CLEAN DEVELOPMENT MECHANISM
SMALL-SCALE PROGRAMME OF ACTIVITIES DESIGN DOCUMENT FORM
(VOLUNTARY-SSC-PoA-DD) Version 01

CONTENTS

Annexes

NOTE:

(i) This form is for the submission of a GS PoA whose VPAs apply a small scale approved methodology.

(ii) At the time of requesting registration this form must be accompanied by a SSC-VPA-DD form that has been specified for the proposed PoA, as well as by one completed SSC-VPA-DD (using a real case).

SECTION A. General description of small-scale programme of activities (PoA)

A.1 Title of the small-scale programme of activities (PoA):

Indonesia Domestic Biogas Programme of Activities (IDBP) (ID 1172)

21 October 2013. Version 6.0

A.2. Description of the small-scale programme of activities (PoA):

1. General operating and implementing framework of PoA

Almost half of the global population still depends on combusting solid fuels on open fires to meet basic cooking and heating needs[1]. Indoor air pollution caused by the combustion of these fuels for cooking is one of the ten major threats to health globally, causing almost two million deaths annually[2]. Similar to many other developing countries, Indonesia still faces high rates of firewood and charcoal usage for cooking purposes[3]. This unsustainable burning of biomass contributes to significant greenhouse gas emissions (GHG) and is one of the drivers behind the high rates of deforestation witnessed over the years.

To provide a clean and sustainable solution to the present situation, the IDBP will install biodigesters at households, local communities, SMEs ('users') currently using non-renewable biomass (NRB) and fossil fuels as their main source of cooking fuel. The biodigesters will be fed with manure mixed with water, which will undergo anaerobic digestion and produce biogas that is channelled directly to a cook stove. This biogas produced replaces the combustion of NRB and fossil fuels, thereby reducing carbon dioxide (CO_2) emissions. The biodigesters also reduce methane (CH_4) emissions by diverting manure that would otherwise decompose without the capture and use of the methane. The technical specification of the biodigester used in this PoA shall comply with the related technical requirement under IDBP.

The Coordinating/Managing Entity (CME) of this Programme of Activities (PoA) is Hivos, a Dutch development organisation. Upon sale of the biogas system, users will sign a Household Agreement, transferring the rights of the generated emission reductions to Hivos. The revenue generated from the subsequent sale of carbon credits will be used to subsidise the investment costs of the biodigesters, making them more affordable. Users will be provided with training on the use of the systems and the proper application of slurry to agricultural land. The unique serial number of each installation will be recorded.

This PoA contributes to sustainable development in a number of ways:

(i) Environmental
- Reduced GHG emissions;

[1] World Health Organization (2011) 'Indoor air pollution and health'. Fact sheet No. 292
[2] World Health Organization (2011) 'Indoor air pollution and health'. Fact sheet No. 292
[3] Laboratory of Energy and Agricultural Electrification (2002) 'Biomass energy potentials and utilisation in Indonesia'

- Reduced deforestation and forest degradation in areas where NRB is used as a source of fuel. This contributes to the overall stability of forest ecosystems, which support biodiversity and watersheds;
- Improved soil conditions where digester slurry is applied to agricultural land[4].

(ii) Social

- Reduced combustion of firewood and fossil fuels reduces indoor air pollution, thereby increasing respiratory health of users, particularly women and children who spend a large portion of their time indoors[5].

(iii) Economic

- Reduced end-user expenses due to reduced expenses on the purchase of biomass and fossil fuels, as well as healthcare related expenses;
- The use of the slurry as an organic fertiliser on agricultural soils can significantly improve soil quality and offset costs that would otherwise be incurred in the purchase of chemical fertilisers. The nutrient value of the slurry produced has also been shown to be higher than raw manure[6].

2. *Policy/measure or stated goal of the PoA.*

The IDBP will implement biodigesters across Indonesia. The biogas produced will be used for cooking and will replace the use of firewood, charcoal or fossil fuels such as kerosene or LPG.

3. *Confirmation that the proposed PoA is a voluntary action by the coordinating/managing entity.*

The CME of the programme is Hivos, a Dutch development organisation experienced in setting up biodigester programmes worldwide. Hivos does not have any legal or other obligations to further spread the use of biodigesters. Therefore all its activities are undertaken purely voluntarily.

A.3. Coordinating/managing entity and participants of SSC-POA:

1. *Coordinating/managing entity of the PoA as the entity which communicates with the Gold Standard Foundation.*

The IDBP is run by Hivos, who acts as the CME of this PoA.

2. *Project participants being registered in relation to the PoA. Project participants may or may not be involved in one of the VPAs related to the PoA.*

Name of Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Indonesia (host)	Hivos	No

[4] Lukehurst, C.T., Frost, P. and Al Seadi, T (2010) 'Utilisation of digestate from biogas plants as biofertiliser'. IEA Bioenergy.
[5] World Health Organization (2007) 'Indoor Air Pollution - National burden of Disease Estimates'. Geneva.
[6] Lukehurst, C.T., Frost, P. and Al Seadi, T (2010) 'Utilisation of digestate from biogas plants as biofertiliser'. IEA Bioenergy.

Netherlands	Hivos	No

Additional project participants can be added during the lifetime of the PoA.

A.4. Technical description of the small-scale programme of activities:

A.4.1. Location of the programme of activities:

A.4.1.1. Host Party(ies):

The Republic of Indonesia.

A.4.1.2. Physical/ Geographical boundary:

The boundary of the PoA is the national boundaries of the Republic of Indonesia (host party). The programme targets all regions in the country.

VPAs are confined to the host party. The geographical boundary of each VPA will be described in the respective VPA-DD.

A.4.2. Description of a typical small-scale programme activity (VPA):

A typical VPA consists of a set of biodigesters with the capacity of up to 100 m^3 installed at households, local communities, SMEs that breed cattle or other farm animals in Indonesia. This means that there are three distinct baseline scenarios applicable, depending on the targeted user group. A VPA can include more than one baseline scenario and therefore target different user groups. The input for the biodigesters is manure and water. Each biodigester will be given a unique serial number, which will be recorded in the CME database. Upon installation, users will sign a Household Agreement confirming that they transfer the rights to the emission reductions to the CME. VPAs shall be developed following small-scale guidelines. Small-scale VPAs are subject to the thresholds set forth by the CDM; 15 MW (45 MW

thermal) for the renewable energy component and an emissions cap of 60,000 tCO_2e for the methane avoidance component.

A.4.2.1. Technology or measures to be employed by the SSC-VPA:

1. Description of the technology and practice being implemented

The technology implemented under the IDBP covers biodigesters fed with a mixture of water and animal manure that is anaerobically digested. The capacity of the biodigesters ranges from 4 m^3 to 100 m^3, below the capacity threshold imposed by the applicable methodology. The generated biogas is intended for use as fuel for cooking. There are two types of biogas systems that will be initially introduced by this PoA. These are not exclusive to the IDBP and other biogas technologies may be included in later stages.

– Fixed-dome biodigesters (**Figure**): This model is constructed with bricks and stone masonry. The fixed-dome technology has a proven durability, and can be installed underground, saving space and protecting the installation. Materials for its construction can be sourced locally.
– Plastic bag biodigester (**Figure**): This model constitutes a plastic biodigester composed of a large bag that is typically stored above-ground.

The use of both biodigester models is simple:

1. Collect manure and mix with water according to the type of manure used and biodigester model
2. Feed this mix into the biodigester.
3. Both biogas and sludge are produced.

The biogas is used as cooking fuel. The build-up of gas will push out slurry through the exit pipe of the biogas system, and is a fertiliser that can either be applied directly to crops or composted with other organic material.

Maintenance needs are limited since the biodigesters have no moving parts. Over time, some indigestible material can build up in the digester, limiting the reactor volume. This issue is solved simply by scooping the indigestible material out and re-filling the biodigester with manure.

Figure 2 – Example of a fixed-dome biodigester model.

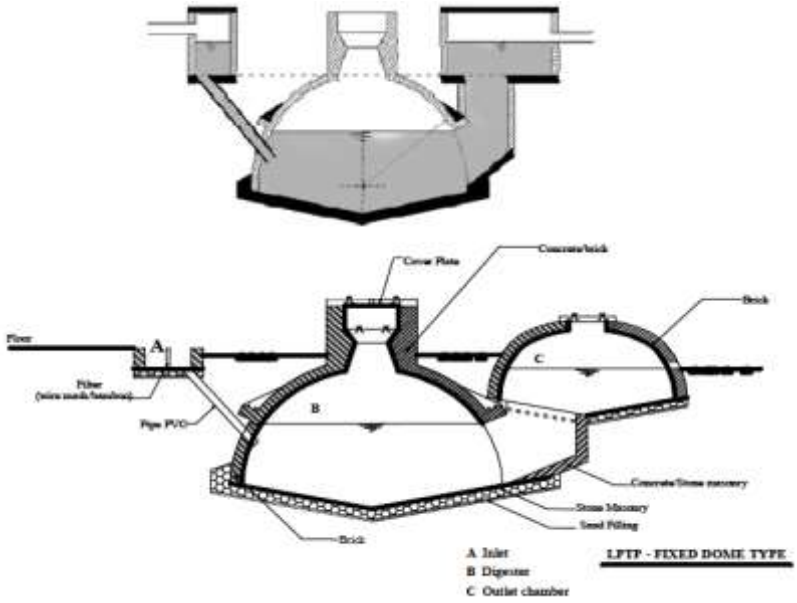
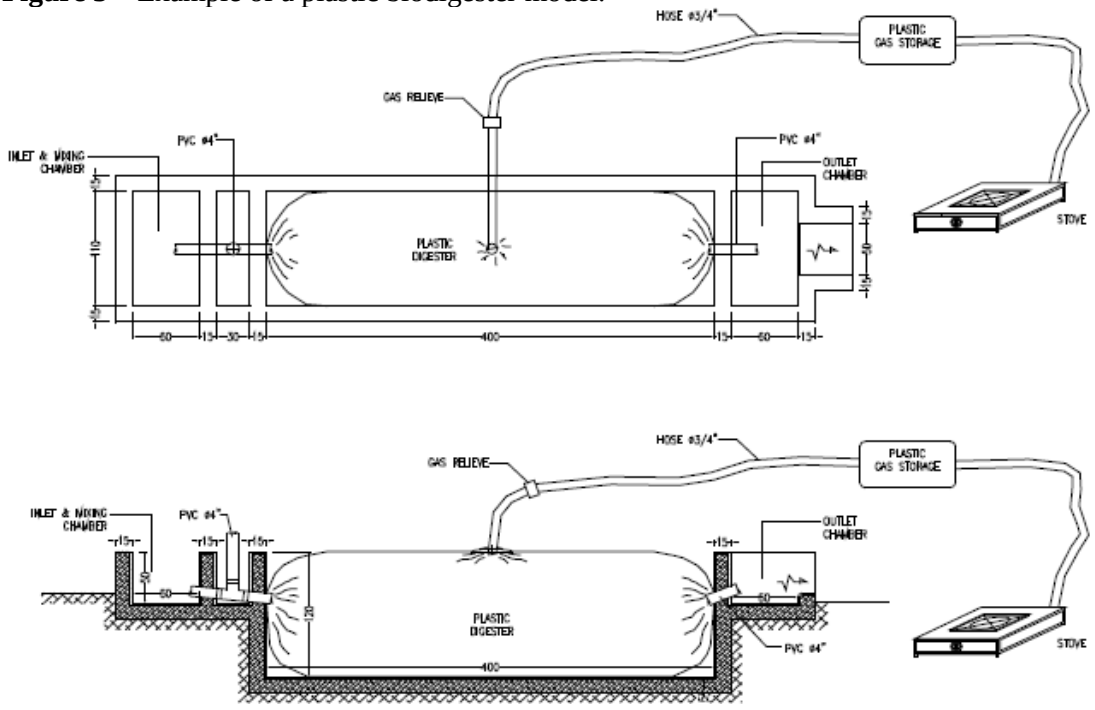


Figure 3 – Example of a plastic biodigester model.



A.4.2.2. Eligibility criteria for inclusion of a SSC-VPA in the PoA:

1. Description of eligibility criteria for inclusion of a VPA in the PoA and requested evidence.

General Eligibility Criteria		Yes/No?	VPA-DD Indicator
1	All biogas systems listed in the VPA are installed within the geographical	☐ Yes ☐ No	Verifiable evidence: – Completion Report;

	boundaries of Indonesia. Each biodigester in the VPA has a unique serial number that is recorded in the User's Manual and/or engraved or permanently attached as a nameplate which confirms the location of the biodigester. The serial numbers are listed in the IDBP database.		– Household Agreement; – IDBP Database; *or* – User's Manual.
2	The technology used consists of biodigesters of capacity no more than 100 m^3. Furthermore, the specific construction quality standards enforced by the IDBP will need to be met by each unit commissioned.	☐ Yes ☐ No	Verifiable evidence: – IDBP Database; – Completion Report; – Household Agreement; *or* – Participation Agreements between CPO and the CME.
3	There are three distinct groups of users targeted under this PoA: 1) Households: Individual houses inhabited by dairy farmers or other types of farmers. 2) Communities: Aggregation of individuals living or meeting in a particular place or area, such as schools, farmer communities, or other social venues. 3) SMEs: Domestic firms with an annual turnover of up to 300 million Rupiah, as defined by the Indonesian Law of Micro, Small and Medium Enterprises from 2008.[7]	☐ Yes ☐ No	Verifiable evidence: – Household Agreement.
4	Each user group as defined in Eligibility Criterion 3 represents a separate baseline scenario, the baseline scenario for which will be defined on the VPA level.	☐ Yes ☐ No	Verifiable evidence: – Baseline surveys – Literature; – Official data *or* – Survey reports.
5	The biodigesters are uniquely identified and defined in an unambiguous manner by providing the serial number of the systems installed.	☐ Yes ☐ No	Verifiable evidence: – IDBP Database; – Completion Report; *or* – Household Agreement.
6	The biodigesters each have	☐ Yes	Verifiable evidence:

[7] Indonesian Law No.20 on Micro, Small and Medium Enterprises (2008)

	continuous useful energy outputs of less than 150kW$_{th}$ per unit (defined as total energy delivered usefully from start to end of operation of a unit divided by time of operation).	☐ No	– Completion Report; – Household Agreement; – IDBP Database; *or* – Emissions reductions calculation spread sheet.
7	The VPA follows the baseline and monitoring methodology 'Technologies and practices to displace decentralized thermal energy consumption' and should meet its eligibility criteria as discussed in section E.2 of the PoA-DD.	☐ Yes ☐ No	Verifiable evidence: – Completion Report; – Household Agreement; *or* – IDBP Database.
8	Confirmation that the VPA, and any of its biodigesters, is/are not registered/being registered as a standalone CDM or voluntary project, or as part of another registered PoA.	☐ Yes ☐ No	Verifiable evidence: – Completion Report; *or* – Household Agreement; –
9	The VPA crediting period shall be confined within 28 years after the date of PoA registration.	☐ Yes ☐ No	Verifiable evidence: – IDBP Database.
10	Any Official Development Assistance received for the VPA has not occurred on the condition that the resulting credits are transferred to the donor country[8].	☐ Yes ☐ No	Verifiable evidence: – ODA Declaration.
11	Confirmation that the VPA will adhere to the conditions related to sampling requirements established for the PoA.	☐ Yes ☐ No	Verifiable evidence: – Baseline surveys; *or* – Biogas user surveys.
12	The VPA is additional according to the criteria in section E.5.1. of the PoA-DD.	☐ Yes ☐ No	The VPA demonstrates additionality as detailed in section D.5.1 of the PoA-DD.
13	Confirmation that the VPA does not receive Green or White certificates, or the equivalent under any scheme, as required by the Gold Standard[9].	☐ Yes ☐ No	Verifiable evidence: – Declaration from the VPA Implementer.
14	The VPA implementer must clearly communicate to all participants to whom the ownership rights of the emission reductions resulting from the project activity belong. The transfer of the ownership rights	☐ Yes ☐ No	Verifiable evidence: – Household Agreement.

[8] Gold Standard Toolkit, Version 2.1, Section 1.2.5.
[9] Gold Standard Toolkit, Version 2.1, Section 1.2.7.

	should be confirmed in writing.		
15	The start date of the VPA will be on or after the start date of the PoA. The start date of the VPA will be defined as the date on which the first Household Agreement is signed under the VPA.	☐ Yes ☐ No	Verifiable evidence: – IDBP Database; *or* – Household Agreement.
16	A Local Stakeholder Consultation has been carried out on Host Country level. An additional Local Stakeholder Consultation session will be carried out when the PoA starts including VPAs with biodigesters exceeding $12m^3$. An environmental impact assessment (EIA) has been carried out for the VPA, or evidence is provided that the programme activities are exempt from an EIA.	☐ Yes ☐ No	Verifiable evidence: – Stakeholder Consultation Report; *or* – EIA exemption proof.
17	Small-scale VPAs are subject to the thresholds set forth by the CDM; 15 MW (45 MW thermal) for the renewable energy component and an emissions cap of 60,000 tCO_2e for the methane avoidance component.	☐ Yes ☐ No	Verifiable evidence: – IDBP Database; *or* – Emissions reduction calculation spread sheet.

2. Description of eligibility criteria for sustainable development aspects

The CME is required to ensure that each included VPA to the programme meets the following sustainable development eligibility criteria.

Sustainable Development Criteria	**Explanation**
Social Development	
Soil condition	Each VPA shall lead to an improvement in local soil condition. Sludge is a by-product created by the digestion process of the manure. The application of this sludge increases the organic content and fertility of soils, thereby increasing crop yields. Each VPA shall encourage the application of the sludge of land and will monitor the application of the final biodigester slurry on agricultural land.
Quality of employment	Each VPA aims to install several thousands of biodigesters and will require constructing and monitoring effort by local staff. Each VPA shall create high quality, job opportunities. All staff will be supported by vocational training sessions supported by the programme. On completion of these trainings, all attendees will receive a certificate proving their attendance and skills gained. Furthermore, as part of the trainings, all staff will undergo a Health and Safety

	training.
Livelihood of the poor	Each VPA shall improve the livelihood of the poor through reducing user energy costs in the long term and freeing up time for other income generating activities through a reduced need to spend time collecting firewood. Household users, for example, on average spend IDR 930,000 (EUR 80) on cooking fuels per year or an average of 20 hours collecting firewood per week[10]. This is particularly relevant for women, whose role it is traditionally to collect firewood[11]. Additionally, since women tend to constitute the larger percentage of those living in poverty[12], each project activity shall also help to promote gender equality through the active employment of women. This will also benefit the programme as a whole since women, as the primary users of cooking fuels, will be more effective at marketing the biogas installations, and associated cook stoves, to other women. Each VPA shall also benefit the quality of life of the poor, particularly women and children, through improved health (less smoke inhalation), less time spent on cleaning soot from the user, collecting fuel and cooking. This will free up time for other activities.
Access to affordable and clean energy services	Each VPA shall improve user's access to safe and affordable energy. Biogas fuel shall be available at the simple turn of a knob, requiring no laborious collection of fuel and no additional costs beyond initial setup other than for maintenance. As long as the manure digester is used and maintained properly, a secure supply of biogas will be provided in each project activity.
Human and institutional capacity	Each VPA shall offer vocational training to engaged staff on the marketing, installation and maintenance of the biodigesters. Women will be especially encouraged to take up roles in marketing, where their experiential expertise will be particularly beneficial to the success of the programme as a whole. Women, as the primary users of the technology, will be more effective at marketing the product to other women. Less time spent on firewood collection, user cleaning and cooking will also allow more time to be available for other activities, such as greater school attendance due to the reduced domestic responsibility of children.
Economic and technological development	
Quantitative employment and income generation	The overall development objective of the programme is to promote and disseminate domestic biodigesters as a local, sustainable energy source through the development of a commercial sector that focuses its implementation through a multi-stakeholder sectoral development approach. The aim of this approach is to involve a wide range of stakeholders connected to the programme in order to ensure local capacity is built and a self-sustaining biogas sector emerges. The construction and maintenance of biodigesters in each VPA shall result in the creation of employment opportunities nationwide. By stimulating this new business sector, each VPA will therefore also create opportunities for

[10] IDBP Baseline Surveys (2012).
[11] WHO (2006) Fuel for Life: Household Energy and Health: Section 2, p.19. Available at: http://www.who.int/indoorair/publications/fflsection2.pdf
[12] UN Women. Women, Poverty and Economics. Available at: http://www.unifem.org/gender_issues/women_poverty_economics/

	entrepreneurs to enter the market.
Technology transfer and technological self-reliance	Each VPA will hire and train local contractors and constructors, thereby transferring technological capacity to local companies allowing them to further offer services in future. The biodigesters will be constructed using locally available materials. As part of the programme, each VPA will openly engage local communities in their activities, including offering training on installation and maintenance of biodigesters. Each VPA will also involve entities outside of the programme in general and technical training about the functioning of the biodigester technology to promote knowledge dissemination and strengthen the domestic biogas market.

A.4.3. Description of how the anthropogenic emissions of GHG by sources are reduced by a SSC-VPA below those that would have occurred in the absence of the registered PoA (assessment and demonstration of additionality):

i. The proposed PoA is a voluntary coordinated action.

There are currently no national or regional regulations requiring the implementation of biogas facilities in Indonesia, and no such regulations are foreseeable. The programme is therefore a voluntary coordinated action.

ii. If the PoA is implementing a voluntary coordinated action, it would not be implemented in the absence of the PoA.

The application of biogas for cooking purposes is a relatively unknown practice in Indonesia. Based on previous experience from a number of pilot programmes implemented in Indonesia in the 1990s and 2000s, the CME identified key existing barriers and developed a strategy for a nationwide biogas programme that overcomes these barriers. The key challenges facing the biogas implementation are:

- Lacking capacity development targeting households, communities and SMEs, construction service providers and equipment suppliers
- Lacking provision of an investment subsidy to the user on the purchase of the biogas technology
- Lacking offer of credit facilities through a number of affiliated (micro) finance institutions.

The uncertainty about the acceptance of the biodigester technology among the local population, together with the failure of previous biodigester programmes in Indonesia, increases financial risks for investors. The consequence is implementation of a nationwide biodigester programme in Indonesia is unlikely in the absence of the PoA.

iii. If the PoA is implementing a mandatory policy/regulation, this would/is not enforced.

Not applicable. Neither the PoA nor the VPAs are implementing a mandatory policy or regulation.

iv. If mandatory a policy/regulation is enforced, the PoA will lead to a greater level of enforcement of the existing mandatory policy/regulation.

Not applicable. Neither the PoA nor the VPAs are implementing a mandatory policy or regulation.

A.4.4. Operational, management and monitoring plan for the programme of activities (PoA):

A.4.4.1. Operational and management plan:

The operational and management plan lays out the framework to ensure that programme execution and operation achieves real and measurable emission reductions and supports the verification process. The entities involved in the PoA and their tasks are defined below.

i. Entities involved in the programme.

The CME (Hivos): Responsible for overall programme execution and management, raising awareness, promotion, capacity building, quality control, extension services, general monitoring and reporting. It will liaise with financial institutions to determine terms and conditions for loans to programme participants, and management of subsidies. It will also be responsible for investing the carbon revenues in the project to enhance the dissemination of biodigesters. It will fulfil the following tasks:[13]

- General management of the programme, including its carbon asset management and coordination of the contributions of all entities involved;
- Draft monitoring reports for all VPAs in accordance with the methodology version applied in time of inclusion of the VPA of the methodology 'Technologies and practices to displace decentralized thermal energy consumption' (11/04/2011) outlined in the registered PoA-DD;
- Coordinate and communicate with the validator/verifier and the Gold Standard Foundation;
- Maintain a system for management and record keeping for each VPA under the PoA;
- Coordinate quality control check of the technology implemented;
- Prepare monitoring reports for carbon credit verification and issuance;
- Request the Gold Standard Foundation to issue carbon credits into a registry account.

Users: End-users will purchase the biodigester, treat animal waste with it, reduce NRB and/or fossil fuel use, and ensure effective destruction of methane through appropriate biogas use. Furthermore they can use or sell bio-fertiliser produced as a by-product of the digestion process. They will support monitoring efforts required by the programme and will transfer the title to the generated emission reductions to the CME. There are three distinct groups of users targeted under this PoA:

1) Households: Individual houses inhabited by dairy farmers or other types of farmers.
2) Communities: Aggregation of individuals living or meeting in a particular place or area, such as schools, farmer communities, or other social venues.
3) SMEs: Domestic firms with an annual turnover of up to 300 million Rupiah, as defined by the Indonesian Law of Micro, Small and Medium Enterprises from 2008.[14]

Technology Suppliers: Suppliers are responsible for providing reliable biogas technologies and providing/arranging after-sale services for users. In doing so, they will prepare Household Agreements and Completion Reports and arrange for after-sales service for users and assist in PoA monitoring at the request of Hivos.

[13] CDM Executive Board guide: EB 32, Annex 38
[14] Indonesian Law No.20 on Micro, Small and Medium Enterprises (2008)

VPA implementing entity: The VPA implementing entity is the party that is in charge for realising a particular VPA. While this role can be performed by the CME, other parties can join the programme and set up new VPAs.

(Micro) finance institutions ((M)FIs): (M)FIs involved in this PoA will act as loan provider.

ii. Operational and management plan of the programme.

The operation of the programme, including the installation and commissioning of the biodigesters will be carried out as per the procedure outlined below.

Figure 1 – General operational framework & responsibilities

1. Pre-construction Form: The pre-construction phase is a time where the CPO surveys the potential household and establishes the eligibility of the household to become a biodigester user. The gathered information is included in the Pre-construction Form. The information in the form is used to ensure that the household receives the appropriate size of biodigester given the household size and the

amount of farm animals kept. After the form is filled in, the CPO will submit the form to IDBP for approval.

2. Household Agreement: Supplier and user in each VPA shall sign a 'Household Agreement', which is the sales contract covering the biodigester. The supplier is responsible for ensuring that the information is correct and complete. The Household Agreement will, at least, contain the following data, in addition to specific sales and financing arrangements:
   - A unique serial number of the implemented biodigester. The serial number shall either be physically attached to or integrated in the biogas system or recorded in the User's Manual.
   - Date of installation (day when construction of the biodigester begins);
   - Name of the user;
   - Address of the user;
   - Mobile phone number/landline of the user (if available);
   - Type and size (m3) of the biodigester;
   - Typology of the user: household, community and SMEs;
   - Acknowledgement that the user is aware that the installation is operating as part of a PoA, and confirmation that they are not taking part in another registered PoA;
   - Confirmation from the user that his participation in the PoA is voluntary;
   - A confirmation that the user assigns the right and title to the generated emission reductions to Hivos;
   - Signature of the user;
   - Name, company, contact details and signature of the supplier.

3. Installation: Supplier will install the biodigester, or have a specialised installation company do so. The installation is finalised by filling and inoculating the biodigester.

4. Commissioning: One week after installation, the supplier shall commission the biodigester by:
   - Handing over the biogas appliances;
   - Checking sufficient flow of gas;
   - Instructing the user to contact the supplier should any maintenance be needed. Contact details of the supplier shall be provided;
   - Instructing the user to contact the supplier should the biodigesters be removed;
   - Providing user training on the proper application of slurry to agricultural land;
   - Providing user training on how to record the quantity of manure fed into the biodigesters;
   - Providing user training on the operation and maintenance of the biogas system, and, if applicable, the water collection facility;
   - Filling out the 'Completion Report' , which will contain the following data:
     - A unique serial number of the implemented biogas system. The serial number shall either be physically attached to or integrated in the biogas system or recorded in the User's Manual.
     - Date of completion, which will be equal to the start date of emission reduction generation;
     - Confirmation that the user has been given training on the proper application of slurry to soils and how to record the quantity of manure fed into the biodigester, confirmation that the user assigns the right and title to the generated emission reductions to the CME, confirmation of the acknowledgement that the user is aware

that engagement in the programme is voluntary; and confirmation of the acknowledgement that the user is aware that the installation is operating as part of the programme.
- Name and signature of user;
- Name and signature of commissioner.

It will be the responsibility of the supplier to ensure that data recorded in the 'Completion Report' is correct and complete.

1. Data entry: The supplier shall provide hard copies of the 'Household Agreement and the Completion Report to the CME, who will be responsible for entering data into the centralised record-keeping database. It will be the CME's responsibility to ensure that data is entered correctly and to follow-up with the supplier if there are errors or missing data. The database will not allow double-entries of the serial numbers. All original hard copies are filed and stored.

2. Operation of biodigester: The end-user will have been provided with the contact details of the supplier should the system need maintenance at any time during the project. It will be the user's responsibility to use the biogas system as instructed during commissioning.

3. Monitoring report: The CME will be responsible for the production of periodical monitoring reports, which will be verified by the DOE.

4. Verification: The DOE will verify monitoring reports and can perform a site visit of each VPA included in the PoA.

iii. A record keeping system for each VPA under the PoA.

The CME shall have a procedure for technical review of inclusion of VPAs to ensure that each VPA meets all requirements and eligibility criteria before its inclusion in the registered PoA. The Senior Technical Advisor at IDBP will be responsible for the technical review of inclusion of VPAs. The CME shall assign dedicated staff for the management of the record keeping system, and as such it will manage and maintain a digital database with all biogas systems in the PoA, with a clear division between the different VPAs. For each biodigester installed, the CME shall also keep a paper copy of the 'Household Agreement and the 'Completion Report that is provided by the suppliers.

The staff responsible for sales and commissioning shall ensure the accuracy of the dates in both documents. Hard copies of both documents will be kept at the office of the CME, and all dates entered into the IDBP database.

The record keeping database will be used to record the results of all monitoring, thereby avoiding double counting, with all data stored to be kept for at least two years after the crediting period or the last issuance of carbon credits for the project activity. The database shall be updated annually and covers the following data:
- Records of arrangements for training and capacity development for, as proven through issuance of a certificate to all constructors – annually;
- The number of jobs generated through the IDBP – annually;
- Sales records – annually.

iv. Procedure to avoid double counting.

Double counting will be avoided by keeping a record of the serial number of each biogas installation in a centralised digital database operated and maintained by the CME, clearly divided per VPA. The data included in the database is detailed above (see '3. Commissioning'). This data can be used by the CME and DOE to identify and locate each individual biodigester installed. The results of all monitoring will also be recorded in the electronic database.

The CME must annually check the systems through sampling to ensure that:
- The recorded address at which the biodigesters are installed is still correct;
- The biodigesters are still operational (as part of the monitoring procedure);
- Serial numbers are unique and correspond with the numbers on the installed systems.

This quality control procedure for carrying out this check will be performed in line with the Quality Control Manual. If systems are no longer in operation the system will be listed as no longer functional and the reason recorded in the database. Also, if certain biodigesters are not used, only the used biodigesters will be taken into account when defining the emission reductions. If the address is found to no longer comply with the database and the user is found to be different to that listed in the 'Household Agreement, the new user will be asked to sign and complete the Household Agreement and, if willing to do so, will undergo commissioning. All new details will be recorded in the database. Where the new user does not wish to sign such contract or does not fit the criteria outlined, the system will be listed as no longer operational in the database and no emission reductions from that system will be accounted for.

There are two situations in which the address or serial number of the biodigester may change:
- A biodigester is replaced. The user will contact the supplier, as indicated during commissioning, who will record the case of a biodigester that needs replacing, and will enter the new serial number into the database, or inform the CME that this needs to be done;
- A biodigester is moved to a different location. During commissioning, the user will have been directed to contact the supplier should a biodigester be moved. If the user is found to differ from that registered in the database the new address will be recorded in the database and a new Household Agreement and Completion Report completed.

A record of old data will be kept alongside a description of the circumstances under which changes were made.

v. The provisions to ensure that those implementing the VPA are aware of and have agreed that their activity is being subscribed to the PoA.

The contracts of all contracted entities will state the involvement of their activities as part of a PoA. All users will also acknowledge they are aware of this as part of the Household Agreement.

vi. Procedure to ensure quality control pertaining to technical requirements of the biodigester implemented in the PoA

The PoA will follow strict quality control procedures to ensure commissioned biodigesters meet the specific construction quality standards pursued under the IDBP. Both the constructors and their supervisors will be trained to apply the quality standards enforced by the programme. To further minimise the risk of commissioning of ineligible biodigesters, each province that participates in the PoA

will have at least one well trained quality inspector who is responsible for checking the biodigesters a) during the construction phase and b) upon commissioning. The selection of the checked biodigesters will be based on a random sample basis. The sampling will be representative of constructor, plant size, and the cluster area. The quality standards enforced under the programme have to be fully met by each commissioned biodigester, otherwise the constructors are penalised and requested to repair the defaults.

vii. Measures for continuous improvements of the PoA management system

Reviewing and continually improving IDBP's operations
The management of the CME will be responsible for ensuring that there is continual improvement in IDBP's operations. The management of the CME will make his/her decisions based on feedback from the individual provincial offices, which will get feedback from the field staff. The management of the CME will be regular communication with the provincial offices and the provincial offices will also be in regular communication with the field staff.

Corrective measures will be taken depending on issues raised (e.g. software issues will be corrected by the software developer, operational procedures for the field staff will be modified adhoc, etc.).

The management of the CME is committed to identifying opportunities for improvement and supporting their implementation. In order to identify areas for improvement, besides regular feedback from the Province Offices and Field Staff, the following issues will be discussed during Programme Meetings which will be held twice a year:
- Any inefficiencies in operation and management (e.g. in recording data or transferring data to database);
- Opportunities to employ better methods;
- Control of planned and unplanned changes.

In addition to that, when special technical issues needed to be undertaken in regard to the carbon component, the issues will be discussed at Quality Inspection meetings which are also held twice a year. Any improvements in the management system shall be checked against the POA-DD and VPA-DDs to ensure there is no conflict.

Reviewing and continually improving the Gold Standard process
The Gold Standard expert will follow the latest developments in the Gold Standard and where necessary will provide advice on updating procedures to comply with new rules and regulations under the Gold Standard. The expert will also critically assess the monitoring and verification processes and will advise management on updating and improving process for the collection of data and reporting. Finally, the expert will be in charge of renewing crediting periods for VPAs and updating the baseline for the PoA where deemed necessary.

A.4.4.2. Monitoring plan:

All monitoring is coordinated by the CME, Hivos. The sampling plan in line with EB65 annex 2 Appendix 3 is outlined below.

Sampling Design
Objectives and reliability requirements
The objective of the sampling effort is to meet the monitoring requirements set forth in the methodology 'Technologies and practices to displace decentralized thermal energy consumption' (11/04/2011), as

detailed in D.7.1 above. In accordance with the requirements set forth in the methodology, the sample size will be selected following a 90% confidence interval and a 10% margin of error (90/10), where applicable.

Target population and sampling frame
The monitoring survey is only conducted with end users representative of the project scenario using the biodigester at the time of the survey. There are three distinct target populations for the application of monitoring procedure (households, local communities, and SMEs with installed biodigesters), as identified through the centralised record-keeping database managed by the CME.

Sampling method and sample size
The CME is responsible for the production of periodical monitoring reports for each VPA, following the criteria outlined in section E.7.2. The minimum total sample size is 100, with at least 30 samples for project technologies of each age being credited[15]. Sampling shall be performed separately per target population (households, communities, SMEs). A usage parameter must be established to account for the drop off rates as project technologies age and are replaced. This parameter shall be representative of the quantity of project technologies of each age being credited in a given project scenario.

Multi-stage sampling[16] will be applied, where clusters consisted of geographical areas and subunits. It is considered more cost-effective to treat several respondents within a local area as a cluster. In order to account that not all the geographical clusters are the same size, sampling will be employed proportionate to cluster size. Clusters will be selected with a probability proportionate to the size of the target population within each cluster such that larger clusters have a greater probability of selection, and smaller clusters a lower probability. This helps to ensure that sampling remains representative of the entire population. Sampling shall be done per user group (i.e. households, SMEs, communities) and shall differentiate between small-scale digesters (defined as capacity up to $12m^3$) and medium-scale digesters (defined as capacities larger than $12m^3$).

Data collection and storage
Baseline data for the programme is established for each target user group (households, local community, or SMEs) on the VPA level. This includes parameters $BB_{b,bio,}$ $BB_{b,fuel,}$ $N_{T,}$ and where Tier 2 is applied, $MCF_{x,k,}$ $MS_{T,x,,k}$. This is gathered through data collected from official baseline surveys, reports or statistical databases. The minimum sample size is 100 for each baseline assessment. Baseline emissions relating to the use of biomass and fossil fuel are confirmed *ex*-post through the Baseline Performance Test, as described in Section 7 of the methodology. Project emissions relating to continued use of biomass and fossil fuel are confirmed *ex-post* through the Project Performance Field Tests (PFTs) of fuel consumption, as described in Section 7 of the methodology.

Response rates will be maximised by contacting all randomly-selected biogas system users beforehand to arrange a practical site visit date and sampling over the minimum required number to compensate for any non-responses. The right of the CME to perform these monitoring efforts will be included in the Household Agreement signed with each user. In special cases where participants refuse to participate in the monitoring, the reason shall be documented in the CME's programme database. The CME will explain that monitoring is part of the requirements of the programme and try to arrange an alternative

[15] 'Technologies and practices to displace decentralized thermal energy consumption' (11/04/2011), p.24
[16] As defined by the General Guidelines for Sampling and Surveys for Small-Scale CDM project activities, EB 50 Annex 30.

date for a site visit, or carryout monitoring with another member of the households, local community, SME.

Training will be given to staff responsible for the data collection system on the management system to be put in place as part of the overall PoA. This will include:
- Data to be recorded in the database (as per A.4.4.1 of the PoA-DD) and how to complete the Household Agreement and Completion Report correctly;
- How to identify the serial number of the biodigester in use;
- How to fill out and where to submit copies of the Household Agreement and Completion Report and any associated documentation;
- How to complete Baseline and Project Performance Tests in accordance with Gold Standard guidelines;
- Monitoring procedures, in accordance section A.4.4.2 of the PoA-DD.

On completion of training, trained staff will receive a letter confirming their attendance. The name, company and contact details of all attendees will be recorded as part of the CME's PoA database. This will be used to confirm that the training has been completed and that staff is qualified to carry out the data collection as required under the PoA.

The accuracy of data entry will be checked regularly by a designated person within the CME. Regular checking and verifying the accuracy of data submitted into the database shall be done by the database personnel and Technical Officer. Data analysis will be carried out by the CME. All underlying data (i.e. questionnaires) will be kept both in hardcopy and electronically by the CME.

Field measurement objectives and data to be collected
The parameters to be monitored within each VPA, as outlined in the applied methodology, are as follows:

A Biogas User Survey shall be completed annually and covers the following data:
- Number of users applying the final biodigester slurry on agricultural fields– annually;
- Perceived improvement of living conditions – annually;
- Number of women attending trainings – annually;
- Percentage of biodigester in use in the given year (y) – annually.
- The number of operational days of the biodigesters in the given year (y) – annually.
- The fraction of manure that is not treated in the biodigester – annually;

A Monitoring Survey shall be completed periodically and covers the following data:
- Quantity of biomass and fossil fuel that is used for cooking in a given baseline scenario in a given year (y) – once every two years;
- Quantity of biomass ($BB_{p,bio}$) and fossil fuel ($BB_{p,fuel}$) that is used for cooking in a given project scenario in a given year (y) – once every two years;
- Leakage in the given project scenario in the given year (y) – once every two years.

The application of bioslurry shall be monitored according the applied methodology, and in line with the approach used in project GS 1083. If there is any anaerobic use/storage of bioslurry under anaerobic conditions reported from the monitoring survey, project emissions shall be accounted for accordingly. The following approach shall be followed:
- Estimation of the total amount of volatile solid entering the biodigester;

- Assessment of remaining VS content of digestate;
- Assessment of methane potential of bio-slurry;
- Methane conversion factor of the digestate management systems;
- Calculation of project emissions using the information obtained in the previous steps.

Implementation
All sampling efforts will be conducted by qualified personnel who have undergone training as part of the programme. This training will cover information on the project background and basic functioning of the biogas systems, as well as the data collection process, including the format in which data should be collected. The personnel will be issued with a certificate confirming their attendance at relevant trainings and their qualification to complete the monitoring. A paper copy of the certificate will also be kept by the CME. Surveyor staff will be required to speak the native language (Bahasa Indonesia) in which biogas systems have been implemented, allowing for full understanding of any responses given by users, and any questions therein.

A.4.5. Public funding of the programme of activities (PoA):

The programme is located in Indonesia, which is part of the OECD Development Assistance Committee's ODA recipient list.[17] Hivos receives Official Development Assistance from the Dutch government. However the credits to be generated by programme are not transferred, directly or indirectly, to meet the Netherlands GHG reduction requirements. A written declaration of the programme's non-use of ODA has been issued and submitted to the Gold Standard Foundation, attached in an annex to this PoA-DD.

SECTION B. Duration of the programme of activities (PoA)

B.1. Starting date of the programme of activities (PoA):

24 October 2009, which coincides with the date the first Household Agreement under VPA-1 was signed.

B.2. Length of the programme of activities (PoA):

28 years.

SECTION C. Environmental Analysis

C.1. Please indicate the level at which environmental analysis as per requirements of the CDM modalities and procedures is undertaken. Justify the choice of level at which the environmental analysis is undertaken:

[17] OECD (2011) 'DAC List of ODA Recipients'. Available at: http://www.oecd.org/dataoecd/32/40/43540882.pdf

1. Environmental Analysis is done at PoA level ☐
2. Environmental Analysis is done at SSC-VPA level ☐

C.2. Documentation on the analysis of the environmental impacts, including transboundary impacts:

An environmental impact assessment is not obligatory for activities implementing household biodigesters in Indonesia, as stipulated by Law no. 32/2009 on Environment Protection and Management (RPPLH, 3 October 2009).

C.3. Please state whether in accordance with the host Party laws/regulations, an environmental impact assessment is required for a typical VPA, included in the programme of activities (PoA):

An environmental impact assessment is not obligatory for activities implementing household biodigesters in Indonesia, as stipulated by Law no. 32/2009 on Environment Protection and Management (RPPLH, 3 October 2009).

SECTION D. Stakeholders' comments

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D.1. Please indicate the level at which local stakeholder comments are invited. Justify the choice:

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

There are four reasons why the stakeholder consultation was performed at the PoA level instead of the project activity level:

- *Identical geographical boundary:* Each VPA under the programme may include biodigesters which are implemented anywhere within the national boundaries of the Republic of Indonesia.
- *Identical technology:* All of the project activities implemented under the programme will implement a biodigester system. The particular size of the biodigester system will be determined on the user level and is contingent upon the user size and number of animals kept. This is independent from VPAs, which are implemented nationwide and need to adhere to the small-scale thresholds set forth by the CDM.
- *Similar time frame:* VPAs will be included consecutively given the programme anticipated implementation schedule.
- *Similar socio-economic situation:* The programme targets users that breed cattle or other farm animals and act as individual farmers form part of a cooperative (local community), or run SMEs. The users are in a similar socio-economic situation and can be classified as belonging to the low income class, typically residing in rural areas.

D.2. Brief description how comments by local stakeholders have been invited and compiled:

First stage – Programme Design Consultation

The Programme Design Consultation (PDC) was arranged to obtain feedback from relevant national and local authorities, NGO communities, and other stakeholders on the general design of the programme as

well as the appropriate level of local stakeholder consultation. A total of 30 stakeholders was contacted and invited to submit feedback.

Hivos identified the relevant stakeholders and invited them through electronic mail, facsimile and/or regular mail. The invitations were in the local language (Bahasa Indonesia) and included a non-technical summary of the programme, the foreseen implementation plan and geographic coverage of the programme, as well as details about the biodigester technology proposed. Furthermore, the communication included a list of questions allowing stakeholders to raise concerns on the general design features of the programme as well as the local stakeholder consultation process proposed. The invitations with the programme information were sent out to the stakeholders on January 9th.

Following the acknowledgement of receipt, Hivos encouraged targeted stakeholders to reply in writing within a time frame of two weeks. Stakeholders that did not return any feedback by the set deadline were contacted again and asked to submit their feedback. Of the 30 targeted stakeholders, 17 confirmed reception of the communication.

Second stage – Local Stakeholder Consultation

All stakeholders approached in the PDC agreed with the proposal from the IDBP to host one LSC meeting on programme level on the national level. Hivos therefore organised a single LSC meeting on the national level and invited a broad range of both national and regional stakeholders. The LSC meeting was held on 16 February 2012. However, the CME commits to organise a second LSC meeting targeting SMEs and communities before biodigesters exceeding 12m^3 will be implemented in the PoA.

The invitations sought to cover a broad range of stakeholder types representing all regions likely to be affected by the programme. Through its involvement in the programme since the setup in 2009 as the managing entity Hivos has built an extensive network with stakeholders both on the local and national level, placing this entity in the right position to identify the relevant stakeholders to the programme. In total 70 targeted invitations were sent out by electronic and regular mail, covering a wide range of stakeholders that included individuals, organisations, companies and government entities.

In order not to close the opportunity for other interested parties to join the LSC, Hivos also used alternative means of communicating to a broader audience concerning the occurrence of the meeting. A public invitation for the LSC was published in Kompas Daily, the most widely read newspaper in Indonesia. Furthermore, a public announcement was published on the IDBP website (www.biru.or.id). The presence of both the individual and general public invitations ensured broad representation and a good mix of viewpoints.

Third stage – Feedback Consultation

The Stakeholder Feedback Round was arranged by Hivos in order to show stakeholders how their comments from the first consultation were taken into account, as well as to offer the stakeholders a second chance to make additional comments. All individuals present during the Local Stakeholder Consultation were contacted again on 5 April 2012 with an updated version of the PoA-DD, VPA1-DD, the Local Stakeholder Consultation Report and the Gold Standard Passport. These documents incorporated all the comments made by the stakeholders during the Local Stakeholder Consultation. The stakeholders were invited to review the documents and raise any further concerns regarding the

programme design. The stakeholders were given two months to respond, and received a reminder one week prior to the submission deadline to encourage a high response rate.

D.3. Summary of the comments received:

First stage – Programme Design Consultation

Most of the comments IDBP received from the participants were positive. The questions raised by the participants were mostly related to possibilities of biogas implementation; whether the areas can be expanded, to build bigger size digester or to use biogas to power generator. Some participants also asked about the subsidy rate and mechanism that are being implemented by IDBP, while others sought clarification about the possibility of partially financing biogas programme by making use of the provincial government fund. One participant also asked about the operation and maintenance system in the case of a community-operated bio-digester. The responses given to those questions were straight to the point as IDBP already has clear policies on how to deal with the above issues.

Below lists the assessment of all comments received, as presented in the LSC report:

Stakeholder comment	Explanation (Why? How?)
Q1: *How long is the period during which a user is required to repay the biodigester purchase? What does the subsidy mechanism look like? When does the user get the return of investment, in terms of fishery and agricultural benefits?*	**A1:** The benefits of biogas may not be apparent immediately for the user, because the user must invest a considerable amount of money upfront, and not every user is ready to do this. For instance, a user who is ready to invest in a biodigester through credit will need to spend IDR150,000 (around EUR 12.00) as a monthly instalment for three years. The user usually repays the instalment to their cooperative in cash, or in the form of milk price deduction that is paid by the cooperative to the user.
Q2: *The biogas development is currently implemented in some parts of Indonesia only. Can it be implemented nationwide? From the side of the government, the need for new renewable energy is increasing. Unfortunately, inadequate action is occurring on this front.*	**A2:** The target for biogas implementation is not limited to the initial set of provinces only, but all of Indonesia. However, as this is only the initial stage of the biogas programme and the responsibility to implement biogas programme does not solely rely on the central government. That is why provincial governments are invited to this kind of meetings, so that they can share the result of the meetings to the other local authorities. The provincial government can allocate a part of their budget for biogas development. IDBP expects to expand into Sumatra island, because it has a lot of potential. At this stage, MCC also already stated that they are interested to do a pilot project in Jambi,

	therefore IDBP will also explore about the next working areas with MCC. It is expected that in the future there will be increasingly more provinces where biogas is implemented.
Q3: *In Central Java, the electrification ratio is 76.63%. Many hamlets still do not have access to electricity. The awareness meetings about biogas benefits are really needed. The level of awareness of the people is still low; therefore collaboration between the provincial and the central government as well as Hivos is necessary.*	**A3:** Technically, it is possible to convert biogas into electricity, but it requires high biogas input. It should also be remembered that the gas quality from biogas – in unprocessed conditions - contains a high level of sulphur and water particles thus making it corrosive to the appliances.
Q4: *Can IDBP build bigger size bio-digesters, such as 20 m3, and make it not limited to cattle manure but also use it for tempeh waste? There are demo plots done by other stakeholders in some areas in Central Java that make use of tempeh waste.*	**A4:** IDBP has been thinking about bigger biogas digester, and there is a possibility of building bigger biodigester systems in 2012 (between 20 m3 and 50 m3). Currently, IDBP still focuses on domestic biogas, which is for the household. IDBP will consider it again, as it is also related with the interest of the programme and SNV as the technical partner. IDBP will keep tracking biogas technology developments.
Q5: *Can the level of IDBP subsidy rate be increased? For instance, the subsidy for small size biodigester is IDR 2 million (around EUR 170), but can bigger sized biodigesters qualify for a higher subsidy rate?*	**A5:** IDBP does not intend to change the subsidy rate because the digester size should match with the user's need for biogas. For instance, a user who has 4 to 5 family members and owns 10 cows could build but does not need a 8 m3 biodigester, because the energy need for the whole family will be met with a 6 m3 digester. By providing a flat subsidy rate, IDBP encourages people to use the energy as efficient as possible.
Q6*: In 2005, the Indonesian government adopted a target to increase the use of new renewable energy up to 17%. In Buru Island, Maluku, cattle rearing is done extensively, and the cattle are kept in a communal stable. Can we extend the IDBP programme to Maluku? Furthermore, If we want to promote biogas, how can we explain to the farmers to make use of the manure (that can be used as biogas and bio-slurry)? Because often the farmers bring the manure to the field, mix it with hay and then*	**A6:** Communal stable for cattle is a common practice. In the case of Buru Island, the energy access can be integrated with that agricultural system. It is in the best interest of IDBP to ensure that the users can get optimum benefits from biogas. Therefore, although it is known that communal systems often do not work very well due to social factors (technically it is feasible), the IDBP is considering building a number of communal plants, so manure of these communities can be used for biogas and

burn it. Is it possible to build a centralised biogas plant there?	eventually for fertiliser. As for centralised biogas, it depends on the distance between the stable and the houses. In principle, a biogas digester can be built up to 100 meters from the house(s). Maluku may be considered in the later stage of the programme if adequate funding is available.
Q7: *Biogas is already present in South Sulawesi. The IDBP is very good there. In South Sulawesi, the electrification rate is 85%, therefore biogas is needed. There are 1 million cattle in South Sulawesi. The target is to increase the number up to 2 million. However, the achievement to build biogas is still difficult because there is no credit access. So it is suggested that:* 1. *The subsidy should be given from the government (from the provincial budget);* 2. *The number of trainings for biogas should be increased as well. The provincial government could finance this;* *Biogas appliances should only be obtained locally, from Indonesia.*	**A7:** There are many other sources of energy that can increase the electrification level, such as micro hydro, solar, geothermal. Biogas is certainly only one of them. The provincial government is welcome to use their own budget to develop the biogas sector employing the concept of IDBP, with a focus on strengthening biogas service providers through training. Credit access is one of IDBP's biggest challenges. Local governments are welcome to play a role in enhancing access to credit. As for locally made biogas appliances, it should be remembered that it is crucial to maintain the quality of the biodigesters. Until now, all but one of the appliances are already made locally. The local main gas valve does still not meet IDBP quality standards. IDBP keeps on looking for local manufacturers, including local workshops and technical schools. Until there is a good quality of locally-made appliances, IDBP will only use imported ones to maintain the quality.
Q8: *What does the carbon trade look like? What will happen with the carbon credit?*	**A8:** The carbon trade is aimed at obtaining revenues, which are subsequently pumped back into the programme. Hivos will have the responsibility to ensure that the programme's carbon credits are sold on the carbon market and will also have the responsibility to meet monitoring demands resulting from the carbon mechanism under the Gold Standard. Hivos has initiated the development of the mechanism as it sees IDBP as a long-term programme which will in the long run result in considerable carbon emission reductions, which will support the programme financially and make it self-reliant, reducing the need of external funding.
Q9: *The central government is actively promoting the biogas programme, but there is a lack of coordination with the provincial*	**A09:** It is true that there still exist communication problems between the provincial and central government. This is because the provincial

government. Not to mention that there is still a programme that builds biogas by using grants (fully-subsidized biodigesters). The grant system is ruining the market. The central and provincial government must have one policy only. The collaboration must be intensified. What will the central government do post-2012 in this respect?	government has the freedom to make their own plans. However, the central government always tries to coordinate in relation to biogas development with the provincial government. At the moment the central government intends to work on a regulation framework in the form of a Ministerial Decree so that the National Budget can be used for subsidy.
Q10: *What can be done to ensure that there is no problem in operation and maintenance of a communal biodigester?*	**A10:** The owners of IDBP biodigesters are thoroughly trained, ensuring that they understand how to handle their plant, but they will also get after sales services to ensure that the systems are kept operational. In the case of communal systems this will also be done and the communal aspects will be given special attention to make sure that the group manages their plant jointly in the right way.
Q11. *Some farmers still dispose bio-slurry to the gutter and river thereby polluting the water and destroying the environment. Does IDBP have any training to provide to biodigester users so that they know the advantages of the bio-slurry?*	**A11.** As part of the IDBP programme, biogas users are entitled to receive knowledge on the advantages of bio-slurry. The programme intensively cooperate with its business partner, herein KPSP Setia Kawan, to ensure that all users should receive the training accordingly.

Hivos understands and fully agrees with all the comments received. IDBP already pro-actively pursues all of the mentioned areas of operations to which the comments relate.

Second stage – Local Stakeholder Consultation

Stakeholders gave positive remarks about the consultation, stating that it was a very useful event for sharing updates about IDBP progress and to promote IDBP itself to government and local stakeholders from other potential areas where IDBP has not gone to. The meeting was also appreciated because it brought together stakeholders from different fields; government of Indonesia, business and banking sector, local authorities and users and that it showed how biogas is necessary and needed.

The attendants also perceived IDBP as a very positive programme because it helps promoting cleaner new renewable energy, decreases air and water pollution, increases local capacity and awareness about environment, and from the economic perspective it provides trickle-down effect as it opens up new job opportunities for local people. One participant mentioned that he found out biogas is easy to use and has three Ps benefits: people, profit and planet.

Based on the evaluation, none of the attendants had a negative opinion about IDBP. They did, however, note that a few things should be improved, such as bio-slurry utilisation and the number of awareness meetings should be increased. One participant suggested that IDBP could explore utilization of other energy sources such as tofu waste and consider the construction of bigger size bio-digesters. Another

participant thought that due to its subsidy policy, IDBP does not allow co-financing from provincial government, and another suggested that IDBP should really make use of cooperatives in terms of financial mobilisation, e.g. to provide credit access to potential users.

All of the above mentioned concerns were already discussed during the Question and Answer session. IDBP has started in 2012 to intensify bio-slurry utilisation amongst its user by conducting around 150 trainings for users. As IDBP is targeting ca. 5,000 new users in 2012, the number of awareness meetings will also be increased. Regarding the bigger size bio-digesters that can also utilise tofu waste, IDBP is open to that kind of technology development although it has not yet become its primary goal. IDBP will consider it again and keep tracking biogas technology developments. For co-financing schemes with the government, IDBP in principle adheres to the existing development concept of limited subsidy, but will consider applying a more flexible policy in 2012, especially for vulnerable groups. In relation to the roles of cooperatives for financial mobilisation, IDBP has been making efforts not only to establish credit access from cooperatives to potential users, but also to connect the cooperatives with other financial institutions from which the cooperatives can get loans. IDBP will intensify these efforts in 2012, and beyond.

Third stage – Feedback Consultation

Due to the overall positive feedback from the Local Stakeholder Consultation, the response rate of the Feedback Round was small. Out of the 68 contacted stakeholders, three responded. One inquiry concerned the clarification as to which entity would be in charge of managing the carbon funds generated under the PoA. The other two responses were confirmations that the programme's social and environmental benefits are clear and that the stakeholders are in full support of the PoA. As none of the comments raised concerns, no alteration to the programme design is required.

D.4. Report on how due account was taken of any comments received:

Hivos understands and fully agrees with all the comments received. IDBP already pro-actively pursues all of the mentioned areas of operations to which the comments relate. IDBP will continue its active work on all these fronts to further improve the reach, effectiveness and customer satisfaction of the programme. Alterations to the programme design based on the comments received are therefore not required.

SECTION E. Application of a baseline and monitoring methodology

This section shall demonstrate the application of the baseline and monitoring methodology to a typical technology or practise. The information defines the PoA specific elements that shall be included in preparing the PoA specific form used to define and include a VPA in this PoA (VPA-DD).

E.1. Title and reference of the approved SSC baseline and monitoring methodology applied to a SSC-VPA included in the PoA:

'Technologies and Practices to Displace Decentralized Thermal Energy Consumption' (11/04/2011)

E.2. Justification of the choice of the methodology and why it is applicable to a SSC-VPA:

The programme applies all baseline and monitoring procedures according to the guidelines laid out in the methodology entitled 'Technologies and practices to displace decentralized thermal energy' (11/04/2011).

This methodology is applicable to programs or activities introducing technologies and/or practices that reduce or displace greenhouse gas (GHG) emissions from the thermal energy consumption of households, communities and SMEs. This includes biodigesters.

To be eligible, the following applicability criteria apply:

Applicability criteria	Justification
1. Clearly identifiable project boundary: The project boundary can be clearly identified, and the biodigesters counted in the project are not included in another voluntary market or CDM project activity (i.e. no double counting takes place). Project proponents must have a survey mechanism in place together with appropriate mitigation measures so as to prevent double-counting in case of another similar activity with some of the target area in common.	The project boundary is the physical, geographical site of the methane recovery and combustion systems The mitigation measures to prevent double-counting are presented in Section A.4.4.1.
2. Limited level of energy output per biodigester: The biodigesters each have continuous useful energy outputs of less than 150 kW_{th} per unit (defined as total energy delivered usefully from start to end of operation of a unit divided by time of operation).	The maximum energy output of the biodigesters implemented in the project activities is 40.7 kW_{th}, below the indicated 150 kW_{th} limit per unit.
3. Continued use of baseline technology: The use of the baseline cook stoves as a backup in parallel with the new, biogas fueled cook stoves introduced by the project activity is permitted as long as a mechanism is put into place to encourage the removal of the old technology and the definitive discontinuity of its use. The project documentation must provide a clear description of the approach chosen and the monitoring plan must allow for a good understanding of the extent to which the baseline cook stove is still in use after the introduction of the improved technology. The success of the mechanism put into place must therefore be monitored, and the approach must be adjusted if proven unsuccessful.	Section D.7 provides an overview of how this parameter is monitored.
4. Settling of ownership rights over generated emission reductions: The project proponent must clearly communicate to all project participants two whom the ownership rights of the emission reductions resulting from the project activity belong. This must be communicated to the technology producers and the retailers of the by contract or clear written assertions in the transaction paperwork.	As set out in the operational and management plan explained in Section A.4.4.1., each end users of a biodigester will be asked to read and sign a contract stating that they agree to transfer the ownership rights of the emission reductions generated by the biodigester technology to Hivos, the CME of the programme. Copies of these signed contracts will be kept by the CME.
5. Use of new biomass feedstock	This applicability criterion is not

Project activities making use of a new biomass feedstock in the project situation (e.g. shift from non-renewable to green charcoal, plant oil or renewable biomass briquettes) must comply with relevant Gold Standard specific requirements for biomass related project activities, as defined in the latest version of the Gold Standard rules.	applicable as no new biomass feedstock is used in the project scenario.
6. Climate zones If more than one climate zone is included in the project activity, a distinction per climate zone must be considered. The distinct geographical boundary of each project area must be clearly documented in the project documentation, using representative GPS data.	This applicability criterion is not applicable as Indonesia constitutes one climate zone. All of Indonesia falls in the Tropical Zone.[18]

The largest biodigester type implemented in this PoA, the 100 m^3 unit, is estimated to produce up to 30 m^3 of biogas per day. This amounts to a maximum output of 40.7 kW_{th}, which is below the established threshold of 150 kW_{th}. The calculation is presented below:

$$\mathbf{Th_{cap}} = \frac{\mathbf{E}}{\mathbf{t}} \quad where \quad \mathbf{E} = \eta * H_b * V_b$$

Where:	Value:	Comments:
t = hours/day usage	2.15	IDBP Baseline Survey, 2012
η = efficiency of stove	50%	Indonesian Government standard on stove efficiency
H_b = heat of combustion per unit volume of biogas	21.0 MJ/m^3[19]	Derived from IPCC defaults
V_b = volume of biogas	30 m^3/day[20]	Data provided by Hivos
E = Energy available from the biogas system	315 MJ/day	Calculated
$\mathbf{E_{th}}$ =	87.5 kWh/day	1 MJ = 0.2778 kWh
$\mathbf{Th_{cap}}$ =	40.7 kW_{th}	Given a 2.15 hour/day usage

E.3. Description of the sources and gases included in the SSC-VPA boundary

Source		Gas	Included?	Justification/Explanation
Baseline	Heat delivery	CO_2	Yes	CO_2 emissions from - fossil fuel cook stoves - cook stoves using non-renewable biomass
	Treatment of manure	CH_4	Yes	CH_4 emissions from the baseline treatment methods of manure

[18] As per the Köppen Climate Classification System, a widely used classification system of the world's climates.
[19] Methane has an energy value of 37.78 MJ/m^3; thus, biogas at 55% CH_4 has an energy value of 21 MJ/m^3
[20] Cow dung produces approximately 40 litres biogas per kg. Each m^3 capacity of the biodigester needs 7.5 kg dung per day. Given a 100 m^3 biodigester, 750 kg of cow dung per day is required. This translates into 30 m^3 of gas produced per day.

		N_2O	No	Insignificant
Project activity	Heat delivery Treatment of manure	CO_2	Yes	Continued CO_2 emissions from - fossil fuel cook stoves - cook stoves using non-renewable biomass
		CH_4	Yes	Emissions due to physical leakage of methane from the biodigester, as well as emissions due to the manure not fed into the biodigester, as per the applied methodology.
		N_2O	No	Insignificant

E.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:

The baseline scenario is composed of three components. All three components are covered by the methodology 'Technologies and practices to displace decentralized thermal energy consumption' (11/04/2011), and include the following:

i. Consumption of non-renewable biomass for cooking.

Dependency on firewood and charcoal as a source of thermal energy for cooking purposes is high in Indonesia[21]. The usage of NRB (including charcoal) contributes to deforestation and forest degradation and results in emission of GHGs. The applicable methodology states that the baseline scenario is, in the absence of the project activity, the use of NRB meeting similar thermal energy demands.

ii. Consumption of fossil fuel for cooking.

Dependency on fossil fuels as a source of thermal energy for cooking purposes, especially kerosene and LPG, is also significant in Indonesia. The combustion of fossil fuels for cooking results in emission of GHGs. The applicable methodology states that the baseline scenario is, in the absence of the project activity, the use of fossil fuels meeting similar thermal energy demands.

iii. Methane emissions from manure handling.

The baseline scenario is the situation where, in the absence of the project activity, organic matter is left to decay anaerobically within the project boundary and methane is emitted to the atmosphere. The amount of methane that is emitted under this scenario is contingent upon the baseline manure management practice, which can include storing manure in anaerobic lagoons, deep pits, liquid storage, deep bedding, or other practices outlined in the '2006 IPCC Guidelines for National Greenhouse Gas Inventories'[22]. The applicable methodology establishes that baseline emissions are calculated by using

[21] Laboratory of Energy and Agricultural Electrification (2002) 'Biomass energy potentials and utilisation in Indonesia'

[22] See chapter 'Emissions from Livestock and Manure Management' under the volume 'Agriculture, Forestry and other Land use' of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories

the amount of the waste that would decay anaerobically in the absence of the project activity, with the most recent IPCC Tier 1 or 2 approaches[23].

E.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the SSC-VPA being included as registered PoA (assessment and demonstration of additionality of SSC-VPA): >>

E.5.1. Assessment and demonstration of additionality for a typical SSC-VPA:

Demonstration of additionality on the VPA level will be conducted using the 'Guidelines on the Demonstration of Additionality of Small-Scale Project Activities' (EB68 Annex 27, version 09.0). Each VPA has to determine additionality depending on its characteristics. To this end, the VPAs are classified into retroactive small-scale VPAs and regular small-scale VPAs.

Approach 1: Demonstration of additionality for retroactive small-scale VPAs.

To demonstrate additionality for retroactive small-scale VPAs, paragraph 1 of the Guidelines on the Demonstration of Additionality of Small-Scale Project Activities' (EB68 Annex 27, version 09.0) shall be followed. This approach requires the provision of an explanation that shows how the project activity would not have occurred anyway due to the existence of a barrier that hinder implementation.

For the demonstration of additionality the Annex 34 of EB 35 "Non-binding best practice examples to demonstrate additionality for SSC project activities" may be used for reference, with focus on varieties of barriers. Therefore each retroactive VPA shall elaborate on at least one barrier that prevents project implementation without carbon revenues.

The following outlines how the additionality argument of a typical VPA can be structured. While the additionality argument on VPA-level should follows the same steps, the assessment may focus only on one of the presented barriers.

i. Access to finance barrier

The project activity proponent shall indicate that the user targeted under the VPA could not access appropriate capital without consideration of the carbon credit revenues at the VPA level.

The project activity shall demonstrate that Indonesian households, communities, SMEs face an access to finance barrier due to their low purchasing power and the high investment costs of the biodigesters. The project activity shall indicate that the investment costs on the user level are significant and constitute a high payback period in terms of cash savings from baseline fuel. Evidence shall be provided on how the VPA helps overcome the access to finance barrier by:

a. indicating that the project activity subsidises part of the investment cost of the biodigesters, thereby lowering the payback period;
b. indicating that the project activity facilitates access to micro finance loans to users

[23] See chapter 'Emissions from Livestock and Manure Management' under the volume 'Agriculture, Forestry and other Land use' of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories

ii. Technological barrier

The project proponent shall indicate that a less technologically advanced alternative to the VPA involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions.

The biodigester technology is not difficult to operate on the condition that the end-user is properly trained and after-sales services, including maintenance and repair are offered at an affordable rate or free of charge. Evidence shall be provided on how the VPA helps overcome the technology barrier by:

a. indicating that the project activity employs staff trained in delivering the technology;
b. indicating that the project activity offers a guarantee covering free-of-charge maintenance services for at least the initial years of operations;
c. indicating that the project activity shall indicate that adequate training is provided to the end-users, helping the targeted users overcome the technology barrier.

iii. Other barriers

The project proponent shall indicate that other barriers such as prevailing practice, institutional barriers or limited information, managerial resources, organisational capacity, or capacity to absorb new technologies, exist and can be overcome by the project activity.

VPAs successfully demonstrating compliance with at least one of the listed barriers shall be defined as additional.

Approach 2: Demonstration of additionality for regular small-scale VPAs

To demonstrate additionality for regular small-scale VPAs, paragraph 2 of the Guidelines on the Demonstration of Additionality of Small-Scale Project Activities' (EB68 Annex 27, version 09.0) shall be followed.

As defined in paragraph 2, the documentation of barriers, as per paragraph 1 of the guidance, is not required for a positive list of technologies and project activity types that are defined as automatically additional for project sizes up to and including the small-scale CDM thresholds. Paragraph 2 c is applicable to this PoA. It states the condition:

"Project activities solely composed of isolated units where the users of the technology/measure are households or communities or Small and Medium Enterprises (SMEs) and where the size of each unit is no larger than 5% of the small-scale CDM thresholds. This size limitation translates into units under 750 kW installed capacity or under 3000 MWh of energy savings per year or 3000 tonnes of emission reductions per year."

VPAs successfully demonstrating compliance with the indicated size limit or any other item included in the positive list shall be defined as additional.

Prior consideration of carbon finance

From the onset it has been the intention for the IDBP to seek carbon financing to ensure the long-term (financial) sustainability of the programme. Hereunder this is explained by sketching the experiences on which IDBP is built on, as well as highlighting the relevant documents and activities executed.

IDBP functions similarly to a larger network of SNV supported domestic biogas programmes, which fall under the Asia Biogas Programme (ABP). Notably the Nepal Biogas Support Program (CDM) and the National Biodigester Programme Cambodia (Gold Standard) are part of the ABP, and the design of IDBP is based on the design of these programmes where carbon finance is a necessary financing component. IDBP has, based on the experiences of these past programmes, always considered carbon finance as integral to programme financing for the near and far future, therefore without the projected income from carbon offsets the IDBP would not have started.

Several documents and activities can be referenced to evidence this. An integral part of the feasibility study undertaken in July 2008 was to investigate financing models in which CDM or any other form of carbon finance can play a role. Additionally, at a stakeholder meeting held in July 2008 the role of carbon finance was discussed. Finally, the proposal submitted by Hivos in April 2009 on the basis of which the IDBP is currently implemented points out that the potential of carbon finance needs to be investigated.

Prior consideration and continued action taken to secure carbon finance after the commencement of the programme is documented in the table below.

Document	**Date of completion**	**CDM relevance**
IDBP feasibility study	January 2009	Carbon finance is identified as an additional source of finance that makes the programme more financially attractive.
Programme Proposal	April 2009	The proposal submitted by Hivos on the basis of which the IDBP is currently implemented points out that carbon finance needs to be investigated.
Electronic mail	Sept 2009 – Jan 2010	Email communication between Hivos staff discussing the strategy to incorporate carbon finance into the programme.
ToRs Baseline study	April 2010	Terms of Reference for the development of a socio-economic and gender baseline study for the IDBP, which includes reference to a carbon baseline study.
PIN	April 2011	The Project Idea Note for the IDBP was drafted with the financial support of KfW Bankengruppe.
Baseline study	October 2011	Contract signed between consultancy Climate Focus and Hivos regarding the completion of the baseline survey for the IDBP.

The first Household Agreement under the programme was signed on 24 October 2009, later than the stakeholder meeting (July 2008), the Feasibility Study (study in July 2008, report in January 2009), and the Programme Proposal (April 2009), each referring to the CDM or the Gold Standard. IDBP evidences therefore that carbon finance is considered prior to the development and implementation of the programme. Based on the evidence provided, it is fair to conclude that IDBP has considered carbon finance before the onset of implementation and that carbon finance was always seen as an integral part of the programme income to achieve a sustainable financing model.

E.5.2. Key criteria and data for assessing additionality of a SSC-VPA:

Approach 1: Retroactive small-scale VPAs

Referring to the assessment and demonstration of additionality in section E.5.1, any one of the following barriers will be referred to in order to assess the additionality of a retroactive small-scale VPA that is proposed to be included in the registered PoA:

Criteria	Means of verification
i. Access to finance barrier evidenced	The VPA implementer shall indicate that the users targeted under the VPA could not access appropriate capital without consideration of the carbon credit revenues at the VPA level.
Or	
ii. Technology barrier evidenced	The VPA implementer shall indicate that a less technologically advanced alternative to the VPA involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions.
Or	
iii. Other barrier evidenced	The VPA implementer shall indicate that other barriers such as prevailing practice, institutional barriers or limited information, managerial resources, organisational capacity, or capacity to absorb new technologies, exist and can be overcome by the project activity.

Approach 2: Regular small-scale VPAs

Referring to the assessment and demonstration of additionality in section E.5.1, the following criteria will be applied in order to assess the additionality of a regular small-scale VPA that is proposed to be included in the registered PoA:

Criteria	Means of verification
i. The project activity is solely composed of isolated units	Only project activities implementing biodigesters are allowed under the PoA. Each biodigester is an isolated unit.
ii. The users of the technology/measure are households or communities or Small and Medium Enterprises (SMEs)	The VPA implementer shall ensure that the biodigesters implemented under the VPA are installed at households or communities or Small and Medium Enterprises (SMEs). The Household Agreements shall evidence the type of user.
iii. The size of each unit is no larger than 5% of the small-scale CDM thresholds. This size limitation translates into units under 750 kW (2,250 kW thermal) installed capacity or under 3000 MWh of energy savings per year or 3000 tonnes of emission reductions per year.	The VPA implementer shall ensure that the installed capacity of each biodigester implemented in the VPA will not exceed 750kW (2,250 kW thermal). Also, each biodigester will not emit more than 3000 tCO_2e per year. The capacity of the biodigesters as described in the IDBP Database shall evidence that the included biodigesters are below the maximum threshold.

E.6. Estimation of Emission reductions of a VPA:

E.6.1. Explanation of methodological choices, provided in the approved baseline and monitoring methodology applied, selected for a typical SSC-VPA:

The programme applies the baseline and monitoring procedures according to the guidelines laid out in the methodology entitled 'Technologies and practices to displace decentralized thermal energy' (11/04/2011).

- The methodology is applicable to the selected biodigester technology as it covers technologies that reduce or displace GHG emissions from the thermal energy consumption of households, communities and SMEs, which is the scope of this programme.
- The methodology accounts for the displacement of NRB and fossil fuels, both which are applicable to the baseline scenario.
- The methodology assumes that in the absence of the project activity, the baseline scenario would be the use of these fuels for meeting similar thermal energy needs. Equation (2) of the methodology is referred to for the calculation of emission reductions.
- The differentiation between non-renewable and renewable woody biomass is determined following the approach outlined in Annex 1[24] of the methodology.
- The methodology also covers the recovery of the methane from manure and organic waste that would otherwise decay anaerobically. The emission reductions are calculated in accordance with Annex 6[25] of the methodology, which refers to the IPCC Tier 1 or 2 methodologies.
- Country-specific values can be applied if these become available. Otherwise, defaults values for parameters VS_T and B_0 can be used.
- Project emissions and leakage will be accounted for in line with the methodology requirements.

E.6.2. Equations, including fixed parametric values, to be used for calculation of emission reductions of a SSC-VPA:

i. Accounting for emission reductions due to the displacement of fossil fuels and non-renewable biomass[26].

Emission reductions:

Emission reductions are credited by comparing fuel consumption in a project scenario to the applicable baseline scenario. When the baseline fuel and the project fuel are different and the emission factors are different, the overall GHG reductions achieved by the project activity in year *y* are calculated as follows:

$$\mathbf{ER_{CO2,y}} = \sum_{b,p} N_{p,y} * U_{p,y} * \left(f_{NRB,b,y} * \ ER_{b,p,y,CO2} + ER_{b,p,y,non-CO2}\right) - \sum LE_{p,y} \qquad \textbf{(1)}$$

[24] Annex 1: Non-Renewable Biomass Assessment

[25] Annex 6: Application of the methodology to biodigesters, including animal waste management

[26] CO_2 and non-CO_2 emissions factors for charcoal may be estimated from project specific monitoring or alternatively by researching a conservative wood to charcoal production ratio (from IPCC, credible published literature, project-relevant measurement reports, or project-specific monitoring) and multiplying this value by the pertinent EF for wood.

Where:

$ER_{CO2,y}$	Cumulative CO_2 emission reductions from the substitution of non-renewable biomass and fossil fuels
$\sum_{b,p}$	Sum over all relevant (baseline b/project p) couples
$N_{p,y}$	Cumulative project operational rate included in the project database for project scenario p against baseline scenario b in year y
$U_{p,y}$	Cumulative usage rate for technologies in project scenario p in year y, based on cumulative adoption rate and drop off rate (fraction)
$ER_{b,p,y,CO2}$	Specific CO_2 emission savings for an individual technology of project p against an individual technology of baseline b in year y, in tCO_2/year and as derived from the statistical analysis of the data collected from the field tests
$ER_{b,p,y,non\text{-}CO2}$	Specific non-CO_2 emission savings for an individual technology of project p against an individual technology of baseline b in year y, converted in tCO_2/year, and as derived from the statistical analysis of the data collected from the field tests
$f_{NRB,b,y}$	Fraction of biomass used in year y for baseline scenario b that can be established as non-renewable biomass
$LE_{p,y}$	Leakage for project scenario p in year y (tCO_2e/yr)

As there is one common baseline scenario and one type of technology applied, and specific non-CO_2 emission savings are treated in a separate equation (equation **5** onwards), the VPAs included under this programme can apply the following formula for calculating emission reductions for the VPA:

$$\sum ER_{CO2,y} = \left(\sum BE_{b,CO2,y} - \sum PE_{p,CO2,y} - \sum LE_{p,CO2,y}\right) * N_{p,y} * U_{p,y} \quad \textbf{(2)}$$

Where:

$\sum ER_{CO2,y}$	Cumulative CO_2 emission reductions from the substitution of non-renewable biomass and fossil fuels
$\sum BE_{b,CO2,y}$	Cumulative baseline emissions as calculated below under formula (**3**)
$\sum PE_{p,CO2,y}$	Cumulative project emissions as calculated below under formula (**4**)
$\sum LE_{p,CO2,y}$	Cumulative leakage as per methodology guidance[27]

[27] 'Technologies and practices to displace decentralized thermal energy – 11/04/2011' p.11 - 12

$N_{p,y}$	Cumulative project operational rate included in the project database for project scenario p against baseline scenario b in year y
$U_{p,y}$	Cumulative usage rate for technologies in project scenario p in year y, based on cumulative adoption rate and drop off rate (fraction)

Baseline emissions:

The baseline scenario per household is defined by the typical baseline fuel consumption patterns in a population that is targeted for adoption of the biodigester technology. In addition to the defined pre-project situation, the methodology allows for a baseline scenario to be assessed in terms of supressed demand if adequate evidence is provided that in the baseline scenario the target population consumes less fuel than would satisfy their human development needs.

$$\mathbf{BE_{b,CO2,y}} = \sum_{b} BB_{b,fuel} * NCV_{fuel} * EF_{b,fuel}) + (BB_{b,bio} * NCV_{bio} * EF_{b,bio} * f_{NRB}) \quad \textbf{(3)}$$

Where:

$BE_{b,CO2,y}$	Cumulative baseline CO_2 emissions from the use non-renewable biomass and fossil fuels during year y
$BB_{b,fuel}$	The quantity of fossil fuel consumed in the baseline scenario b, in tonnes/year
NCV_{fuel}	Net calorific value of fossil fuel, in TJ/tonne
$EF_{b,fuel}$	CO_2 emission factor of fossil fuel in baseline scenario b, in tonnes/TJ
$BB_{b,bio}$	The quantity of biomass consumed in the baseline scenario b, in tonnes/year
NCV_{bio}	Net calorific value of biomass, in TJ/tonne
$EF_{b,bio}$	CO_2 emission factor of biomass in baseline scenario b, in tonnes/TJ
f_{NRB}	Fraction of non-renewable biomass, in percentage

$BB_{b,fuel}$ and $BB_{b,bio}$ shall be defined *ex-ante* on the VPA level referencing a baseline survey applicable to the target user[28]. Prior to submission for verification, these values shall be fixed *ex-post* and will be deduced from the statistical analysis conducted on the data collected during the Baseline Performance Field Tests (BFT). The BFTs will target end users representative of the baseline scenario and shall be arranged in accordance with the guidance provided by the methodology[29].

Unless updated IPCC guidance is published, reference shall be made to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories for the default EF_{fuel}, EF_{bio}, NCV_{fuel}, NCV_{bio} values.

[28] 'Technologies and practices to displace decentralized thermal energy – 11/04/2011' p.10
[29] 'Technologies and practices to displace decentralized thermal energy – 11/04/2011' p.12 - 14

Project emissions:
The project scenario is defined by the fuel consumption of end users within the targeted population that adopts the biodigester technology.

$$\mathbf{PE_{p,CO2,y}} = \sum (BB_{p,fuel} * NCV_{fuel} * EF_{p,fuel}) + (BB_{p,bio} * NCV_{bio} * EF_{p,bio} * f_{NRB}) \quad \textbf{(4)}$$

Where:

$PE_{p,CO2,y}$	Cumulative project CO_2 emissions from the use non-renewable biomass and fossil fuels during year y
$BB_{p,fuel}$	The quantity of fossil fuel consumed in the project scenario p, in tonnes/year
NCV_{fuel}	Net calorific value of fossil fuel, in TJ/tonne
$EF_{p,fuel}$	CO_2 emission factor of fossil fuel in project scenario p, in tonnes/TJ
$BB_{p,bio}$	The quantity of biomass consumed in the project scenario p, in tonnes/year
NCV_{bio}	Net calorific value of biomass, in TJ/tonne
$EF_{p,bio}$	CO_2 emission factor of biomass in project scenario p, in tonnes/TJ
f_{NRB}	Fraction of non-renewable biomass, in percentage

Ex-ante $BB_{p,fuel}$ and $BB_{p,bio}$, the quantities of fossil fuel and biomass consumed during year y, shall be estimated from literature, lab testing, application of appropriate discount factors, manufacturer specifications or other viable sources. These values will be presented prior to validation. Prior to submission for verification, these values shall be fixed *ex-post* and will be deduced from the statistical analysis conducted on the data collected during the Project Performance Field Tests (PFT), which will be updated once every two years. The PFTs will target end users representative of the project scenario target population using the biodigester technology and shall be arranged in accordance with the guidance provided by the methodology[30].

Unless updated IPCC guidance is published, reference shall be made to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories for the default $EF_{p,fuel}$, $EF_{p,bio}$, NCV_{fuel}, NCV_{bio} parameters.

To estimate the f_{NRB}, reference shall be made to one of the methodologies outlined in Annex 1[31] of the methodology.

Leakage:
In accordance with the methodology, the following potential sources of leakage are to be considered:

[30] 'Technologies and practices to displace decentralized thermal energy – 11/04/2011' p.12 - 14
[31] Annex 1: Non-Renewable Biomass Assessment

- The displaced baseline cook stoves- are reused outside the project boundary in place of lower emitting technology or in a manner suggesting more usage than would have occurred in the absence of the project;
- The non-renewable biomass or fossil fuels saved under the project activity are used by non-project users who previously used lower emitting energy sources;
- The project significantly impacts the NRB fraction within an area where other CDM or VER project activities account for NRB fraction in their baseline scenario;
- The project population compensates for loss of the space heating effect of inefficient technology by adopting some other form of heating or by retaining some use of inefficient technology;
- By virtue of promotion and marketing of a new technology with high efficiency, the project stimulates substitution within users who commonly used a technology with relatively lower emissions, in cases where such a trend is not eligible as an evolving baseline.

A leakage investigation shall be conducted every two years using relevant survey methods that can be combined with monitoring surveys as is applicable. Leakage risks deemed very low will be ignored where the case for their insignificance can be substantiated.

Leakage shall be calculated as a quantitative emissions volume (tCO_2e) or as a percentage of total emissions.

ii. Accounting for emission reductions due to the avoidance of methane emissions from manure handling.

The baseline emissions from the handling of animal waste shall be determined by using one to the two approaches; IPCC Tier 1 or IPCC Tier 2. The choice of the appropriate approach shall be contingent upon the availability of baseline data for the estimation of the methane emission factor per category of livestock.

Baseline emissions following Tier 1:

The Tier 1 approach is applicable to situations where baseline data required for the estimation of the methane emission factor per category of livestock is *not* available, or where it is difficult to define a distinct practice of manure handling within the programme boundary. The following equation is applicable to calculate the baseline emissions per household:

$$\mathbf{BE_{b,CH4,y}} = GWP_{CH4} * \sum_{T} (EF_{awms,T} * N_{T,h}) \quad \textbf{(5)}$$

Where:

$BE_{b,CH4,y}$	Baseline emissions from manure handling during the year y in tCO_2e
GWP_{CH4}	Global Warming Potential of methane (21)
$EF_{awms,T}$	Emission factor for the defined livestock population category T
$N_{T,h}$	Number of livestock category T in premise h

The relevant default methane emission factor for livestock by temperature and region shall be sourced from Tables 10.14 – 10.16 of the IPCC Guidelines for National Greenhouse Gas Inventories[32]. $U_{p,y}$, which in accordance to the PoA-DD is assumed to be 1 *ex-ante,* will be confirmed *ex-post* through the annual Biogas User Survey.

Project emissions following Tier 1:

Project emissions include both the physical leakage of biogas from the biodigester and the incomplete combustion of biogas. These shall be accounted for in accordance with equation (17) of the applicable methodology:

$$\mathbf{PE_{p,CH4,y}} = GWP_{CH4} * \sum (N_{T,h,y} * EF_{awms,T}) * PL_y + \sum (N_{T,h,y} * EF_{awms,T}) * (1 - \eta_{new\ stove}) (1 - PL_y) + PE_{awms,NT} \quad \mathbf{(6)}$$

Where:

$PE_{p,CH4,y}$	Project emissions from manure handling during the year y in tCO_2e
GWP_{CH4}	Global Warming Potential of methane (21)
$N_{T,h}$	Number of livestock category T in premise h
$EF_{awms,\ T}$	Emission factor for the defined livestock population category T
PL_y	Physical leakage of the biodigester (through measurement or application of 10% default)
$\eta_{\ new\ stove}$	Combustion efficiency of the used type of biogas stove
$PE_{awms,NT}$	Project emission from the animal waste not treated in the biodigester

Project emissions from the animal waste not treated in the biodigester in the project scenario will be zero since the non-treated animals in the project scenario will have the same situation as they would have had in the baseline. Tier 1 approach is applied for the calculation of the baseline emissions where baseline data required for an estimation of the methane emission factor per category of livestock were not available, thus the project scenario for untreated animal waste will be similar to baseline.

Total emissions reductions following Tier 1:

Emission reductions for the VPA will be calculated as:

$$\mathbf{ER_{CH4,y}} = (BE_{b,CH4,y} - PE_{p,CH4,y}) * N_{p,y} * U_{p,y} \quad \mathbf{(7)}$$

Where:

$ER_{CH4,y}$	Methane emissions reductions in year y (tCO_2)

[32] IPCC Guidelines for National Greenhouse Gas Inventories (2006) 'Chapter 10: Emissions from Livestock and Manure Management'

$BE_{b,CH4,y}$	Baseline methane emissions during the year y (tCO_2)
$PE_{p,CH4,y}$	Project methane emissions during the year y (tCO_2)
$N_{p,y}$	Cumulative project operational rate included in the project database for project scenario p against baseline scenario b in year y
$U_{p,y}$	Cumulative usage rate for technologies in project scenario p in year y, based on cumulative adoption rate and drop off rate (fraction)

Baseline emissions following Tier 2:

The Tier 2 approach is applicable to situations where baseline data for an estimation of the methane emission factor per category of livestock are available. The baseline emissions per household shall be calculated as follows:

$$\mathbf{BE_{b,CH4,h,y}} = \frac{(VS_T * 365) * (B_{0,T} * 0.67 kg/m^3 * MCF_{x,k} * MS_{T,x,k} * GWP_{CH4} * N_{T,h})}{1000} \quad \textbf{(8)}$$

Where:

$BE_{b,CH4,h,y}$	Baseline emissions from manure handling during the year y in tCO_2e for manure handling method h
VS_T	Daily volatile solid excreted for livestock category T in g dry matter per animal per day
$B_{0,T}$	Maximum methane producing capacity for manure produced by livestock category T in m^3 CH_4
$MCF_{x,k}$	Methane conversion factors for the animal waste handling system in the baseline situation by climate zone k, (%)
$MS_{T,x,k}$	Fraction of livestock category T's manure handled using manure management system x in climate region k (determined through survey method ex-post)
GWP_{CH4}	Global Warming Potential of methane (21)
$N_{T,h}$	Number of livestock category T in premise h

$MCF_{x,k}$, $MS_{T,x,k}$ and $N_{T,h}$ shall be defined *ex-ante* on the VPA level referencing a baseline survey applicable to the target user . The conversion factors applicable to the baseline scenario will be sourced from default values presented in Table 10.17 of the IPCC Guidelines for National Greenhouse Gas Inventories.

VS_T and $B_{0,T}$ can be defined *ex-ante* as per the default values presented in the IPCC Guidelines for National Greenhouse Gas Inventories, where no country-specific data is available. These can be found in Tables 10A-4 through 10A-9 of the referenced report.

Project emissions following Tier 2:
Project emissions from the animal waste not treated in the biodigester in the project scenario shall be calculated using equation (**8**) and with the following changed definition of parameters:

$MCF_{p,s,k}$	Methane conversion factor of livestock category p manure treated in the animal waste management system s, in climate region k
$MS_{p,s,k}$	Fraction of livestock category p manure treated in the animal waste management system s, in climate region k

Total emissions reductions following Tier 2:
Emission reductions per VPA will be calculated as:

$$\mathbf{ER_{CH4,y}} = \left(BE_{b,CH4,y} - PE_{p,CH4,y}\right) * N_{p,y} * U_{p,y} \quad (\mathbf{9})$$

Where:

$ER_{CH4,y}$	Methane emissions reductions in year y (tCO_2)
$BE_{b,CH4,y}$	Baseline methane emissions during the year y (tCO_2)
$PE_{p,CH4,y}$	Project methane emissions during the year y (tCO_2)
$N_{p,y}$	Cumulative project operational rate included in the project database for project scenario p against baseline scenario b in year y
$U_{p,y}$	Cumulative usage rate for technologies in project scenario p in year y, based on cumulative adoption rate and drop off rate (fraction)

iii. Accounting for total emission reductions

The total emission reductions per VPA per year from both the displacement of fossil fuels and non-renewable biomass and avoidance of methane emissions from manure handling will be calculated as:

$$\mathbf{ER_{Total}} = ER_{CO2,y} + ER_{CH4,y} \quad (\mathbf{10})$$

Where:

$ER_{CO2,y}$	CO_2 emissions reductions in year y (tCO_2)

$ER_{CH4,y}$ Methane emissions reductions in year y (tCO_2)

E.6.3. Data and parameters that are to be reported in SSC-VPA-DD form:

Data / Parameter:	**$f_{NRB,y}$**
Data unit:	%
Description:	Fraction of biomass used in the absence of the project activity in year y that can be established as non-renewable biomass using nationally approved methods
Source of data used:	FAO (2010) Global Forest Resources Assessment 2010 Country Report Indonesia surveys, and government data
Value applied:	64.8
Justification of the choice of data or description of measurement methods and procedures actually applied :	
Any comment:	-

Data / Parameter:	**NRB**
Data unit:	m^3
Description:	Non-renewable woody biomass
Source of data used:	FAO (2010) Global Forest Resources Assessment 2010 Country Report Indonesia;
Value applied:	55,984,649
Justification of the choice of data or description of measurement methods and procedures actually applied :	NRB can be calculated by subtracting the DRB of 30,411,351 m^3 from B_y of 86,396,000 m^3. B_y is the amount of firewood removed from forests which amounts to 86,396,000 m^3 (FAO, 2010).
Any comment:	-

Data / Parameter:	**DRB**
Data unit:	m^3
Description:	Demonstrably renewable woody biomass
Source of data used:	FAO (2010) Global Forest Resources Assessment 2010 Country Report Indonesia; calculation
Value applied:	30,411,351
Justification of the choice of data or description of measurement methods and procedures actually applied :	The annual sustainable yield from the plantations is determined to be 35,490,000 m^3, in line with 35,378,000 m^3 estimated by ITTO (2009). The more conservative number 35,490,000 m^3 is multiplied by the fraction of wood fuel removals from total wood removals (85.57%) reported by FAO, yielding yields the demonstrably renewable biomass (DRB) of 30,411,351 m^3.

Any comment:	-

Data / Parameter:	**$EF_{b, bio}$**
Data unit:	tCO_2/TJ
Description:	Emission factor of the woody biomass used in baseline scenario b
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value applied:	112
Justification of the choice of data or description of measurement methods and procedures actually applied :	As per requirement of the methodology and Table 2.3, Chapter 2, Volume 2 of the 2006 IPCC Guidelines. The IPCC is a standard, credible source of emissions factors.
Any comment:	IPCC (2006); May be updated according to any future changes by the IPCC. CO_2 and non-CO_2 emissions factors for charcoal may be estimated from project specific monitoring or alternatively by researching a conservative wood to charcoal production ratio (from IPCC, credible published literature, project-relevant measurement reports, or project-specific monitoring) and multiplying this value by the pertinent EF for wood.

Data / Parameter:	**$EF_{p, bio}$**
Data unit:	tCO_2/TJ
Description:	Emission factor of the woody biomass used in project scenario p
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value applied:	112
Justification of the choice of data or description of measurement methods and procedures actually applied :	As per requirement of the methodology and Table 2.3, Chapter 2, Volume 2 of the 2006 IPCC Guidelines. The IPCC is a standard, credible source of emissions factors.
Any comment:	IPCC (2006); May be updated according to any future changes by the IPCC.

Data / Parameter:	**NCV_{bio}**
Data unit:	TJ/tonne
Description:	Net calorific value of the non-renewable biomass used in the baseline scenario
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value applied:	0.015
Justification of the choice of data or description of measurement methods and procedures actually applied :	As per requirement of the methodology and Table 2.3, Chapter 2, Volume 2 of the 2006 IPCC Guidelines. The IPCC is a standard, credible source of emissions factors.
Any comment:	IPCC (2006); May be updated according to any future changes by the IPCC

Data / Parameter:	**$EF_{b, fuel}$**

Data unit:	tCO_2/TJ
Description:	Emission factor of fossil fuels used in baseline scenario b
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value applied:	Kerosene = 71.9 LPG = 63.1
Justification of the choice of data or description of measurement methods and procedures actually applied :	As per requirement of the methodology and Table 2.3, Chapter 2, Volume 2 of the 2006 IPCC Guidelines. The IPCC is a standard, credible source of emissions factors.
Any comment:	IPCC (2006); May be updated according to any future changes by the IPCC

Data / Parameter:	**$EF_{p, fuel}$**
Data unit:	tCO_2/TJ
Description:	Emission factor of fossil fuels used in project scenario p
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value applied:	Kerosene = 71.9 LPG = 63.1
Justification of the choice of data or description of measurement methods and procedures actually applied :	As per requirement of the methodology and Table 2.3, Chapter 2, Volume 2 of the 2006 IPCC Guidelines. The IPCC is a standard, credible source of emissions factors.
Any comment:	IPCC (2006); May be updated according to any future changes by the IPCC

Data / Parameter:	**NCV_{fuel}**
Data unit:	TJ/tonne
Description:	Net calorific value of fossil fuels used in the baseline scenario
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value applied:	Kerosene = 0.0438 LPG = 0.0473
Justification of the choice of data or description of measurement methods and procedures actually applied :	As per requirement of the methodology and Table 2.3, Chapter 2, Volume 2 of the 2006 IPCC Guidelines. The IPCC is a standard, credible source of emissions factors.
Any comment:	IPCC (2006); May be updated according to any future changes by the IPCC

Data / Parameter:	**VS_T**
Data unit:	kg/head/day
Description:	Daily volatile solid excreted for livestock category T
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value applied:	Dairy cows = 2.8 Other cattle = 2.3

	Buffalo = 3.9 Market swine = 0.3 Goats = 0.35 Sheep = 0.32 Poultry = 0.02
Justification of the choice of data or description of measurement methods and procedures actually applied :	As per requirement of the methodology and sourced from Tables 10. A-4 through A-9, Chapter 10, Volume 4 of the 2006 IPCC Guidelines The IPCC is a standard, credible source of emissions factors.
Any comment:	IPCC (2006); May be updated according to any future changes by the IPCC. National data can replace the IPCC value, if available

Data / Parameter:	**Bo_T**
Data unit:	m^3 CH_4/kg
Description:	Maximum methane producing capacity for manure produced by animal type T
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value applied:	Dairy cows = 0.13 Other cattle = 0.10 Buffalo = 0.10 Market swine = 0.29 Goats = 0.13 Sheep = 0.13 Poultry = 0.24
Justification of the choice of data or description of measurement methods and procedures actually applied :	As per requirement of the methodology and sourced from Tables 10.A-4 through A-9., Chapter 10, Volume 4 of the 2006 IPCC Guidelines The IPCC is a standard, credible source of emissions factors.
Any comment:	IPCC (2006); May be updated according to any future changes by the IPCC. National data can replace the IPCC value, if available

Data / Parameter:	**$MCF_{x,k}$**
Data unit:	%
Description:	The methane conversion factor for the baseline manure management systems (x) in all the regions (k).
Source of data used:	Determined on VPA level referencing reports, studies or baseline surveys
Value applied:	Determined on VPA level
Justification of the choice of data or description of measurement methods and procedures actually applied :	As per Tables 10.A., Chapter 10, Volume 4 of the 2006 IPCC Guidelines
Any comment:	National data can replace the IPCC value, if available

Data / Parameter:	$\eta_{biogas\ stove}$
Data unit:	%
Description:	Combustion efficiency of the new biogas stove introduced by the programme
Source of data used:	Determined on VPA level through reference to studies, reports, or laboratory tests.
Value applied:	Determined on VPA level
Justification of the choice of data or description of measurement methods and procedures actually applied :	-
Any comment:	-

Data / Parameter:	$EF_{awms,T}$
Data unit:	kg CH_4
Description:	Emission factor for the defined livestock population category T by average temperature (27.1°C)
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories; Indonesian Meteorological Climatological and Geophysical Agency
Value applied:	Dairy cows = 31 Other cattle = 1 Buffalo = 2 Market swine = 7 Goats = 0.22 Sheep = 0.20 Poultry = 0.02
Justification of the choice of data or description of measurement methods and procedures actually applied :	As per requirement of the methodology and sourced from Tables 10.A-4 through A-9., Chapter 10, Volume 4 of the 2006 IPCC Guidelines The IPCC is a standard, credible source of emissions factors.
Any comment:	IPCC (2006); May be updated according to any future changes by the IPCC

E.7. Application of the monitoring methodology and description of the monitoring plan:

E.7.1. Data and parameters to be monitored by each SSC-VPA:

Data / Parameter:	$U_{p,y}$
Data unit:	Fraction
Description:	Cumulative usage rate for technologies in project scenario p in year y, based on cumulative adoption rate and drop off rate (fraction)
Source of data to be used:	Collected through the annual Biogas User Survey.

Value of data applied for the purpose of calculating expected emission reductions	
Monitoring frequency	Annual
QA/QC procedures to be applied:	The usage rate of thermal applications will be monitored annually using survey methods to satisfy the requirements put forth by the methodology 'Technologies and practices to displace decentralized thermal energy consumption' (11/04/2011).
Any comment:	A single usage parameter is weighted to be representative of the quantity of project technologies of each age being credited in a given project scenario.

Data / Parameter:	**$N_{p,,y}$**
Data unit:	Number
Description:	Cumulative project operational rate included in the project database for project scenario p against baseline scenario b in year y
Source of data to be used:	IDBP database.
Value of data applied for the purpose of calculating expected emission reductions	Reported as a result of ($No_{p,y}$ * ($O_{p,y}$ / 365))
Monitoring frequency	Continuous
QA/QC procedures to be applied:	As per procedures of the IDBP database.
Any comment:	$N_{p,y}$ shall be calculated from (a) the number of installed system (parameter $No_{p,y}$); and (b) the average operational days of the system ($O_{p,y}$). The equation is therefore ($N_{p,y}$ = $No_{p,y}$ * ($O_{p,y}$ / 365)). The average operational days will be confirmed upon verification. Households are required to notify provincial office staff in a situation when a biodigester stops working. This information is recorded in the IDBP database, allowing the identification per included biodigester the amount of operational days per year. In a scenario where the biodigester stops operating, the number of non-operational days is recorded in the database.

Data / Parameter:	**$No_{p,y}$**
Data unit:	Number
Description:	Cumulative number of project technologies included in the project database for project scenario p in year y
Source of data to be used:	IDBP database.
Value of data applied for the purpose of calculating expected emission reductions	Shall be determined at VPA level.
Monitoring frequency	Continuous
QA/QC procedures to be applied:	As per procedures of the IDBP database.

Any comment:	The actual cumulative number of biodigester operational days will be confirmed upon verification.

Data / Parameter:	**$O_{p,y}$**
Data unit:	Number
Description:	The average technology-days during which the biodigesters are operational for project scenario p against baseline scenario b in year y
Source of data to be used:	IDBP database.
Value of data applied for the purpose of calculating expected emission reductions	Shall be determined on VPA level.
Monitoring frequency	Continuous
QA/QC procedures to be applied:	As per procedures of the IDBP database.
Any comment:	The actual cumulative number of biodigester non-operational days will be confirmed upon verification. The equation to calculate this is ($O_{p,y}$ = 365 – non-operational days)

Data / Parameter:	**$BB_{b,bio}$**
Data unit:	Tonnes/year
Description:	Amount of woody biomass used in the baseline scenario b
Source of data to be used:	Estimated on VPA level referencing reports, studies or baseline or Biogas User surveys. Confirmed through a Baseline Performance Test.
Value of data applied for the purpose of calculating expected emission reductions	Determined on VPA level, with 'b' being sub-categorised into: b1: households b2: communities b3: SMEs
Monitoring frequency	Updated every two years
QA/QC procedures to be applied:	
Any comment:	Baseline Performance Field Test will be updated once every two years.

Data / Parameter:	**$BB_{p,bio}$**
Data unit:	Tonnes/year
Description:	Amount of woody biomass used in the project scenario p
Source of data to be used:	Estimated on VPA level referencing reports, studies or baseline or Biogas User surveys. Confirmed through a Project Performance Test.
Value of data applied for the purpose of calculating expected emission reductions	Determined on VPA level, with 'p' being sub-categorised into: p1: households p2: communities p3: SMEs
Monitoring frequency	Updated every two years
QA/QC procedures to be applied:	
Any comment:	Project Performance Field Test will be updated once every two years.

Data / Parameter:	$BB_{b,fuel}$
Data unit:	Tonnes/year
Description:	Amount of fossil fuels used in baseline scenario b
Source of data to be used:	Estimated on VPA level referencing reports, studies or baseline or Biogas User surveys. Confirmed through a Baseline Performance Field Test.
Value of data applied for the purpose of calculating expected emission reductions	Determined on VPA level, with 'b' being sub-categorised into: b1: households b2: communities b3: SMEs
Monitoring frequency	Updated every two years
QA/QC procedures to be applied:	
Any comment:	Baseline Performance Field Test will be updated once every two years.

Data / Parameter:	$BB_{p,fuel}$
Data unit:	Tonnes/year
Description:	Projected amount of fossil fuels used in the project scenario p
Source of data to be used:	Estimated on VPA level referencing reports, studies or baseline or Biogas User surveys. Confirmed through a Project Performance Test.
Value of data applied for the purpose of calculating expected emission reductions	Determined on VPA level, with 'p' being sub-categorised into: p1: households p2: communities p3: SMEs
Monitoring frequency	Updated every two years
QA/QC procedures to be applied:	
Any comment:	Project Performance Field Test will be updated once every two years.

Data / Parameter:	$LE_{p,y}$
Data unit:	tCO_2e/year
Description:	Leakage in project scenario p during year y
Source of data to be used:	Collected through the annual Biogas User Survey.
Value of data applied for the purpose of calculating expected emission reductions	
Monitoring frequency	Every two years
QA/QC procedures to be applied:	The leakage will be monitored once every two years using survey methods to satisfy the requirements put forth by the methodology 'Technologies and practices to displace decentralized thermal energy consumption' (11/04/2011).
Any comment:	-

Data / Parameter:	$MS_{P,S,K}$
Data unit:	%
Description:	Fraction of livestock category T's manure not treated in bio-digester, in climate

	region k
Source of data to be used:	Collected through the annual Biogas User Survey.
Value of data applied for the purpose of calculating expected emission reductions	0
Monitoring frequency:	Annual
QA/QC procedures to be applied:	-
Any comment:	-

Data / Parameter:	**$MS_{T,S,k}$**
Data unit:	%
Description:	Fraction of livestock category T's manure fed into the bio-digester, S in climate region k
Source of data to be used:	Biogas User Survey
Value of data applied for the purpose of calculating expected emission reductions	
Monitoring frequency:	Annual
QA/QC procedures to be applied:	
Any comment:	Applicable to VPAs applying Tier 2 only

Data / Parameter:	**$MS_{T,x,k}$**
Data unit:	%
Description:	Fraction of livestock category T's manure handled using manure management system x in climate region k
Source of data to be used:	Determined on VPA level referencing reports, studies or baseline or Biogas User surveys
Value of data applied for the purpose of calculating expected emission reductions	Determined on VPA level
Monitoring frequency:	
QA/QC procedures to be applied:	
Any comment:	

Data / Parameter:	**$N_{T,h}$**
Data unit:	Unit
Description:	Number of animals of livestock category T in premise h
Source of data to be used:	Biogas User Survey

Value of data applied for the purpose of calculating expected emission reductions	
Monitoring frequency:	Annual
QA/QC procedures to be applied:	-
Any comment:	Estimated on VPA level referencing reports, studies or baseline or Biogas User surveys.

Data / Parameter:	**PL**
Data unit:	%
Description:	Physical leakage of the biodigester
Source of data to be used:	IPCC
Value of data applied for the purpose of calculating expected emission reductions	Estimated using a 10% default rate of total methane production; or through measurement.
Monitoring frequency:	Annual
QA/QC procedures to be applied:	
Any comment:	As per Annex 6 of the applied methodology

Data / Parameter:	**GWP_{CH4}**
Data unit:	-
Description:	Global Warming Potential of methane
Source of data to be used:	IPCC (2006); May be updated according to any future changes by the IPCC
Value of data applied for the purpose of calculating expected emission reductions	-
Monitoring frequency:	Annual
QA/QC procedures to be applied:	-
Any comment:	-

Data / Parameter:	**Bio**
Data unit:	-
Description:	Use of bio-slurry
Source of data to be used:	Biogas User Survey
Value of data applied for the purpose of calculating expected emission reductions	-

Monitoring frequency:	Annual
QA/QC procedures to be applied:	-
Any comment:	To be used for the calculation of project emissions associated with bio-slurry usage – the CH_4 emissions from the anaerobic decay of the residual organic content of digestate subjected to anaerobic storage.

The PoA will also monitor the following social and environmental parameters, as defined under the Gold Standard[33]:

Data / Parameter:	**GS-03 Soil condition**
Data unit:	Number
Description:	Soil condition refers to changes compared to the baseline in organic matter content.
Source of data to be used:	Collected through the annual Biogas User Survey.
Description of measurement methods and procedures to be applied::	Number of users applying the final biodigester slurry on agricultural land. Data is to be collected annually.
QA/QC procedures to be applied:	This will be monitored through sampling to the requirements put forth by the methodology 'Technologies and practices to displace decentralized thermal energy consumption' (11/04/2011).
Any comment:	-

Data / Parameter:	**GS-06 Quality of employment**
Data unit:	Number
Description:	Quality of employment refers to changes compared to the baseline in the qualitative value of employment, such as whether the jobs resulting from the project activity are highly or poorly qualified, temporary or permanent. The proportion of employees attending vocational training programs, as proven through issuance of a certificate to all constructors, will be monitored.
Source of data to be used:	Collected through the IDBP Database.
Description of measurement methods and procedures to be applied::	All vocational training and Health and Safety training attendees will be issued with a certificate proving their attendance, and a record of their names, contact details and gender, will be kept as part of the CME's consolidated monitoring database. Data is to be collected annually.
QA/QC procedures to be applied:	This will be monitored through sampling to satisfy the requirements put forth by the methodology 'Technologies and practices to displace decentralized thermal energy consumption' (11/04/2011).Hard copies of all certificates issued will be kept by the CME.
Any comment:	-

Data / Parameter:	**GS-07 Livelihood of the poor**

[33] Refer to accompanying Gold Standard PoA-Passport for further details.

Data unit:	%
Description:	Livelihood of the poor refers to changes compared to the baseline in living conditions, access to healthcare services including affordability and poverty alleviation.
Source of data to be used:	Collected through the annual Biogas User Survey.
Description of measurement methods and procedures to be applied::	Carried out as part of the annual Biogas User Survey conducted by the IDBP. As part of this survey the following question will be included: "Do you feel that your living conditions have a) improved, b) stayed the same, c) worsened; since the installation of the biogas digester?"
QA/QC procedures to be applied:	This will be monitored through sampling to satisfy the requirements put forth by the methodology 'Technologies and practices to displace decentralized thermal energy consumption' (11/04/2011).
Any comment:	-

Data / Parameter:	**GS-08 Access to affordable and clean energy services**
Data unit:	Number
Description:	Access to energy services refer to changes in unsustainable energy use. This will be monitored through the number of biogas units commissioned.
Source of data to be used:	Collected through the IDBP Database.
Description of measurement methods and procedures to be applied::	As in the assessment of parameter 'N' above, the unique serial number of each installation will be recorded upon commissioning and entered into the electronic database, with clear divisions between VPAs. This will allow a count of the number of systems commissioned.
QA/QC procedures to be applied:	This will be monitored through sampling to satisfy the requirements put forth by the methodology 'Technologies and practices to displace decentralized thermal energy consumption' (11/04/2011).
Any comment:	-

Data / Parameter:	**GS-09 Human and institutional capacity**
Data unit:	Number
Description:	Changes compared to the baseline in education and skills, gender equality and empowerment. Women spend much of their time collecting firewood and cooking, and have little spare time to undertake activities that stimulate personal and entrepreneurial development. The number of women attending the Operation and Maintenance training as well as the bio-slurry utilization training will be monitored.
Source of data to be used:	Through the IDBP Database; Biogas User Survey
Description of measurement methods and procedures to be applied::	Either confirmed through the IDBP Database or carried out as part of the annual Biogas User Survey conducted by the IDBP.
QA/QC procedures to be applied:	This will be monitored through sampling to satisfy the requirements put forth by the methodology 'Technologies and practices to displace decentralized thermal energy consumption' (11/04/2011).
Any comment:	-

Data / Parameter:	**GS-10 Quantitative employment and income generation**
Data unit:	Number
Description:	The number of jobs generated by within the IDBP as well as the number of constructors employed will be monitored. To evidence income generation, the amount of users selling biodigester slurry on the market will be monitored.
Source of data to be used:	Employment records and through the IDBP Database; Biogas User Survey.
Description of measurement methods and procedures to be applied::	A record will be kept of all employees and jobs created as part of the programme. Hard copies of employment contracts will be kept by the CME, and details recorded in the centralised record-keeping database managed by the CME. Through the Biogas User Survey, the amount of users selling biodigester slurry on the market will be monitored.
QA/QC procedures to be applied:	This will be monitored through sampling to satisfy the requirements put forth by the methodology 'Technologies and practices to displace decentralized thermal energy consumption' (11/04/2011).
Any comment:	-

Data / Parameter:	**GS-12 Technology transfer and technological self-reliance**
Data unit:	Number
Description:	Refers to changes compared to the baseline in activities that build usable and sustainable know-how in a region/country for a technology, where know-how was previously lacking. The number of constructors trained and users attending the operation and maintenance training will be monitored.
Source of data to be used:	Training records and through the IDBP Database; Biogas User Survey.
Description of measurement methods and procedures to be applied::	Records will be kept of all staff and their attendance at the vocational training programmes, including general training extended to entities outside of the programme. All attendees will be issued with a certificate proving attendance and skills gained. Monitoring of this parameter will be combined with the monitoring of GS- 10. A record of all trainings held, and attendees, will be kept in the programme database.
QA/QC procedures to be applied:	This will be monitored through sampling to satisfy the requirements put forth by the methodology 'Technologies and practices to displace decentralized thermal energy consumption' (11/04/2011).
Any comment:	-

E.7.2. Description of the monitoring plan for a SSC-VPA:

All monitoring is coordinated by the CME, Hivos. The sampling plan in line with EB65 annex 2 Appendix 3 is outlined below.

Sampling Design

Objectives and reliability requirements

The objective of the sampling effort is to meet the monitoring requirements set forth in the methodology 'Technologies and practices to displace decentralized thermal energy consumption' (11/04/2011), as detailed in D.7.1 above. In accordance with the requirements set forth in the methodology, the sample

size will be selected following a 90% confidence interval and a 10% margin of error (90/10), where applicable.

As the PoA progresses and the number of VPAs increases, a single monitoring plan can be applied, covering several VPAs, adopting a confidence/precision level of 95/10 according paragraph 20 of the "Standard for sampling and surveys for CDM project activities and programme of activities" (Version 3.0). This option can be applied to a group of similar VPAs.

Target population and sampling frame
The monitoring survey is only conducted with end users representative of the project scenario using the biodigester at the time of the survey. The target population for the application of monitoring procedure is the households, local communities, SMEs with installed biodigesters, as identified through the centralised record-keeping database managed by the CME.

Sampling method and sample size
The CME is responsible for the production of periodical monitoring reports for each VPA, following the criteria outlined in section A.4. The minimum total sample size is 100, with at least 30 samples for project technologies of each age being credited[34]. A usage parameter must be established to account for the drop off rates as project technologies age and are replaced. This parameter shall be representative of the quantity of project technologies of each age being credited in a given project scenario.

Data collection and storage
Baseline data for the programme is estimated *ex-ante* for each target user group (households, local community, or SMEs) on the VPA level. This includes parameters $BB_{b,bio,}$ $BB_{b,fuel,}$ $N_{T,}$ and where Tier 2 is applied, $MCF_{x,k,}$ $MS_{T,x,k}$. This is gathered through data collected from official baseline surveys, reports or statistical databases. The minimum sample size is 100 for each baseline assessment. Baseline emissions relating to the actual use of biomass and fossil fuel are confirmed *ex-post* through the Baseline Performance Field Tests (BFTs) of fuel consumption, as described in Section 7 of the methodology. This Test shall be updated every second year. Project emissions relating to continued use of biomass and fossil fuel are confirmed *ex-post* through the Project Performance Field Tests (PFTs) of fuel consumption, as described in Section 7 of the methodology.

Response rates will be maximised by contacting all randomly-selected biogas system users beforehand to arrange a practical site visit date and sampling over the minimum required number to compensate for any non-responses. The right of the CME to perform these monitoring efforts will be included in the Household Agreement signed with each user. In special cases where participants refuse to participate in the monitoring, the reason shall be documented in the CME's programme database. The CME will explain that monitoring is part of the requirements of the programme and try to arrange an alternative date for a site visit, or carryout monitoring with another member of the households, local community, SME.

Training will be given to VPA implementer staff responsible for the data collection system on the management system to be put in place as part of the overall PoA. This will include:
- Data to be recorded in the database (as per A.4.4.1 of the PoA-DD) and how to complete the Household Agreement and Completion Report correctly;
- How to identify the serial number of the biodigester in use;

[34] 'Technologies and practices to displace decentralized thermal energy consumption' (11/04/2011), p.24

- How to fill out and where to submit copies of the Household Agreement and Completion Report and any associated documentation;
- How to complete Baseline and Project Performance Tests in accordance with Gold Standard guidelines;
- Monitoring procedures, in accordance section A.4.4. of the PoA-DD.

The Baseline and Project Performance Tests shall be updated once every two years, and will be designed in coordination with a qualified statistician.

On completion of training, trained staff will receive a letter confirming their attendance. The name, company and contact details of all attendees will be recorded as part of the CME's PoA database. This will be used to confirm that the training has been completed and that staff is qualified to carry out the data collection as required under the PoA.

The accuracy of data entry will be checked regularly by a designated person within the CME. Regular checking and verifying the accuracy of data submitted into the database shall be done by the database personnel and Technical Officer. Data analysis will be carried out by the CME. All underlying data (i.e. questionnaires) will be kept both in hardcopy and electronically by the CME.

Field measurement objectives and data to be collected
The parameters to be monitored within each VPA, as outlined in the applied methodology, are as follows:

A Biogas User Survey shall be completed annually and covers the following data:
- Number of users applying the final biodigester slurry on agricultural fields– annually;
- Perceived improvement of living conditions – annually;
- Number of women attending trainings – annually;
- Percentage of biodigester in use in the given year (y) – annually.

A Monitoring Survey shall be completed periodically and covers the following data:
- Quantity of biomass and fossil fuel that is used for cooking in a given baseline scenario in a given year (y) – once every two years through a Baseline Performance Test;
- Quantity of biomass and fossil fuel that is used for cooking in a given project scenario in a given year (y) –once every two years through a Baseline Performance Test;
- Leakage in the given project scenario in the given year (y) – once every two years. The PoA must conduct a leakage investigation every two years using survey methods that can be combined with monitoring surveys, as per the applied methodology.

The application of bio-slurry shall be monitored according the applied methodology, and in line with the approach used in project GS 1083. If there is any anaerobic use/storage of bioslurry under anaerobic conditions reported from the monitoring survey, project emissions shall be accounted for accordingly. The following approach shall be followed:
- Estimation of the total amount of volatile solid entering the biodigester;
- Assessment of remaining VS content of digestate;
- Assessment of methane potential of bio-slurry;
- Methane conversion factor of the digestate management systems;
- Calculation of project emissions using the information obtained in the previous steps.

Implementation
All sampling efforts will be conducted by qualified personnel who have undergone training as part of the programme. This training will cover information on the project background and basic functioning of the biogas systems, as well as the data collection process, including the format in which data should be collected. The personnel will be issued with a certificate confirming their attendance at relevant trainings and their qualification to complete the monitoring. A paper copy of the certificate will also be kept by the CME. Surveyor staff will be required to speak the native language (Bahasa Indonesia) in which biogas systems have been implemented, allowing for full understanding of any responses given by users, and any questions therein.

E.8 Date of completion of the application of the baseline study and monitoring methodology and the name of the responsible person(s)/entity(ies)

The Baseline Survey for households was completed in January 2012. The entity determining the baseline is Climate Focus BV. Climate Focus BV is not a project participant.

Contact information:

Climate Focus BV
Szymon Mikolajczyk
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Annex 1

CONTACT INFORMATION ON COORDINATING/MANAGING ENTITY and PARTICIPANTS IN THE PROGRAMME of ACTIVITIES

Organization:	Hivos
Street/P.O.Box:	Raamweg 16
Building:	
City:	Den Haag
State/Region:	
Postfix/ZIP:	2508 CG
Country:	Netherlands
Telephone:	
FAX:	
E-Mail:	h.clemens@hivos.nl
URL:	www.hivos.nl
Represented by:	
Title:	Mr.
Salutation:	
Last Name:	Clemens
Middle Name:	
First Name:	Harry
Department:	Hivos Head Office
Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

geen grenzen aan mensen

Hivos

Date: 17 January 2012
Project reference: Gold Standard PoA Indonesia Domestic Biogas
To: Gold Standard Foundation

Declaration of Non-Use of Official Development Assistance by Project Owner

Humanist Institute for Co-operation with Developing Countries, Hivos
As Project Owner of the above-referenced project, acting on behalf of all project participants, I now make the following representations:

Ben Witjes, Director Programmes & Projects

I hereby declare that I am duly and fully authorised by the project owner of the above referenced project, acting on behalf of all project participants, to make the following representations on Project Proponent's behalf:

I. Gold Standard Documentation
I am familiar with the provisions of Gold Standard Documentation relevant to Official Development Assistance (ODA). I understand that the above-referenced project is not eligible for Gold Standard registration if the project receives or benefits from Official Development Assistance under the condition that some or all credits coming out of the project are transferred to the ODA donor country. I now expressly declare that no financing provided in connection with the above-referenced project has come from or will come from ODA that has been or will be provided under the condition, whether express or implied, that any or all of the credits [CERs, ERUs or VERs] issued as a result of the project's operation will be transferred directly or indirectly to the country of origin of the ODA.

II. Duty to Notify Upon Discovery.
If I learn or if I am given any reason to believe at any stage of project design or implementation that ODA has been used to support the development or implementation of the project, or that an entity providing ODA to the host country may at some point in the future benefit directly or indirectly from the credits generated from the project as a condition of investment, I will make this known to the Gold Standard immediately.

III. Sanctions. I am fully aware that under Section 10 of the Gold Standard Terms and Conditions sanctions and damages may be incurred for the provision of false information related to Projects and/or Gold Standard credits.

Signed:

Name: R.g.M. Wijkes

Title: Director Programmes & Projects

On behalf of: Hivos

Humanistisch Instituut voor Ontwikkelingssamenwerking
Humanist Institute for Co-operation with Developing Countries
Instituto Humanista para la Cooperación con los Países en Desarrollo

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Annex 3

BASELINE INFORMATION

Annex 4

MONITORING INFORMATION

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