This forms a financial barrier.

Offering better loan conditions can be an additional financial incentive for replacement of a boiler at a time, when the average technical lifetime is not yet at its end. The investment costs of a pre-term replacement with fuel switch to natural gas/or biomass as well as replacement of natural gas boilers without fuel switch can partially be compensated by the programme. The latter therefore provides an incentive to overcome financial barriers.

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

Neither the JI project itself or the activities implemented within the **BOŚ Bank** Programme receive any public subsidies.

A.4.5. Operational, management and monitoring plan:

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

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

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

- Financial Institutions Department (FID) (at headquarters) - will be responsible for:
  - Maintaining contact with DFP, Verifier;
  - Overseeing the proper implementation of the Programme;
  - Monitoring of the eligibility criteria of each customer involved into PoA;
  - Processing of the aggregate data on measures implemented, monitoring effects;
  - Submitting monitoring reports to the Verifier and to the DFP;
- Financing and Ecology Department (F&ED) at headquarters – will be responsible for:
  - Identification and appraisal of individual projects, the appraisal will be processed with the 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 every customer whether the participations conditions were fulfilled. This group of advisors is also responsible for signing the Supplementary statement to the contract with every new participant of the Boiler Modernization Programme.

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

- the scope of the investment,
- describes the technology he/she intends to implement,
- actual energy consumption,
- expected ecological effect,

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 elaborate technical and ecological opinion about the investment that gives a comprehensive overview of the measure. Within this procedure 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 is the debundling rules.

The JPA must satisfy de-bundling rules for PoA. The JPA should be deemed not to be de-bundled component of a large-scale activity. This shall be checked according to the rules provided in the "Guidelines on assessment of de-bundling for SSC project activity", Version 02, EB 47. According to that rule:

> *"a proposed small-scale JPA of a PoA shall be deemed to be a de-bundled component of a large scale activity[8] if there is already an activity, which satisfies both conditions (a) and (b).:*
>
> (a) *Has the same activity implementer as the proposed small scale JPA or has a coordinating or managing entity, which also manages a large scale PoA of the same technology/measure, and;*
>
> *(b) The boundary is within one kilometre of the boundary of the proposed small scale JPA, at the closest point."*

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.

[8] Which may be a registered small scale JPA of a PoA, or an application to register another small-scale JPA of PoA or another registered JI project activity

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

The BOŚ Bank as the managing/coordinating entity will supervise the process of monitoring. All participants will be monitored on ex post basis.

The specific fuel consumption or heat production of every customer is measured ex post every year. For measurement of fuel consumption and heat generation meters and invoices of fuel providers are used. Therefore, a deadline will be set, until which all customers should provide all measured values. All documentation will be collected by the loans administering departments in each branch and stored in credit files. One additional copy of documentation is stored in central database carried by Financial Institutions Department (FID). Only ecologists calculate CO_2 emission reductions figures basing on dedicated formulas. The paper calculation is stored in credit files additional copy is processed in FID in order to get the annual report on Programme reductions.

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 the assistance of the Principal Ecologist of BOŚ Bank.

To monitor emissions reduction on ex post basis a specific agreement between BOŚ and the single participants regarding JI-related payments will be signed that include, inter alia, duties for the participants regarding the transfer of data for calculation/monitoring purposes as well as for verification procedures. Monitoring reports will be sent in form of fuel bills (provided by the energy supplier) from the participants to BOŚ Bank

Most of the necessary data needed for the calculation of the project emissions will be once enquired from each JPoA participant. These data will be collected in a central excel-database. All standardized values will be documented in this database, too.

In order to guarantee the data and quality reliability, it is further determined, that within the scope of the verification process, random checks of the emission reductions of 10% of the programme participants will be accomplished on-site. If the number of participants is below ten, at least one site per year will be accomplished on site. This approach has been applied in agreement with the German DFP (DEHSt) for similar JI projects in Germany.

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

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

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 shall 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 1st April 2010.

Table 11: Timeline table indicating the milestones of the programme

Date	Actions
06/10/2008	Memorandum of Understanding with KfW
10/11/2008-10/04/2009	Elaboration of preliminary concept (Project Idea Note)
29/06/2009	Application for LoE
02/09/2009	Receipt of LoE
06/10/2009	Kick Off Workshop BOS Bank (KfW)/FutureCamp Climate
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.

B.3. Length of the crediting period:

A fixed crediting period of 10 for each JPA shall be applied. While for the whole programme, on JPoA level, 12 years 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.

The Polish Act of 17 July 2009 on the "System to Manage the Emissions of Greenhouse Gases and Other Substances"[9] 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.

[9] 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 project activities:

Reduction of greenhouse gas emissions because of:

- A lower amount of fuel required by modern heat and steam boilers compared to old boilers with a lower annual standard efficiency;
- A lower carbon intensity of fuels when switching from fossil fuels with a high GWP (Global Warming Potential) to fuels or waste gas with a lower GWP or/and switching from fossil fuels to biomass (zero emissions);

In case of natural gas/oil boilers:

- 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 o f biomass boilers:

- 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. by transportation of biomass.

The only possible negative environmental effects are subject to the handling and burning of biomass, which 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.

Socio-economic aspects

Positive aspects of the programme will be:

- 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.

Besides, there are no essential differences between the baseline and the programme situation.

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 SSC-JPA level ☒

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

There is an internal regulation No B/23/2009 in force enforcing rules on assessment and monitoring ecological risk of investments. This regulation provides standard as well as simplified procedure of ecological impact assessment of defined group of projects financed from Banks credit lines.

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

The Main Ecologist or Ecologist of the Branch performs 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, time table of 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.

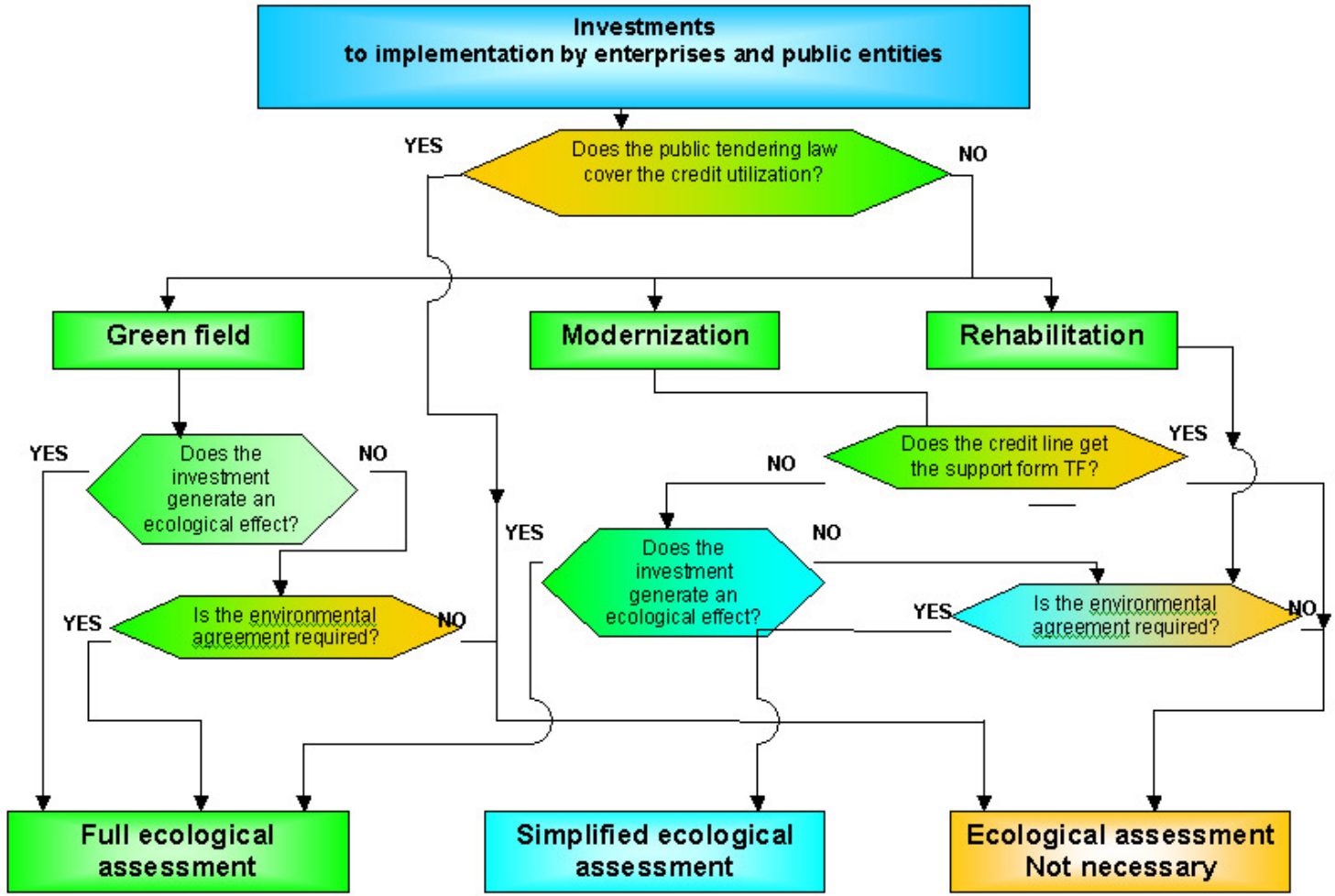


Diagram 1: Stepwise the BOŚ Bank's internal process regarding the Environmental Impact Assessment for enterprises and pubic facilities

SECTION D. Stakeholders' comments

1. Local stakeholder consultation is done at PoA level ☐
2. Local stakeholder consultation is done at SSC-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 at this stage of the project.

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[10] 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 an approved CDM baseline methodology applied to the small-scale project activity, which falls in the following category:

[10] 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."*

E.1.1. For all project activities with <u>fuel switch to biomass</u>

The UNFCCC provides an approved CDM baseline and monitoring methodology applied to the small-scale project activity, which falls in the following category:

<u>Option 1:</u> **Main Category: Type I –Renewable Energy Projects**

Sub Category: C. Thermal Energy for the User with or without Electricity; Version 18, Scope 1 (EB 54)

The reference has been taken from the recent list of the small-scale CDM project activity categories contained in Appendix B of the *"Simplified Modalities and Procedures for Small-Scale CDM Project Activities"* (Version 15, Scope 01, EB48).

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."*

Default values for emission coefficients

"*For steam/heat produced using fossil fuels the baseline emissions are calculated as follows:*

$BE_y = HG_y * EF_{CO2} / \eta_{th}$ (1)

Where:

BE_y the baseline emissions from steam/heat displaced by the programme of activities during the year y in tCO_2e.

HG_y the net quantity of steam/heat supplied by the programme of activities during the year y in TJ.

EF_{CO2} the CO_2 emission factor per unit of energy of the fuel that would have been used in the baseline plant in (tCO_2 / TJ), obtained from *"IPCC, see Annex 3*"

η_{th} the efficiency of the plant using fossil fuel that would have been used in the absence of the programme of activities."

Table 12: Baseline data requirement and data source

S.No	Parameter	Unit	Data source
1	Emission coefficient of replaced fuel	t_{CO2}/TJ	See Annex 3"
2	Thermal energy generated by the boilers	TJ/annum	
3	Boiler annual utilisation ratio	%	Literature, see Annex 3

The programme activity "fuel switch" applies to the *"Type I: Renewable energy projects" and "Category I C: Thermal energy for the user"*.

As per the methodology "*AMS I C"* version 18, Scope 01, EB56,

> *"1. This category comprises renewable energy technologies that supply users[11] with thermal energy that displaces fossil fuel use. These units include technologies such as solar thermal water heaters and dryers, solar cookers, energy derived from renewable biomass and other technologies that provide thermal energy that displaces fossil fuel."*

[11] "E.g., residential, industrial, commercial facilities"

The JPoA activity is a biomass system that uses renewable fuels (for example wood chips), for steam generation for meeting the process requirements in different sectors, thereby displacing the use of fossil fuels like coal, lignite, thus satisfying the above condition.

"3. The total installed/rated thermal energy generation capacity of the project equipment is equal or less than 45 MW thermal."

This criterion will be fulfilled, since only installations with an input capacity less than 20MW are accredited as participants for the JPoA and therefore also output thermal generation capacity will be even lower than 20 MW,

As other programme activities such as efficiency improvements are in this case simply a side effect of fuel switch to biomass measure and therefore already included and covered by the methodology, no further methodology has to be applied.

Hence, the choice of the JI project category and the methodology is justified.

Biomass supply to the installations is guaranteed to be only from regional biomass suppliers. Providing contracts and bills from the regional biomass suppliers during the verification process will prove this.

E.1.2. For all project activities with fuel switch to natural gas (from oil, coal or liquid gas) or oil as well as replacement of natural gas/ oil/or coal boilers without fuel switch:

Option 1:

Main Category: Type II. – Energy Efficiency Improvement Projects

Sub Category: E. Energy Efficiency and Fuel Switching Measures for Buildings"; Version 10, Scope 03, EB 35

Option 1 is partly applicable.

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.[12]"

The programme at hand is aiming primarily at boiler replacement with and without fuel switch. The energy efficiency measures are mostly a result from the main measures. Therefore, this criterion is not 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."

Based on the definitions from the methodology, the baseline scenario is applicable for the project at hand. However, the lower efficiency of the old unit will be also taken into account. Therefore, this criterion is fulfilled for the programme at hand.

Option 2:

Main Category: Type II. –Energy Efficiency Improvement Projects

Sub Category: D. Energy Efficiency and Fuel Switching Measures for Industrial Facilities; Version 12, Scope 04, EB 51

Option 2 is as well partly applicable. Project boundary and general baseline approach are considered within this programme, while baseline calculation is based on approach from AMS I.C.

As per the methodology "*AMS II D"* version 12, Scope 04, EB51, defines measures as follows:

[12] *"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."*

"This category comprises any energy efficiency and fuel switching measures implemented at a single or several industrial or mining and mineral production facility(ies). This category covers project activities aimed primarily at energy efficiency; a project activity that involves primarily fuel switching falls into category III.B."

The programme at hand is aiming primarily at boiler replacement with and without fuel switch. The energy efficiency measures are mostly a result from the main measures. Therefore, this criterion is not applicable.

The baseline approach mentioned in paragraph 7 and 10 of the AMS II.E is as follows:

"7. In the case of replacement, modification or retrofit measures, the baseline consists of the energy baseline of the existing facility or sub-system that is replaced, modified or retrofitted."

"10. Each energy form in the emission baseline is multiplied by an emission coefficient (in kg CO2e/kWh… For fossil fuels, the IPCC default values for emission coefficients may be used."

Based on the definitions from the methodology, the baseline scenario is applicable for the project at hand. However, the lower efficiency of the old unit will be also taken into account. Therefore, this criterion is fulfilled for the programme at hand

Option 3:

Main Category: Type III. –Other Projects Activities

Sub Category: B. Switching fossil fuels, Version 14, Scope 01, EB 47

Option 3 is not applicable.

As per the methodology "*AMS III B"* version 14, Scope 01, EB47, defines measures as follows:

"1 This methodology comprises fossil fuel switching in industrial, residential, commercial, institutional or electricity generation applications (e.g., fuel switch from fuel oil to natural gas in an existing captive electricity generation or replacement of a fuel oil boiler by a natural gas boiler)."

The JPoA activity includes fossil fuel switching (for example fuel switch from oil to natural gas) in different sectors, thereby displacing the use of fossil fuels like coal, lignite, thus satisfying the above condition.

"4. Fuel switching may also result in energy efficiency improvements. If the project activity primarily aims at reducing emissions through fuel switching, it falls into this methodology."

The programme at hand is aiming primarily at boiler replacement with and without fuel switch. The energy efficiency measures are mostly a result from the main measures. Therefore, this criterion is satisfied.

In paragraph 14 of the methodology the baseline requirements are described as follows:

"14. In case of existing facilities historical information (detailed records) on the use of fossil fuels and the plant output (e.g., heat or electricity) in the baseline captive energy generation plant from at least 3 years prior to project implementation shall be used in the baseline calculations, e.g., information on coal use and heat output by a district heating plant, liquid fuel oil use and electricity generated by a generating unit (records of fuel used and output can be used in lieu of actual collecting baseline validation data). For facilities that are less than 3 years old, all historical data shall be available (a minimum of one year data would be required)."

The baseline emission calculation described in Option 3 is not applicable, because it requires monitoring of the energy use of the old installation (past energy demand). In this JPoA the actual energy demand of each new installation is multiplied with the emissions factor of the old used fuel, taking into account the lower efficiency of the old unit. Therefore, the above condition is not satisfied.

As proved above the Option 1, Option 2, and Option 3, are only **partly applicable**[13]

Due to the special applicability conditions in the different methodologies as well as the individual conditions of this programmatic approach, a programme specific baseline methodology will be used, following a conservative approach for any arguable data for calculation and adaptation.

In general, the following baseline approaches are then applicable:

[13] Project boundary and general baseline approach are considered within this programme, while baseline calculation are based on approach from AMS I.C as described further below.

Option 4:

Historical emissions: If the historic situation remains the same, the hypothetical emissions are applied from the calculated fuel consumption and therefore from the steam or heating energy demand. Every installation shall be considered individually. Within this baseline approach the actually achieved emission reductions are accurately calculated (for more information see Annex 3.

Thus, this option approach is most suitable for the preparation of a reference scenario.

Option 5:

Least Cost Alternative: This programme addresses mainly commercial and industrial installations where the continuation of the existing situations is the most economically reasonable situation. For household customers in some cases a replacement of the installations may already be economically reasonable, but due to existing barriers the continuation of the existing situation is the most likely scenario. Therefore, the Least Cost Alternative approach is not applicable for the conversion of the existing installations.

Option 6:

Benchmark: For the same reasons as described in Option 5 the continuation of the existing situation is the most likely scenario. Therefore, applying a benchmark does not make sense in this case.

In consequence, Option 4: Historical emissions approach has been chosen.

Technology/measure

This approach comprises boiler replacement with or without fossil fuel switching in industrial, residential, commercial, institutional (e.g., fuel switch from fuel oil to natural gas in small industry or replacement of a fuel oil boiler by a natural gas boiler)."

Boundary

The project boundary is the physical, geographical site of the building(s).

Baseline

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.

Considering the different technologies expected to be implemented, the following approach for the historical emissions estimations is applied. To calculate the baseline in case of heat and steam boilers means to determine the amount of emissions, which would be produced, if the heat demand generated by the individual heat or steam boiler during the participation in this programme were generated by the respective predecessor systems. Therefore, baseline emissions are calculated based on actual annual fuel consumption times the ratio of the annual utilisation ratio of the new boiler and the annual utilisation ratio of the old boiler. If information regarding the development of an actual annual utilisation ratio of the old and new boiler is not available, a standard annual utilisation ratio is used.

$$BE_{Var1a,y} = \sum_{i=1}^{n} \frac{\eta_{PJ,participant\,i}}{\eta_{\mathrm{BL}participant\,i}} \cdot EF_{CO_2,fuel\,BL,participant\,i} \cdot FC_{PJ,fuelj,participant\,i}$$

where m:= total number of fuel sources per participant in the project scenario

n:= total number of participants

If the total capacity of the new installed installation is higher than the capacity of the old installation to satisfy increased heating demand, crediting shall be capped to the capacity (maximum output) of baseline equipment. In that case the calculation will be corrected in a conservative way by the following factor:

$$FC_{PJ,corrected} = \sum_{j=1}^{m} FC_{PJ,fuel\ j,participant\,i} \cdot \frac{installed\,capacity\,old\,installation}{installed\,capacity\,new\,installation}$$

Details regarding general formulas are provided in section E.4. For information regarding the above described energy efficiency methods and the resulted utilisation ratios please see Annex3.

The data on the historical situation will be collected for each installation before replacement. If the historic situation can be extrapolated into the future, baseline emissions are calculated - as hypothetical emissions from the steam and or hot water demand - by applying fuel consumption data.

With this very stringently kept baseline approach the actually achieved emission reductions can be accurately calculated.

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 SSC-JPA is performed based on the "*Additionality Tool"* of the CDM Executive Board (Version 05, 2 EB 39). The latter is applied from the perspective of the coordinating/managing entity as well as from a JPoA participant in order to ensure a broad view of all aspects of the programme 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.2.3: JPoA participants (JPA level)

It is postulated, that the steam and hot water generating installations considered in the JPoA at hand are in operation and have not been converted yet, when they are allowed to participate in the programme.

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:

- **National Fund for Environmental Protection and Water Management** (NFOSiGW):

act on Environmental protection law (articles from 400 to 411) refers to all issues related to these funds.

Together with the Voivodeship Funds for Environmental Protection (WFOŚ) – it forms the backbone of the system for financing environmental protection projects.

The National Fund, which operates in accordance with the Environmental Protection Law, is a special purpose fund with legal personality and manages its finances independently. It finances tasks relating to environmental protection and water management from its own funds and from monies otherwise obtained. The National Fund is the largest institution in Poland that cooperates with international financial partners and handles foreign funds designated for environmental protection. In recent years the National Fund has had the important task of demonstrating its effective and efficient use of funds obtained from the European Union for the development and modernization of the infrastructure for protecting the environment in Poland. Coordinating ecological projects which have already obtained, or are in the process of receiving, financial support from the European Commission, and co-financing these projects from the resources of the National Fund, will help Poland achieve the environmental goals that result from its international obligations.

Financing environmental protection

The National Fund's moneys derive from the following: fees paid for use of the environment for economic activity; penalties paid for violation of the ecological law - which is closely connected with the Environmental Protection Law; utilization and concession fees collected under the Geological and Mining Law; fees determined under the Water Management Law, and also the act on recycling of decommissioned vehicles. Since co-financing mostly takes the form of loans, the National Fund constitutes a "renewable source of financing" for environmental protection projects.

Loans and grants, as well as other forms of co-financing provided by the National Fund, are mainly designated for co-funding large national and pan-regional capital projects for controlling water, air and land pollution. Grants are also allocated for tasks related to geology and mining, environmental monitoring, preventing threats to the environment, protecting nature and forestry, promoting environmental awareness, protecting children against health threats, and also scientific and research work and for obtaining expert opinions. Recently top priority has been given to investments related to improving energy efficiency and using renewable energy sources.

The NFOSiGW support is up to 20% of the cost of projects. However, this fund has no relevance for the programme at hand as it supports only large projects with a minimum investment of 10 Mio PLN (e.g. Multi Megawatt wind farms or large cogeneration plants) whereas the JI programme aims at smaller activities only.

- **Green Investment Scheme (GIS)**

Due to restructuring of the economy in 1990s, focused inter alia on reduction of the impact of the national economy to the environment and decoupling of the GDP growth from the emissions levels, Poland will have GHG emissions well below target established under the Kyoto Protocol. The surplus amounts to 500 million of AAUs in the period 2008-2012, and is assumed to be the third largest, after Russian and Ukrainian.

As of April 29, 2008 Poland met specific criteria and became eligible to engage in international emissions trading (Article 17 of the Kyoto Protocol) including trading of AAUs. The Polish Act on management of GHG emissions and emissions of other substances adopted on July 17, 2009 defines:

- proceeds from the transactions can be spent on hard greening, as well as on soft greening.
- transparent rules for acquiring of the applications for projects, that can be co-financed from the GIS proceeds,
- robust but flexible regulations for monitoring, reporting and verification of the effects provided by the projects,
- other operational rules of National Green Investment Scheme.

According to the Act, the operating entity for the National GIS is the National Fund for Environmental Protection and Water Management (NFEP&WM). The minimum amount of investment is 10 Mio PLN.

http://www.nfosigw.gov.pl/en/priority-programmes/green-investment-scheme/- chapter 7 (art. 22 - 36) of the Act refers to GIS.

- **EcoFound Foundation**

The EcoFound Foundation has been granting installations, especially solar. However, 2008 was the last year of its activity and therefore with no relevance for the programme at hand.

- **BOŚ Bank Funding:**

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 right to approve that the investment conforms the eligibility criteria. Therefore, BOŚ Bank has never provided subsidies in any form to any of pro-environmental investments that derive from its capital. Thus, this is not relevant for the targeted measures at all.

Furthermore, the participants accept within the participation agreement to indicate any subsidies received for the respective measure implemented during the crediting period.

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.

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/or coal 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.

As Investment Analysis (Step 2) as well as **Barrier Analysis** (Step 3) is applicable for the programme at hand, **Barrier analysis (step 3**) is chosen to be applied.

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 within this new 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 of pro-environmental investments that derive from its capital. 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 right to approve that the investment conforms the eligibility criteria. Therefore, this is not relevant for the targeted measures at all. Therefore, it can be also stated that the programme is not common practice in Poland.

Outcome of Additionality analysis for JPoA level:

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 the planned SSC-JPA, the following alternatives have been identified:

Alternative 1. Status quo

Replacement of the installations for steam or hot water generation with fuel switch to natural gas/fuel oil or biomass as well as replacement of natural gas/oil/coal boilers without fuel switch are not required by law nor are there other obligations (e.g. result from the notice of approval of the installation). So the status quo constitutes a realistic alternative.

Alternative 2. Programme scenario: Fuel switch and efficiency increase activities, replacement or modernization of the installations, without JI

Another alternative is replacement of the installations for steam or hot water generation with fuel switch to natural gas/fuel oil or biomass as well as replacement of natural gas/oil/coal boilers without fuel switch without planned JI project.

Alternative 3. Conversion to other low emission fuels

A third alternative is replacement of the installation including conversion to other low emission fuels without planned JI project. For example, such case can be fuel switch to biomass for commercial and industrial installations with utilisation of contracting services.

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

- **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.

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. Besides, neither directs programmes/regulations limiting the future use of natural gas/biomass boilers, nor initiatives that are mandatory requiring the use of such technologies. Therefore, every future JPoA participant has the choice between different scenarios.

As Investment Analysis (Step 2) as well as **Barrier Analysis** (Step 3) is applicable for the programme at hand, **Barrier analysis (step 3**) is chosen to be applied.

Step 3: Barrier analysis

The paper "Guidelines for objective demonstration and assessment of barriers"[14] 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:**

The implementation of the project activities requires in general additional investment in comparison to the status quo scenario that includes the continued operation of the existing equipment.

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

As principle the highest investments are needed for biomass installations whereas the investment costs are decreasing to natural gas and oil boilers.

Fuel switch to biomass boilers

Currently fuel switching to biomass in Poland suffers from general high investment costs and unfavourable conditions for financing, as:

- high interest rates (e.g. actual conditions for small and medium enterprises: 3.5-3.8% plus WIBOR (Warsaw Interbank Offered Rate, actual rate from 08.12.2009 of WIBOR 3M 4,2%[15] and in total: 7,7%-8,00%) [16]
- short maturity times
- difficult access to credit lines for people with weaker incomes.

As stated in Energy Policy 34, L.J. Nilsson et al. (2006) nearly all investment in industrial and district heating applications using biomass have been made with investment subsidies. Nevertheless, these funds are either restricted to very large applications (National Fund for Environmental Protection and Water Management, NFEP) or they are provided only on a regional level and not throughout the country (ex: Voivodship Funds for Environmental Protection). The aim of the JI programme is to support the biomass installation in cases where no other subsidies are available.

Fuel switch to natural gas and fuel oil boilers

Investment costs for natural gas and fuel oil boilers are in general lower than investments in biomass installations. Nevertheless, investments in these technologies suffer from longer amortisation periods as the price structure of these fuels is very unfavourable in Poland and yearly savings from the efficiency increase are partly compensated by increased costs from gas and oil especially in comparison to coal.

As shown in Energy Policy 34, L.J. Nilsson et al., (2006) and in Jablonski 2008, coal is in general the cheapest fuel source, followed by different sources of biomass. In contrary the fuel costs of natural gas per GJ are 1.5 to 3 times higher than coal prices and prices for light fuel oil are even higher. The exemplary

[15] http://wibor.money.pl/

[16] To set the final interest rate of the loan for the final borrower banks usually use WIBOR 3M or WIBOR 6M, which is 4,29%. 3M means 3 months, 6M means 6 months – these factors show the cost of money borrowed on inter bank market for 3 or 6 months.

investment analysis as shown in table 5 demonstrates that due to the high fuel costs of natural gas the investment is not economically viable without any incentive.

Coal would be the most favourable fuel in Poland and any switch from coal to any other fuel would be additional. Such situation, however, might change over the crediting period. On the other hand as the investment period for the inclusion of JPAs will expire already end of 2012 and that major changes during this relatively short period cannot be expected.

Therefore, additional incentives are needed to make investment in new natural gas and fuel oil boilers more attractive.

Table 13: Exemplary investment analysis of the real case (see Annex 2)

Basic data		**new gas boiler**	**Old coal boiler**
Period of assessment	a	20	20
Interest rate	%/a	10.0%	
fuel costs	€/MWh	27.83[17]	12.01[18]
Technical data[19]			
Installed heating capacity of the boiler	MW	2	4.7
Utilisation ratio of the boiler	%	95%	65%
Annual heating generation	MWh/a	8,463	8,463
Required fuel	MWh/a	8,909	12,992
Investment			
Specific investment cost for gas boiler	€/kW	118	
Total Investment	€	552,819	

[17] Eurostat, industrial gas price 1st half 2009

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

[19] all technical data from additional agreement and from a credit application sheet in 2009

Costs			
Capital costs	€	64,934	0
Fuel costs	€/a	247,910	156,076
operational costs	€/a	4,958	15,608
Total year costs	**€/a**	**317,803**	**171,683**

JI Bonus (2009-2012)			
Emission reductions	tCO2/a	2,600	
ERU Price	€/ERU	15	
Total JI Bonus	€/a	39,007	

Heat generation costs			
Specific heat generation without JI	**€/MWh**	**37.55**	**20.29**
Specific heat generation with JI	**€/MWh**	**32.94**	

		Sensitivity Analysis											
		gas price + 10 %		gas price - 10 %		coal price + 10 %		coal price - 10 %		Investment + 10 %		Investment - 10 %	
Basic data		**new gas boiler**	**Old coal boiler**	**new gas boiler**	**Old coal boiler**	**new gas boiler**	**Old coal boiler**	**new gas boiler**	**Old coal boiler**	**new gas boiler**	**Old coal boiler**	**new gas boiler**	**Old coal boiler**
Period of assessment	a	20	20	20	20	20	20	20	20	20	20	20	20
Interest rate	%/a	10.0%		10.0%		10.0%		10.0%		10.0%		10.0%	
fuel costs	€/MWh	30.61	12.01	25.05	12.01	27.83	13.21	27.83	10.81	27.83	12.01	27.83	12.01
Investment													
Specific investment cost for gas boiler	€/kW	276		276		276		276		304		249	
Total Investment	€	552,819		552,819		552,819		552,819		608,101		497,537	
Costs													
Capital costs	€	64,934	0	64,934	0	64,934	0	64,934	0	78,570	0	52,597	0
Fuel costs	€/a	272,702	156,076	223,119	156,076	247,910	171,683	247,910	140,468	247,910	156,076	247,910	156,076
operational costs	€/a	4,958	15,608	4,958	15,608	4,958	15,608	4,958	15,608	4,958	15,608	4,958	15,608
Total year costs	**€/a**	**342,594**	**171,683**	**293,012**	**171,683**	**317,803**	**187,291**	**317,803**	**156,076**	**331,439**	**171,683**	**305,465**	**171,683**
Heat generation costs													
Specific heat generation without JI	**€/MWh**	**40.48**	**20.29**	**34.62**	**20.29**	**37.55**	**22.13**	**37.55**	**18.44**	**39.16**	**20.29**	**36.09**	**20.29**
Specific heat generation with JI	**€/MWh**	**35.87**		**30.01**		**32.94**		**32.94**		**34.55**		**31.48**	

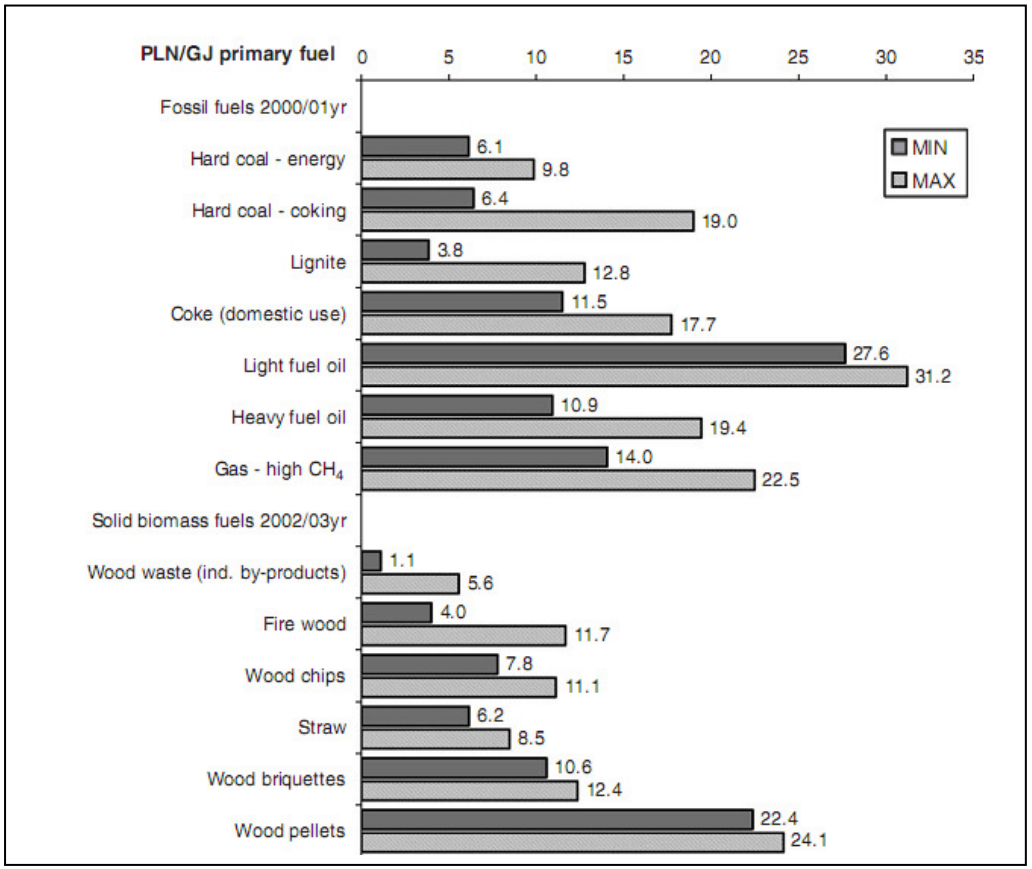


Figure 1: fuel price structure in Poland (source: Energy Policy 34)

Incentives to overcome the barrier:

In order to eliminate the barriers linked to the investment in new boiler technology, BOŚ bank aims to provide the following subsidies for participants in the JI programme considering the expected revenues of ERU sales:

- Lowered volume of own capital 15% instead of 30%
- 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;
- 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);

Outcome of sub-step 3a: In summary it can be stated, those investment barriers are one of the main barriers. To exclude possible participants which have enough capital and where those barriers are not relevant, the programme is implemented as loan incentive programme and not as a bonus payment programme: The conceptual design of the programme guarantees that companies which have enough capital (especially large companies) that might implement boiler modernization even without additional revenues have no incentive to join the programme.

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

From the perspective of JPoA participants (JPA level):

The first status quo alternative (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 fuel switch to natural gas/oil or biomass 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;

The other alternatives mentioned in Step 1 are affected by an equal or greater degree by the mentioned barriers.

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:

- **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.[20] 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.

- **Fuel switch to natural gas/or oil or replacement of natural gas/ oil/or coal installations without fuel switch**

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

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%. [21]

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

- **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.

- **Fuel switch to natural gas/or oil or replacement of natural gas/ oil/or coal 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.

Outcome of Step 4: In summary it can be stated that the considered technologies for new boilers 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 the.

Outcome of Additionality analysis for typical JPA:

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 JPA project.

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

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: 05

The date of completion: 08/06/2011

Table 14: 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:

Taking into account the 2 main types of JPA the following monitoring is chosen:

A.4.5.2.1. For all project activities with fuel switch to biomass (JPA-biomass-X)

Where methodology is applicable the following methodology description are applicable. Paragraphs 30 to 35 of *"Type AMS. I. C. Thermal energy for the user:*(Version 18) of Appendix B of the "*Simplified M&P for Small-Scale CDM Project Activities"* describe the monitoring requirements for biomass projects. According to paragraphs 30 and 31, fossil fuel and biomass input must be monitored for each type separately. In the JPoA at hand the biomass input will not be monitored as project emissions will be zero and this parameter is not necessary for emissions calculation. For baseline calculations, the actual heat demand will be monitored in this case. For this monitoring plan, no specific energy consumption is calculated as demanded in paragraph 32, because this parameter is not needed for emissions calculation. Paragraphs 33 and 34 do not apply to the described programme activities, as co-production is not considered. The in paragraph 35 stated requirements for emission factors and net calorific values are complied with, as reliable national data will be used (please see Annex3).

Monitoring requirements for project activities under a programme of activities are also described on page 13 under *"Project activity under a programme of activities"*, subhead (c) of *"Type AMS. I. C. Thermal energy for the user:*(Version 18) of Appendix B of the "*Simplified M&P for Small-Scale CDM Project Activities".* As in the described programme activities the replacement of equipment is considered, disposing of replaced equipment will be assured by applying the participation criteria. The proof has to be available with verification. Therefore, this parameter does not need to be monitored as described in the methodology (see participation criteria under Section A4.3)

For biomass activities, strict application of biomass requirements is assured by applying the participation criteria, described under (see participation criteria under Section A 4.3)

Proof in forms of invoices, contracts, internal documents (where the correct term with reference of the applied norm is given) of quality requirements shall be verified annually by sampling during verification. This is insured by Participant agreement.

A.4.5.2.2. For all project activities with and without fuel switch to natural gas/oil/or coal (JPA-gas-X, JPA-oil-X and JPA-modernization-X)

As described in Section E.1.2., there are several relevant methodologies for the programme activities fuel switch to natural gas or oil. However, they are not applicable for the monitoring plan of the programme activities, as all of them require monitoring of the energy use of the old installation (historic energy demand). In this JPoA, the monitoring will be similar to the biomass case in section A.4.5.2.1.: the actual emission reductions will be verified ex-post, based on the data collected during the monitoring. Therefore, the fuel consumption will be monitored and for baseline calculations, the actual heat demand will be monitored in this case. Some of the essential parameters that will be monitored are: name of participant, type of old and new installation, type of fuel of old and new installation, commissioning date of boilers, utilisation ratios, annual fuel consumption, annual heat production etc.

For more specific details regarding monitoring and monitoring plan please see Section A.4.5.2 as well as Annex 4.

In order to guarantee the data and quality reliability, it is further determined, that within the scope of the verification process by an independent body, random checks of the emission reductions of 10% of the programme participants will be accomplished on-site. If the number of participants is below ten, at least one site per year will be accomplished on site.

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 of the participant	Ex-ante survey of individual participant in additional	-	r	Once, at registration	100%	Electronic: Database	

		agreement						
2	Type of new installation (as listed in **ANNEX 5**)	Ex-ante survey of individual participant in additional agreement	-	r	Once, at registration	100%	Electronic: Database	
3	Fuel source, new installation (as listed in **ANNEX 5**)	Ex-ante survey of individual participant in additional agreement	-	r	Once, at registration	100%	Electronic: Database	
4	Commissioning date of the new installation (as listed in **ANNEX 5**)	Ex-ante survey of individual participant in additional agreement	-	r	Once at registration	100%	Electronic: Database	
5	Indication whether back up (old) boilers are installed	Ex-ante survey of individual participant in additional agreement	"Yes/No"	r	Once, at registration	100%	Electronic: Database	
6	Fuel source back up boiler (as listed in **ANNEX 5**)	Ex-ante survey of individual participant in additional agreement	-	3	Once, at registration	for participants with back up boiler	Electronic: Database	
7	$EF_{CO2,fuel\ j,\ particIpant\ i}$, specif. emission factor for the used fuel	Standard value, see **ANNEX 3**	tCO_2/GJ	c	Automatically stored in database	100%	Electronic: Database	

8	$FC_{PJ,fuel\ j,participant\ i}$,annual fuel consumption relating to each fossil fuel source of the installation	JPoA participant measurement	GJ (based on net calorific value)	m	Annually	100%	Electronic: Database	

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):

The project emissions are calculated based on **actual annual fuel consumption**. Therefore, the project emissions can be calculated directly:

$$PE_y = \sum_{i=1}^{n}\sum_{j=1}^{m} EF_{CO_2,fuel\ j,participant\ i} \cdot FC_{PJ,fuel\ j,participant\ i}$$

where m:= total number of fossil fuel sources per participant in the project scenario

n:= total number of participants

However, in cases where **fuel switch to biomass** is implemented the **project emissions are considered to be zero**.

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
9	Commissioning date of the old boiler (if not available: year of construction) (as listed in **ANNEX 5**)	Ex-ante survey of individual participant in additional agreement	Date (DD/MM/YYYY)	r	Once at registration	100%	Electronic: Database	
10	Installed capacity of the old system (as listed in **ANNEX 5**)	Ex-ante survey of individual participant in additional agreement	kW	r	Once at registration	100%	Electronic: Database	
11	Installed capacity of the new system (as listed in **ANNEX 5**)	Ex-ante survey of individual participant in additional agreement	kW	r	Once at registration	100%	Electronic: Database	
12	Old system type (as listed in **ANNEX 5**)	Ex-ante survey of individual participant in additional agreement	-	r	Once at registration	100%	Electronic: Database	

13	Used fuel in old installation (as listed in **ANNEX 5**)	Ex-ante survey of individual participant in additional agreement	-	r	Once at registration	100%	Electronic: Database	
14	Type of new installation (as listed in **ANNEX 5**)	Ex-ante survey of individual participant in additional agreement	-	r	Once at registration	100%	Electronic: Database	
15	Installation is operational (operation permit available)	Ex-ante survey of individual participant in additional agreement	"Yes/No"	r	Once at registration	100%	Electronic: Database	
16	Use of any public subsidies for the implementation of the measure	Ex-ante survey of individual participant in additional agreement	"Yes/No"	r	Once at registration	100%	Electronic: Database	
17	η_{BL}, Standard-annual utilisation ratio for old system	Fixed value, ex ante definition; **ANNEX 3**	%	c	Fixed value, ex ante definition; Automatically given in database	100%	Electronic: Database	
18	η_{PJ}, Standard-annual utilisation ratio for new system	Fixed value, ex ante definition; **ANNEX 3**	%	c	Fixed value, ex ante definition; Automatically given in database	only for Var. 1a	Electronic: Database	

19	$EF_{CO2,\ fuelold,\ participanti}$ Specific emission factor for the previous used fuel	Fixed value, ex ante definition; **ANNEX 3**	tCO_2/ GJ	c	Automatically given in database	100%	Electronic: Database	
20	$FC_{PJ,fuel\ j,participant\ i}$,annual fuel consumption of the new installation	JPoA participant measurement	GJ (based on net calorific value)	m	Annually	only for Var. 1a	Electronic: Database	
21	$HG_{PJ,participant\ I}$, annual heat production of the new installation	JPoA participant measurement	GJ	m	Annually	only for Var. 1b	Electronic: Database	

Most data that are relevant for the calculation of the baseline emissions are queried in a Supplementary agreement for each JPoA participant. These data will be collected in a central Excel-database. All standardized values can be found in this database too.

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

For the explanation of the abbreviations and sources see Annex.

Var. 1a: The baseline emissions are calculated based on **actual annual fuel consumption**. Without the JI project the following CO_2 emissions would occur over the considered period:

$$BE_{Var1a,y} = \sum_{i=1}^{n} \frac{\eta_{PJ,participant\ i}}{\eta_{\mathrm{BLparticipant\ i}}} \cdot EF_{CO_2,fuel\ BL,participant\ i} \cdot FC_{PJ,fuelj,participant\ i}$$

where m:= total number of fuel sources per participant in the project scenario

n:= total number of participants

Var. 1b: The baseline emissions are calculated based **on actual heat generation**.

$$BE_{Var1b,y} = \sum_{i=1}^{n} \frac{EF_{CO_2,fuel\ BL,participant\ i}}{\eta_{\mathrm{BLparticipant\ i}}} \cdot HG_{PJ,participanti}$$

where n:= total number of participants

If the total capacity of the new installed installation is higher than the capacity of the old installation to satisfy increased heating demand, only part of the heat generation can be related to the baseline emissions of the old boiler. In that case the calculation will be corrected by the following factor:

Var. 1a: $FC_{PJ,corrected} = \sum_{j=1}^{m} FC_{PJ,fuel\ j,participant\ i} \cdot \frac{installed capacity old installation}{installed capacity new installation}$

Var. 1b: $HG_{corrected} = HG_{participanti} \cdot \frac{installed capacity old installation}{installed capacity new installation}$

The correction factor is calculated based on the ratio of the installed capacity data of the replaced and the new boiler. The product of this ratio and the total fuel consumption (or heat generation in case of monitoring of the heat generation) reflects the energy amounts that are attributable to the replaced boiler. This means that e.g. in case of doubling the boiler capacity, only half of the emission reduction will be considered following a conservative approach.

In some cases the total capacity of installations might increase as the old boilers remain in operation as back-up boilers. The correction factor shall not be applied for these installations and therefore it will be monitored whether increased capacities are related to back-up applications.

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

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

There are no data to be collected in order to direct monitor emission reductions from the programme, because emission reductions will be calculate by means of formulae presented in paragraph E.4.1.

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):

Left blank on purpose as it does not apply in the JPoA at hand.

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 *ACM 009 "Consolidated baseline methodology for fuel switching from coal or petroleum fuel to natural gas"* (Version 03, 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.

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.

Calculations by the "*Global Emission Model for Integrated Systems (GEMIS*)" from the German "*Öko-Institut*" are listed in the following table 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, leakage emissions are negligible in the case of biomass boilers.

Table 15: CO_2e-emissions per MWh calculated by GEMIS, ver.4.4 including emissions in the production chains and transport emissions

	Wood chips[22] [kg CO_2e/MWh]	Wood pellets[23] [kg CO_2e/MWh]	Light fuel oil[24] [kg CO_2e/MWh]	Natural gas[25] [kg CO_2e/MWh]

[22] GEMIS process " Hacker-gross\Holz-HS-Wald-CON-2010"
[23] GEMIS process " Fabrik\Holz-Pellets-CON-2010"
[24] GEMIS process " Raffinerie\Öl-leicht-PL-2010"
[25] GEMIS process " Pipeline\Gas-PL-2010-lokal"

100km	3.86	16.38		
150km	5.42	17.95		
200km	6.99	19.52		
500km	16.41	28.93	69.01	72.90

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.

> "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.

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

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):

Leakage emissions are not to be considered.

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):

Annual emissions savings in tonnes of CO_2 are equal to the difference between the baseline and the project emissions under consideration of leakage emissions:

$$ER_y = BE_y - PE_y - LE_y$$

$$ER_y = \sum_{i=1}^{n} \frac{EF_{CO_2,\,fuel\,BL,\,participant\,i}}{\eta_{\mathrm{BLparticipant\,i}}} \cdot HG_{participanti} - \sum_{i=1}^{n}\sum_{j=1}^{m} EF_{CO_2,\,fuel\,j,\,participant\,i} \cdot FC_{fuel\,j,\,participant\,i}$$

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:

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.: 1-6	Low	Data given in the Supplementary agreement will be annually verified. If the data is not available, conservative default values will be used. For detailed information see **ANNEX 3**
E.4.1.1.: 7	Low	QA/QC not necessary, as standard factors are used.
E.4.1.1.: 8-9	Medium	JPoA participant measurement. Receipts from the supplier (also using for financial issues, e.g. taxes and tax refunds) need to be attached for the annual verification. All fuel consumptions will be reported within a database.
E.4.1.3.: 10-17	Low	Data given in the Supplementary agreement will be annually verified. If the data is not available, conservative default values will be used. For detailed information see **ANNEX 3**
E.4.1.3.: 18-20	Low	QA/QC not necessary, as standard factors are used.
E.4.1.3.: 21-22	Low	JPoA participant measurement.

Reliability of the data collected

Furthermore, requirements, which result from the notice of approval of the installation, will be assessed to clarify if there is a requirement for replacement the old installation or if there are requirements, which are in conflict with the implemented JI programme of activities. This is to secure legal compliance of the implemented programme of activities. Therefore, the JPoA participants allow the responsible staff of BOŚ Bank to look at the notice of approval of the installation and in relevant measuring reports.

If any data in the Supplementary agreement is missing, realistic default values will be used for measures, which in case of doubt is a conservative option resulting in lower emission reductions. Further information is given in Annex 3.

For measurement of fuel consumption or heat production meters are used who conform to relevant requirements. Only measured fuel consumption or heat production is applicable for calculating emission reductions. If installed meter should out of order, meanwhile exist fuel consumption or heat production is not applicable. In such case calculations shall be done conservative with default utilisation rate and fuel consumption.

In case of using different fuel sources, e.g. by operating a multiburner for biogenic and fossil fuel, the following procedure has to be taken into account. For calculation of project emissions only the different fossil fuel sources have to be considered. A consideration of biogenic fuel sources, which are applicable in the context of the programme, is not required, because of the emission factor 0 t CO_2/ GJ.

For calculation of baseline emissions total fuel consumption or heat production has to be considered times the emission factor of the previous used fuel. Therefore, only the emission factor of the previous used fuel source has to be considered. In case of different fuel sources in the baseline it is stated, that an accurate allocation of the fuel consumption or heat production to the different fuel sources is possible. Instead of this approach, the lowest emissions factor of the fuel sources can be applied as a conservative approach.

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

Name of entity setting the monitoring plan: FutureCamp Climate GmbH

FutureCamp Climate is not a project participant.

Version: 05

The date of completion: 08/06/2011

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*
01	JPA-gas-1	Fuel switch to natural gas	Boiler replacement with fuel switch from coal to natural gas in a bakery	See details in supplementary agreement	See details in supplementary agreement	Poland	30/09/2010 (expected)	10 years	2,600t/yr	See details in supplementary agreement	See details in supplementary agreement

APPENDIX A TO ANNEX 2

The measures foreseen for the exemplary JPA include boiler replacement with fuel switch from coal dust to natural gas. The old installation consists of 5 boilers in total with capacity of 4,720 kW and commissioning date 1984: 2 water boilers WCO 80 (one continuous operation, one back up) and 3 steam boilers PCO 60 (two continuous operation, one back up). The fuel demand for all boilers is 1,909 tons per year. The average calorific value of the coal used is about 24,500 kJ/kg with sulphur content of 0.41 %. While the new gas installation consist only of 4 units with total capacity of 2,000 kW and fuel demand about 890,000 m^3/a. The expected commissioning date is 30/09/2010. Summary of the basic technical information regarding the exemplary JPA is provided in the table below.

Table 16: Summary of the basic technical information of exemplary JPA

	Old installation	New installation
Fuel type	Coal dust	Natural gas
Boiler type	2 water boilers WCO 80 (one continuous operation, one back up) 3 steam boilers PCO 60 (two continuous operation, one back up)	Viessmann Vitoplex 300, 2 units Viesmann Vitoplex 100 LS, 2 units
Installed capacity	4,720kW	2,000kW
Commissioning date	1984	Expected 2010
Fuel demand	1,909 t/a	890,867m³/a

Based on the described technical information 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 have been done.

$$BE = 1{,}909 t/a \cdot 24.5 GJ/t \cdot 0.094 tCO_2/GJ = 4{,}396 tCO_2/a$$

$$PE = 890{,}867 m^3/a \cdot 0.036 GJ/Nm^3 \cdot 0.056 tCO_2/GJ = 1{,}796 tCO_2/a$$

$$ER = BE - PE = 4{,}396 - 1{,}796 = 2{,}600 tCO_2/a$$

Table 17: Emission reduction of the exemplary JPA in t CO_2 eq (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)
2010	449	None	1,099	650
2011	1,796	None	4,396	2,600

2012	1,796	None	4,396	2,600
Sum for the crediting period 2010-1012	**4,041**	**None**	**9,892**	**5,851**

Table 18: Emission reduction of the exemplary JPA in t CO_2 eq (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	1,796	None	4,396	2,600
2014	1,796	None	4,396	2,600
2015	1,796	None	4,396	2,600
2016	1,796	None	4,396	2,600
2017	1,796	None	4,396	2,600
2018	1,796	None	4,396	2,600
2019	1,796	None	4,396	2,600
2020	1,347	None	3,297	1,950
Sum for the period 2013-2020	**13,919**	**None**	**34,072**	**20,153**

Table 19: Overview of emission reduction of the exemplary JPA in t CO_2 eq 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)
2010	449	None	1,099	650
2011	1,796	None	4,396	2,600
2012	1,796	None	4,396	2,600
Sum for the crediting period 2010-1012	4,041	None	9,892	5,851
2013	1,796	None	4,396	2,600

2014	1,796	None	4,396	2,600
2015	1,796	None	4,396	2,600
2016	1,796	None	4,396	2,600
2017	1,796	None	4,396	2,600
2018	1,796	None	4,396	2,600
2019	1,796	None	4,396	2,600
2020	1,347	None	3,297	1,950
Sum for the period 2013-2020	**13,919**	**None**	**34,072**	**20,153**
Sum 2010-2020				**26,004**

Annex 3

BASELINE INFORMATION

Additional Baseline Information

Emissions factors:

For the fuels such as natural gas, light fuel oil, heavy 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)**
Residual fuel oil:	**0.0774 t CO_2/ GJ (IPCC)**
Coal Poland:	**0.094 t CO_2/ GJ (***Bundesumweltministerium 2007: „Zuteilungsverordnung 2012“, Anhang 1)*
Liquid gas:	**0.063 t CO_2/ GJ (IPCC)**
Biomass:	**0 t CO_2/ GJ**

Other fuels:

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

Determining the annual utilisation ratio:

Each participant may use standardised annual utilisation ratios as listed below or he must use individual values if appropriate data are available.

In case of individual values data of fuel consumption and heat generation of the last 3 years will be accounted for the calculation of the utilisation ratio:

$$\eta_{BL,participanti} = \frac{HG_{last\,3\,years}}{FC_{last\,3\,years}}$$

Hot water boilers

The standard annual utilisation ratio for hot water boilers are given in the table below:

Table 20*:* Common annual utilization ratios for oil/coal and gas operation (Table5 of the ordinance of 6 October 2008 of the Polish the Infrastructure on energy profile calculation methodology of building and living space or part of the building that presents a separate technical and operational unit and on method of energy audit preparation and on form of energy profile certificates Minister (OJ 201 item 1240).)

Rodzaj źródła ciepła Type of heat source	Annual utilization ratio η	Used values for monitoring
Kotły węglowe wyprodukowane po 2000 r. Coal boilers year built from 2000	0.82	
Kotły węglowe wyprodukowane w latach 1980-2000 Coal boilers year built from 1980 to 2000	0.65–0.75	0.7
Kotły węglowe wyprodukowane przed 1980 r. Coal boilers year built before 1980	0.50–0.65	0.57
Kotły na biomasę (słoma) wrzutowe z obsługą ręczną o mocy do 100 kW Biomass boilers (straw)manual maintenance; output < 100 kW	0.63	
Kotły na biomasę (drewno: polana, brykiety, palety, zrębki) wrzutowe z obsługą ręczną o mocy do 100 kW Biomass boilers (wood: logs, briquettes, pellets, silvers) manual maintenance; output < 100 kW	0.72	
Kotły na biomasę (słoma) wrzutowe z obsługą ręczną o mocy powyżej 100 kW Biomass boilers (straw) manual maintenance; output > 100 kW	0.70	
Kotły na biomasę (słoma) automatyczne o mocy powyżej 100 kW do 600 kW Biomass boilers (straw) automatic; output 100 - 600 kW	0.75	
Kotły na biomasę (drewno: polana, brykiety, palety, zrębki) automatyczne o mocy powyżej 100 kW do 600 kW Biomass boilers (wood: logs, briquettes, pellets, silvers) automatic; output 100 - 600 kW	0.85	
Kotły na biomasę (słoma, drewno) automatyczne z mechanicznym podawaniem paliwa o mocy powyżej 500 kW Biomass boilers (straw, wood) automated with mechanical fuel supply >500 kW	0.85	
Podgrzewacze elektryczne – przepływowe Electric flow heaters	0.94	
Podgrzewacze elektrotermiczne Electro-thermal heaters	1.00	
Elektryczne grzejniki bezpośrednie: konwektorowe, płaszczyznowe, promiennikowe i podłogowe kablowe Direct electric radiators: convecting, surface (plate), radiant and cable floor	0.99	
Ogrzewanie podłogowe elektryczno-wodne	0.95	

Floor heating (electrical – water)		
Piece kaflowe Tile stoves	0.60-0.70	0.65
Piece olejowe pomieszczeniowe Indor Oil stoves	0.84	
Piece gazowe pomieszczeniowe Indor gas stoves	0.75	
Kotły na paliwo gazowe lub płynne z otwartą komorą spalania (palnikami atmosferycznymi) i dwustawną regulacją procesu spalania Gas or liquid Boilers with open burning chamber (atmospheric burners) and two modes of burning process regulation	0.86	
Kotły niskotemperaturowe na paliwo gazowe lub płynne z zamkniętą komorą spalania i palnikiem modulowanym Low temperature gas or liquid boilers with closed burning chamber and modulated burner.		
- do 50 kW; up to 50kW	0.87-0.91	0.89
- 50-120 kW	0.91-0.97	0.94
- 120-1.200 kW	0.94-0.98	0.96
Kotły gazowe kondensacyjne[1)] Condensing gas boilers		
- do 50 kW (70/55°C); up to 50kW	0.91-0.97	0.94
- do 50 kW (55/45°C); up to 50kW	0.94-1.00	0.97
- 50-120 kW (70/55°C)	0.91-0.98	0.945
- 50-120 kW (55/45°C)	0.95-1.01	0.98
- 120-1.200 kW (70/55°C)	0.92-0.99	0.955
- 120-1.200 kW (55/45°C)	0.96-1.02	0.99
Pompy ciepła woda/woda w nowych/istniejących budynkach Heat pumps water/water in new/existing buildings	3.8/3.5[2)]	3.65
Pompy ciepła glikol/woda w nowych/istniejących budynkach Heat pumps glycol/water in new/existing buildings	3.5/3.3	3.4
Pompy ciepła powietrze/woda w nowych/istniejących budynkach Heat pumps air/water in new/existing buildings	2.7/2.5	2.6
Węzeł cieplny kompaktowy z obudową Compact heat distribution assembly with cover		
- do 100 kW; up to 100kW	0.98	

- powyżej 100 kW; over 100kW	0.99	
Węzeł cieplny kompaktowy bez obudowy Compact heat distribution assembly no cover		
- do 100 kW; up to 100kW	0.91	
- 100-300 kW	0.93	
- powyżej 300 kW; over 300kW	0.95	

Calculation of fuel consumption (FC) and heat generation (HG) if the measured unit is not GJ, can be done following the described formulas below:

- **If used fuel is gas and is measured in unit m³:**

$$FC_{fuel\ j, participant\ i} = FC_{gas, participant\ i} \cdot NCV_{gas}$$

with: NCV = Net Calorific Value

- If used **fuel is gas and is measured in unit MWh_{GCV}** (gas supplier calculate the gas consumption of their customer relative to gross calorific value):

$$FC_{fuel\ j, participant\ i} = FC_{gas, participantsi} \cdot \frac{NCV_{gas}}{GCV_{gas}} \cdot 3.6 \frac{GJ}{MWh}$$

with: GCV= Gross Calorific Value

- **If used fuel is oil and is measured in unit l:**

$$FC_{fuel\ j, participant\ i} = FC_{oil, participant\ i} \cdot p_{oil} \cdot NCV_{oil}$$

with: p_{oil} = density of oil

- **If heat is measured in unit MWh:**

$$HG_{participant\ i} = HG_{participant\ i} \cdot 3.6 \frac{GJ}{MWh}$$

The following **Net calorific value (NCV)** can be applied above:

If individual data are not available the following net calorific values should be used:

Natural gas (H): **33.6 GJ/1000 Nm³** (IPCC)

Light fuel oil: **43.0 GJ/t (IPCC)**

Resdiual fuel oil: **40.4GJ/t (IPCC)**

Coal: **27.5 GJ/t** *"Bundesumweltministerium 2007: Zuteilungsverordnung 2012, Anhang I"*

Other fuels:

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

Density

The following density value should be used for oil: **0.860 kg/l**

Source: *DIN 51603*

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 technology possibilities - 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 CO_2 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***
- 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 are conducted. After this final check, the applicant signs the Statement of End User (SoEU). For further information please see further below.

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 21: 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

Verify, if the data are complete:

Heating systems, for which complete data sets are not available, are verified individually and – if possible – corrected to allow a conservative calculation of the emission reductions, taking into account the default options (see below). If a correction is not possible, those heating systems are not included in the programme for the relevant reporting year.

Calculating the success of the programme:

According to the specified procedure stated in the programme documentation and using the Excel spread sheet, the generated emission reductions are calculated automatically for all converting customers included in the programme, who convert the systems or introduce the new installations. In order to do so, the necessary documentation such as invoices and/or data from the JPAs, the regional suppliers and municipal utilities is to be sent once a year to the local branch of BOŚ Bank. The data from the documentation shall be put into Excel reporting tool and stored in central back office of BOŚ Bank. These emission reductions will be then included in the final overall calculations conducted by BOŚ Bank for the monitoring report.

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.

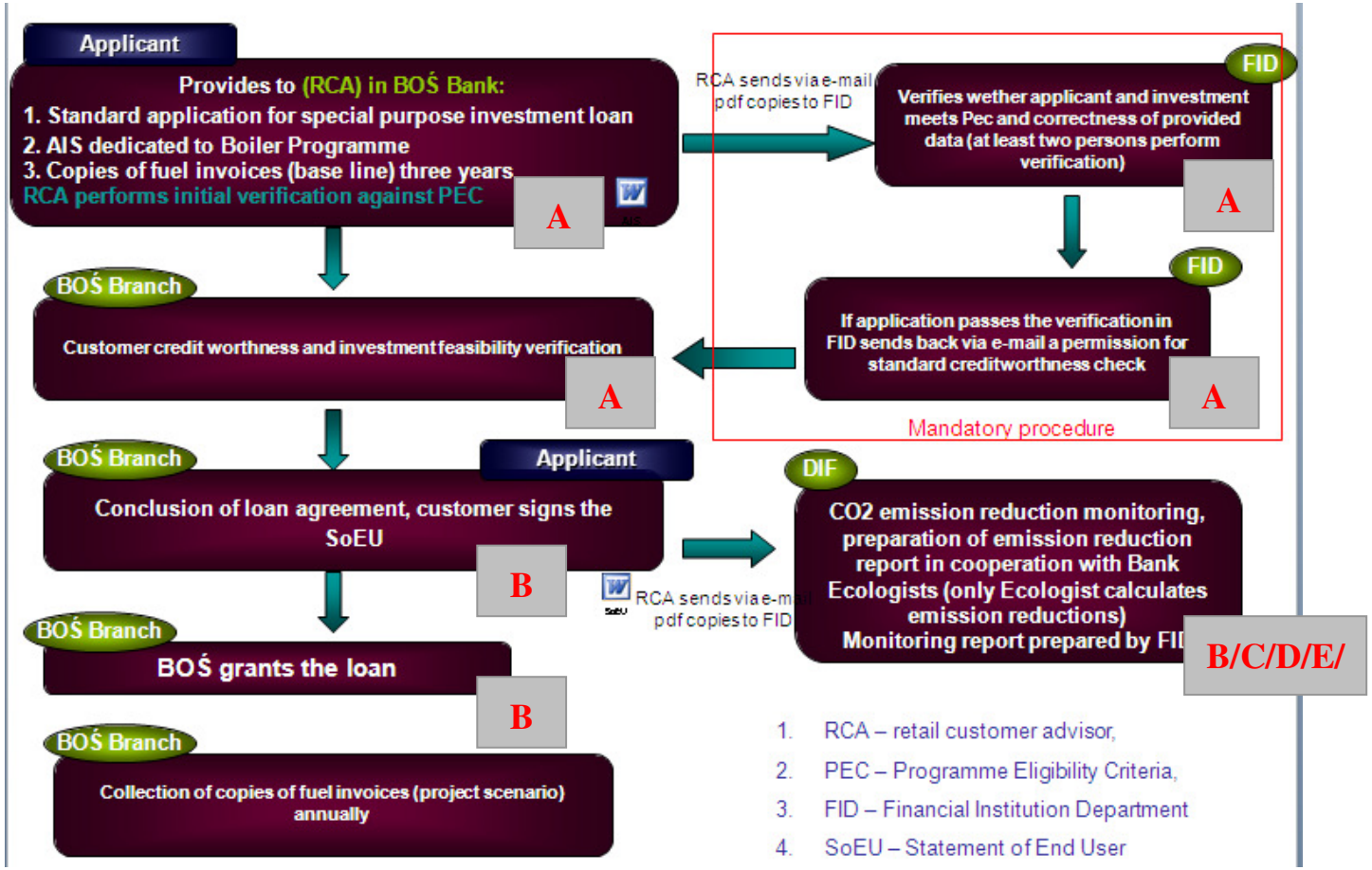
Monitoring quality:

High quality of monitoring is assured with use of internal monitoring and reporting process between BOŚ and KfW and internal training courses. An excel table of the report is attached. BOŚ is obliged under ERDA to provide KfW with the report every three months.

Internal training courses
13 introductory training courses dedicated for employees in Corporate Centers corporate client advisors 113 persons already trained
4 introductory training courses dedicated for retail client advisors
Training course for BOŚ representatives performed by DET NORSKE VERITAS POLAND - risk management under JI projects
Detailed training course on CO_2 reduction calculation methodology dedicated for ecologists
Development of e-learning module dedicated for corporate client advisors

Permanent improvement of the monitoring and the excel sheets during the whole crediting period is as well to be controlled by the responsible department FID and the BOS Bank Ecologists.

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


Applicant
Provides to (RCA) in BOŚ Bank:
1. Standard application for special purpose investment loan
2. AIS dedicated to Boiler Programme
3. Copies of fuel invoices (base line) three years
RCA performs initial verification against PEC
A
RCA sends via e-mail pdf copies to FID
FID
Verifies wether applicant and investment meets Pec and correctness of provided data (at least two persons perform verification)
A
FID
If application passes the verification in FID sends back via e-mail a permission for standard creditworthness check
A
Mandatory procedure
BOŚ Branch
Customer credit worthness and investment feasibility verification
A
BOŚ Branch
Applicant
Conclusion of loan agreement, customer signs the SoEU
B
RCA sends via e-mail pdf copies to FID
DIF
CO2 emission reduction monitoring, preparation of emission reduction report in cooperation with Bank Ecologists (only Ecologist calculates emission reductions)
Monitoring report prepared by FI
B/C/D/E/
BOŚ Branch
BOŚ grants the loan
B
BOŚ Branch
Collection of copies of fuel invoices (project scenario) annually
1. RCA – retail customer advisor,
2. PEC – Programme Eligibility Criteria,
3. FID – Financial Institution Department
4. SoEU – Statement of End User

Annex 5

Part I: Declaration to the Contract

Information on the participant

Organisation: _____PSS Spolem_____

Street: ____Witosa 66_____

Postcode & Town: ___Kielce_____

Represented by:

First name, surname: _____

Position: _____

Fax: _____

Tel: _____

E-mail: _____

Information on the old installation

In case of different boilers and/or different fuel sources in the baseline, information of each boiler and/or fuel source has to be submitted.

1. Location of the installation (if other address than within participant information above)

_____ (Identification)

_____ (Street)

_____ (Postcode & Town)

2. Fuel

(If coal, please also give the coal type)

☐ Hard coal, _____

☐ **X Lignite,** _____

☐ natural gas ☐ fuel oil, heavy ☐ fuel oil, light ☐ liquid gas ☐ other_____

3. Boiler type:

☐ **X Hot water boiler: 2 boilers**

☐ **X standard boiler**

- **1** one continuous operation
- **1** and one back up boiler

☐ low temperature boiler

☐ condensing boiler

☐ **X Steam generator: 3 boilers**

- **2** continuous operation boilers
- **1** back up boiler

4. Commissioning date **__1984_____(year)**

5. Installed capacity of the boiler **_4,720__ kW**

6. Authorisation status:

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

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

☐ No ☐ **X Yes**

Does the installation have to be replaced or modernised until 2012 according to requirements, which result from this technical inspection?

☐ **X No** ☐ Yes

Information on the new installation

7. Boiler type:

Hot water boiler: 2 boilers

☐ low temperature boiler ☐ condensing boiler ☐ only burner replacement

Steam generator: 2 boilers

☐ Large water tank boiler ☐ Rapid steam generator ☐ Thermo-oil heater
☐ Other_____

What additional measures are there in the steam system to increase efficiency?

☐ Economiser ☐ continuous burner control
☐ O2-setting ☐ others_____

Installation of a Back-up boiler? ☐ no ☐ Yes, What type of fuel?_____

8. Installed capacity of the boiler **_2,000_ kW**
9. Is the system subject to European emissions trading?

☐ **X no** ☐ yes

10. Commissioning date _____**mid 2010**_____(DD/MM/YYYY)

11. Usage of any public or other funding:

☐ **X No** ☐ Yes, please specify: _____

Part II: Supplementary Agreement to the Credit Contract

As a participant in this programme, I agree:

- to report the data of the installation to BOŚ Bank each year.
- to report information regarding legal requirements or requirements which result from the notice of approval of the installation which are in conflict with the implemented JI programme of activities 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 **or**
- to use the replaced boiler as backup boiler of the biomass boiler and report all emissions as described under section E 1.1
- that the used biomass is from local suppliers.
- 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 under legal and technical aspects is ensured (The installation is still in operation until the date of the replacement);
- I am not registered as a participant in another single Joint Implementation Project;

Data given in the participant agreements will be annually verified at a sample of 10% of the participants or minimum one participant.

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 measure to be implemented within the relevant JPA does not constitute an EU Obligated Installation or part of an EU Obligated Installation, and such JPA and/or the measure to be implemented has neither any direct or indirect effect on an EU Obligated Installation nor directly or indirectly reduces or limits (or will do the same in the future) the emissions of an EU Obligated Installation. • 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 than the whole crediting period. This supplementary agreement will expire automatically in case of cancellation of the contract with the BOŚ bank.

_____ _____

Signature of the JPoA participant Date

Annex 6

Emission reductions

It is conservatively assumed that about 60 heat and steam boilers shall participate in the JPoA Project over the entire crediting period 2010-2012 whereas a replacement of an intensive CO_2 fuel with a less intensive one will take place.

The reduction is estimated on the assumption that in the years 2010 and 2011 the following number of new participants shall join the programme:

2010:

- 10 boilers with a capacity of 1.5 MW for a conversion from coal-to-natural gas (estimated emission reduction: 850t per boiler)
- 10 boilers with a capacity of 6.4 MW for a conversion from coal-to-natural gas (estimated emission reduction: 2,163t per boiler)
- 10 boilers with a capacity of 1.1 MW for a conversion from coal-to-biomass (estimated emission reduction: 1,240t per boiler)

2011:

- 15 boilers with a capacity of 1.5 MW for a conversion from coal-to-natural gas (estimated emission reduction: 850t per boiler)
- 15 boilers with a capacity of 6.4 MW for a conversion from coal-to-natural gas (estimated emission reduction: 2,163t per boiler)

This makes in total 60 customers:[26]

Table 22: Emissions reductions t CO_2 per Year

	Participants number	tCO_2 Reductions 2010	tCO_2 Reductions 2011	tCO_2 Reductions 2012 and following years
New Participants 2010	30	21,264	42,528	42,528
New Participants 2011	30		22,596	45,192
New Participants 2012	0	0	0	0
$C0_2$ Reduction per Year	0	21,264	65,124	87,720

[26] Having in mind the average number of participants in other similar projects on the territory of Germany and concerning the territory of Poland, we have assumed that 60 participants for the period 2010-2012 is realistic and even conservative.

Table 23: Emission reduction units for the period 2010-2012

Year	New boilers	Boilers cum	ERUs
2010	30	30	21,264
2011	30	60	65,124
2012	0	60	87,720
Sum for the crediting period 2010-1012			**174,108**

Table 24: ERUs for the period 2013-2020

Year	New boilers	Boilers cum	ERUs
2013	0	60	87,720
2014	0	60	87,720
2015	0	60	87,720
2016	0	60	87,720
2017	0	60	87,720
2018	0	60	87,720
2019	0	60	87,720
2020	0	60	87,720
Sum for the period 2013-2020			**701,760**

Table 25: Summary of ERUs for the whole crediting period (2010-2020)

Year	New boilers	Boilers cum	ERUs
2010	30	30	21,264
2011	30	60	65,124
2012	0	60	87,720
Sum for the crediting period 2010-1012			**174,108**
2013	0	60	87,720
2014	0	60	87,720
2015	0	60	87,720
2016	0	60	87,720
2017	0	60	87,720

2018	0	60	87,720
2019	0	60	87,720
2020	0	60	87,720
Sum for the period 2013-2020			**701,760**