Gold Standard for the Global Goals
Key Project Information & VPA Design Document (PDD)

July 2017, Version 1

KEY PROJECT INFORMATION

Title of Project:	Nepal Biogas Support Program – CPA 1: 10,589 digesters
Title of the PoA:	Nepal Biogas Support Program – PoA (UNFCCC ref: 9572; GS 3110)
Brief description of Project:	This Component Project Activity (CPA) is part of the Nepal Biogas Support Program-Programme of Activity (PoA). This CPA includes 10,589 digesters which were implemented between 13/07/2018 and 19/10/2019. This CPA is also intended to include in CDM. Alternative Energy Promotion Centre (AEPC) is responsible for overall coordination and the implementation of all the CPAs under the Nepal Biogas Support Program-PoA.
Expected Implemetation Date: Expected duration of Project:	Implementation date: 13/07/2018 to 19/10/2019 Project duration: 20 years from the start date
Project Developer:	Alternative Energy Promotion Centre (AEPC)
Project Representative:	Alternative Energy Promotion Centre (AEPC)
Project Participants and any communities involved:	atmosfair gGmbH
Version of PDD: Date of Version:	1 17/04/2020
Host Country / Location:	Nepal
Certification Pathway (Project Certificatin/Impact Statements & Products	impact statements & products
Activity Requirements applied: (mark GS4GG if none relevant)	GS4GG (Renewable Energy Activity requirements)
Methodologies applied:	AMS I.E. version 09
Product Requirements applied:	GS-CER
Regular/Retroactive:	Retroactive inclusion
SDG Impacts:	1 – SDG 3: Good Health and Well Being (SDG Targets: 3.9.1, 3.9.2, 3.9.3) 2 – SDG 7: Affordable and Clean Energy (SDG Target: 7.1.2) 3 – SDG 13: Climate Action (SDG Target: 13.3.2)
Estimated amount of SDG Impact Certified	SDG 13: 38,731 tCO2e SDG 3: 100% users percept the reduction in health problem SDG 7: 100% users felt the reduction on firewood collection time due to clean energy access (Biogas)

SECTION A. Description of project

A.1. Purpose and general description of project

Main objective of the Nepal Biogas Support Programme-PoA is to further develop and disseminate biogas digesters as a renewable energy solution in Nepal, while better addressing poverty, social inclusion and regional balance issues and at the same time ensuring sustainability of the sector. Under this, AEPC currently supports to implement up to 20,000 digesters for each CPA under this PoA, which assures to remain within the small scale threshold. Besides investment subsidy to user households, AEPC needs funding on program level to maintain its activities. Target group under the PoA/CPA are households with at least one head of cattle (generally cows or buffalos) who currently use non-renewable biomass (firewood) for cooking purpose. The baseline of the PoA considers only non-renewable biomass replaced through household biogas applications. Only households previously using non-renewable biomass are eligible to the PoA. Before this PoA, four CDM projects activities have been registered that cover digesters implemented between 1st of November 2003 and 21 June 2007.

The baseline scenario is continued use of non renewable biomass (NRB) i.e. firewood for cooking. In addition to non renewable firewood, the households also use small amounts amount of cow dung and agricultural waste for cooking. Fossil fuels like kerosene and LPG are hardly used. Only firewood consumption is considered for the baseline estimates. Thus, in the absence of the programme the beneficiaries would have continued the use of non renewable biomass (firewood) leading to its associated GHG emissions. Hence, use of non renewable biomass is considered as the baselines and emission reductions will be claimed only for the displacement of non renewable fuelwood. The technology is environmentally sound. The programme may use accessories like Valve, Multilayer Pipes, Pressure meter, which has been procured from Thailand, China, and may also be procured from other countries.

This CDM Program Activity (CPA) is part of the Nepal Biogas Support Program-Programme of Activity (PoA). This CPA includes 10,589 digesters which were implemented between 13/07/2018 and 19/10/2019. Table 1 provides an overview of the digesters according to their size and location.

Table 1: Digesters listed in this CPA.

Region / Size	Terai	Hill	Mountain or Remote Hill	Total
2 m³	2	4	0	6
4 m³	2215	1956	107	4278
6 m³	2111	4081	37	6229
8 m³	50	19	0	69
10 m³	2	5	0	7
Total	**4380**	**6065**	**144**	**10589**

A.2. Eligibility of the project under approved PoA

The CPA is eligible for the inclusion in the PoA for Nepal Biogas Support Program-PoA since it meets all the criteria listed in the eligibility criteria for inclusion of a CPA in the PoA as given in registered PoA-DD as under.

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion	Description of this CPA in relation to the criterion and supporting evidence
1	Geographical boundary	-All biogas digesters in the CPA are located within the geographical boundaries of Nepal. - This will be confirmed by the CME by ensuring that each individual installation is a) located at an address that lies within the geographical boundaries of Nepal as demonstrated by providing the address of all biogas digesters in the CPA database that are situated within the geographical boundaries of Nepal.	-Commissioning Report from Biogas Companies (BC). - CPA Database indicating digester code and address.	All the biogas digesters under this CPA are located within the boundary of Nepal. As the Renewable Energy Subsidy Policy allows the Biogas digesters to take part in the subsidy only for Nepal, the CME confirm that the Biogas are within the territory of Nepal. The commissioning report for the biogas digester and the CPA database can be evidenced for this.
2	Double counting	-Double counting is avoided by assuring that no digester is already included to a different CDM project or CPA. - This will be confirmed by the CME based on a) the digester codes listed in the BSP database and b) if necessary also GPS coordinates (the latter applies if biogas projects emerge under the CDM that are not part of the BSP).	- CPA Database indicating digester code, address. - CDM website indicating potential further projects not included to BSP using the same technology.	Double counting is avoided by giving each digester a unique code (biogas digester code).. Also for maintaining the subsidy scheme it is important to avoid double counting. To avoid that households try to optimise their subsidy revenues, BSP does not allow that more than one digester is implemented per household. The digester codes listed in the database will be used to confirm that each digester is counted only once and is not already included under a different CDM project or CPA.
3	Technology	- AEPC will implement all CPAs as part of the BSP. - All digesters listed in the CPA shall be household biogas digesters with a sludge and gas holding capacity range of 2-10 m^3. - Biogas shall be supplied to a stove with a maximum capacity of 400 l/h leading to a maximum annual gas capacity of not more than 1.86 kWth per stove. - The equipment shall be new and not transferred from other project activities.	- Commissioning Report from Biogas Companies (BC). -Technical specification documents detailing digester models and equipment applied.	Since the CPA uses only one type of digester GGC 2047 model, this can be evidenced in plant completion report

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion	Description of this CPA in relation to the criterion and supporting evidence
4	Start Date	- The start date of a CPA is the date of commissioning of the first biogas digester included to that respective CPA. - The start date of CPA 10 shall be 13 July 2018, which is the date of commissioning of the first digester in CPA 10. - The start of each future CPA shall be after the date of commissioning of the last installation included to a previous CPA. - The date of commissioning is recorded in the Commissioning Report, which is archived and the date recorded in the CPA database.	- Commissioning Report from Biogas Companies (BC), indicating the commissioning date. - CPA Database	The commissioning of the last installation of the CPA-9 is 12 July 2018. So, the CPA start date for this CPA-10 is 13 July 2018 which is the first installation under this CPA. This can be evidenced from the commissioning report and the database.
5	Compliance with applied methodology	- The activity shall replace non renewable biomass. This will be confirmed through documenting that participating households use non-renewable biomass as firewood.	Report confirming use of non-renewable biomass as firewood prior to installation of digesters (e.g. BUS)	Biogas User Survey done for the PoA for the monitoring period 4 has confirmed that the biogas digesters implemented replaces the non-renewable biomass as firewood. So, the CPA is identical with other under the PoA, this is eligible for the inclusion under the PoA.
6	Diversion of official development assistance	- The CPA shall not result into the diversion of official development assistance.	- Declaration from CPA implementer/ AEPC. - Confirmation of ODA non diversion, as applicable.	The biogas under the CPA are supported by the Alternative Energy Promotion Centre and AEPC declare that the CPA shall not result into the diversion of the ODA.
7	Target Group and distribution mechanism	-The target group within the CPA are households.	-Installation confirmation from Biogas Companies (BC) indicating that the digesters are installed in a household	All the digesters are distributed to the household as per the subsidy policy of the Government of Nepal. This can be confirmed by the database that name of the individual household owner is given. This can also be demonstrated from commissioning report.

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion	Description of this CPA in relation to the criterion and supporting evidence
8.	Threshold check	Number of biogas digester included in each CPA shall not exceed 20,000 units, which assures compliance with the small scale limit of 45 MW_{th}[1]	- BSP/AEPC database to confirm the number of digesters in a CPA is maximum 20,000.	The CPA includes total of 10,590 biogas digester which is below the ceiling of maximum of 20,000. So the CPA is eligible. CPA database can be checked.
9	Other/ Voluntary action	Each CPA to be included in this PoA should be a voluntary action and not mandated by the Government of Nepal	Confirmation that each CPA is a voluntary action not mandated by the Government of Nepal	Being a Government Focal Point Entity for this CPA, AEPC confirmed that this CPA is voluntary action which is not mandated by any government rules/regulations.

All other criteria for the eligibility given in PoA-DD susch as safeguarding principles and the SDG outcomes is in-line with the PoA.

A.3. Legal ownership of products generated by the project and legal rights to alter use of resources required to service the project

The technology used in this PoA is the household level biogas plants and the owner of the technology is the particular household using biogas plants. The owners of a digester signed an agreement with AEPC by transferring all legal rights, interests, credits, entitlements, benefits or allowances arising from or in connection with any greenhouse gas emissions reductions arising from the operation of the digester (Emission Reduction), and agrees to take all necessary action required to ensure the transfer of those Emission Reductions to the Alternative Energy Promotion Centre or its nominee, including executing any relevant documents. So, the ownership of the products that are generated under Gold Standard Certification is under Alternative Energy Promotion Centre.

A.4. Location of project

A.4.1. Host Country

Nepal

A.4.2. Region/State/Province etc.

The CPA is distributed all over Nepal

A.4.3. City/Town/Community etc.

The CPA database contains the following information for each digester: owner's name, VDC/NP, ward number or cluster, district, region, plant size, name of Installation Company, digester code and the commissioning date.

A.4.4. Physical/Geographical location

The digesters in this CPA are located at various locations across Nepal. The geographical coordinates of Nepal are:
Latitude – North 26.20 degree to North 30.45 degree
Longitude – East 80.07 degree to East 88.20 degree

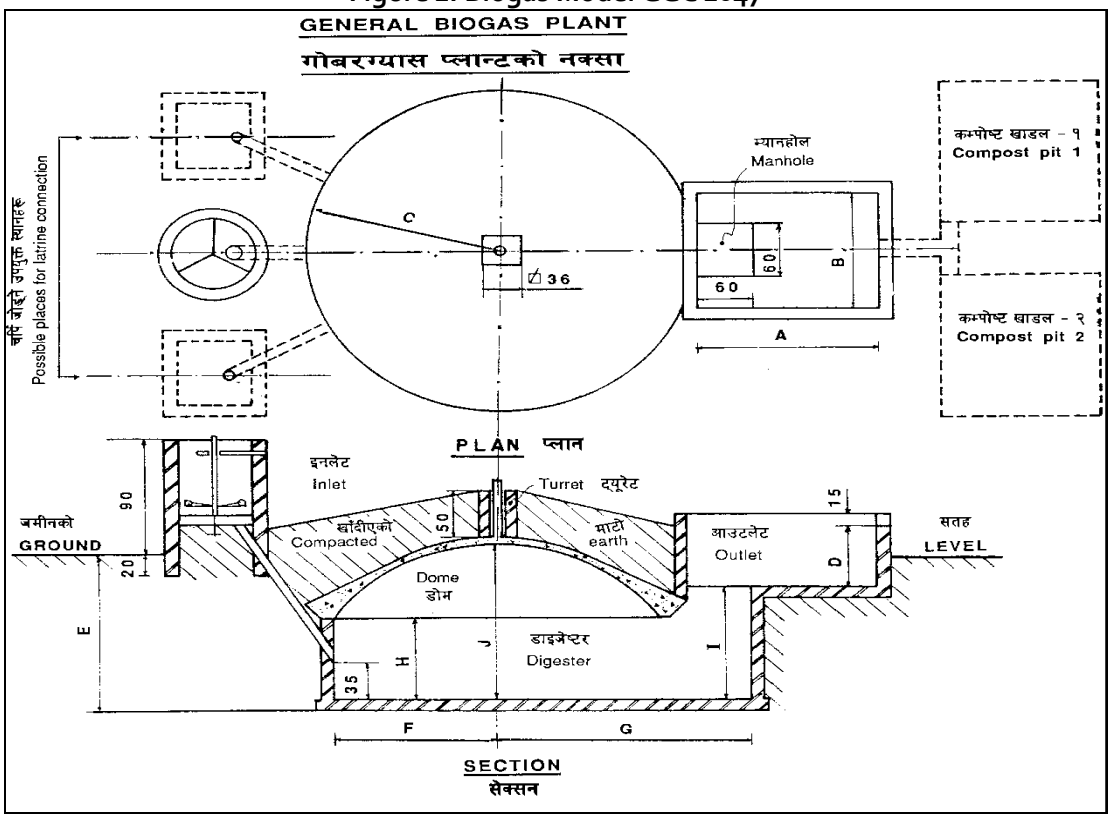
[1] Estimated maximum capacity of 1.86 kWth per stove. Considering that the limit for SSC is 45 MWth, the maximum number of digesters allowed under a CPA (20,000) remains well below the SSC threshold.

The CPA database contains the following information for each digester: owner's name, VDC/NP, ward number or cluster, district, region, plant size, name of Installation Company, digester code and the commissioning date.

A.5. Technologies and/or measures

The technologies used in this CPA are household biogas digesters with a sludge and gas holding capacity range of up to 10 m^3. The different sizes of the digesters that would be included in the programme would be of 2, 4, 6, 8 and 10 m^3. The programmes uses only one design i.e. GGC 2047 model. The biogas digesters are based on a uniform technical design and are manufactured and installed following established technical standards in Nepal. The digester itself is a closed underground container made of concrete or other materials. The design of the digester is mentioned below:

Figure 1: Biogas Model GGC 2047



The GGC 2047 biogas digester consists of five main structures or components. They are the inlet, outlet, digester, dome and the compost pits. The required quantity of dung and water is mixed in the inlet tank and this mix in the form of slurry is allowed to be digested inside the digester. The gas produced in the digester is collected in the dome, called as the gas holder. The digested slurry flows to the outlet tank from the digester through the manhole. The slurry then flows through the overflow opening to the compost pit where it is collected and composted. The gas is supplied to the point of application through the pipeline.

A.6. Scale of the project

The proposed small scale CPA is not a de-bundled component of a large CDM project. Each of the independent subsystems (bio digesters) included in the CPA is not greater than 1% of the threshold defined for a small scale project[2]. 1% of the 15 MWel (45MWth) threshold for type I projects is 150 kW_{el} (450kW_{th}). The capacity of a digester is 1.86 kW_{th} and hence remains well below the 1% of 15 MW threshold.

[2] Guidelines on Assessment of Debundling for SSC Project Activities – Version 03, (EB 54, Annex 13)

A.7. Funding sources of project

The digesters listed in the CPA receive subsidies and technical support under the program executed by AEPC.

SECTION B. Application of selected approved Gold Standard methodology

B.1. Reference of approved methodology

Title: Switch from non-renewable biomass for thermal applications by the user (AMS I.E. version 09)
Reference: https://cdm.unfccc.int/methodologies/DB/IO5FJLJFWT91R6B8SO5BC7TXSK27I2

B.2. Applicability of methodology

The Nepal Biogas Support Programme-CPA-10 meets the applicability criteria of AMS-I.E (version 09) as follows:

Criteria AMS-I.E.	Explanation
Small-Scale project requirement: For biomass, biofuel and biogas project activities, the maximal limit of 15MW(e) is equivalent to 45 MW thermal output of the equipment or the plant (e.g. boilers). For thermal applications of biomass, biofuels or biogas (e.g. the cookstoves), the limit of 45 MWth is the installed/rated capacity of the thermal application equipment or device/s (e.g. biogas stoves).	The biogas capacity of each stove is 400 litre/hour. With a methane content of 52%, this gives an annual natural gas capacity of not more than 1.86 kW_{th} per stove (validated during registration). This means that around 24,000 stoves would still have an aggregated capacity below the 45MW_{th} small scale threshold value, however the CPA has 10,589 installations only.
This category comprises activities to displace the use of non-renewable biomass by introducing renewable energy technologies. Examples of these technologies include but are not limited to biogas stoves, solar cookers, passive solar homes, renewable energy based drinking water treatment technologies (e.g. sand filters followed by solar water disinfection; water boiling using renewable biomass).	The digesters are indeed "small thermal appliances that displace the use of non-renewable biomass by introducing new renewable energy end-user technologies". AMS-I.E. even lists biogas stoves as an example of eligible end user technologies.
Project participants are able to show that non-renewable biomass has been used since 31 December 1989, using survey methods or referring to published literature, official reports or statistics.	The BUS conducted in 2018 demonstrated that the time needed to gather firewood, the price of firewood and the distance travelled to gather firewood is increasing at least since December 1989. In that survey the respondents were asked to provide averages for the time needed to gather firewood, the distance travelled and the price. The average of the estimates from all respondents, showed a clear increase on all three indicators.

B.3. Project boundary

The project boundary follows the definition in AMS-I.E (version 9.0) and is the physical, geographical area of the use of biomass or the renewable energy. This includes the digesters and the cooking stoves where the emission reduction takes place due displacement of non renewable biomass. Emissions other than those from non-renewable biomass (e.g. from fossil sources for cooking) have not considered in the establishment of the baseline.

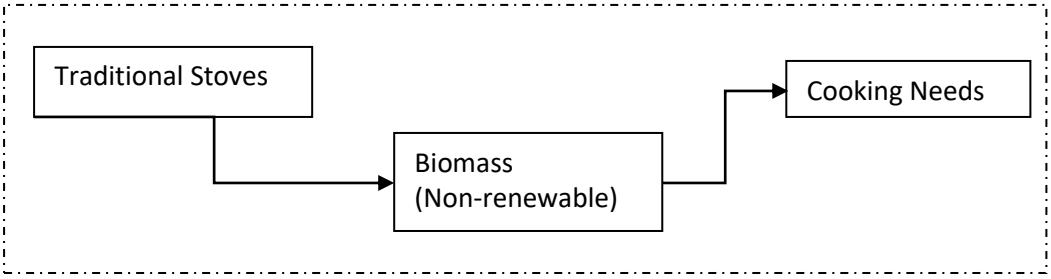


Figure 2: Baseline Emission Project Boundary

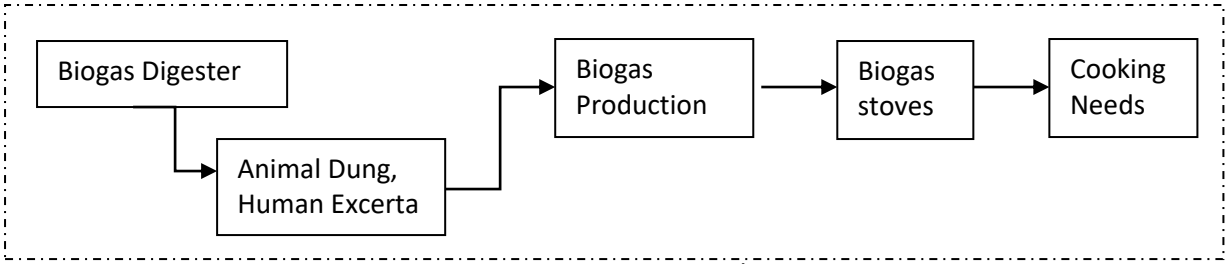


Figure 3: Project Boundary

Source		GHGs	Included?	Justification/Explanation
Baseline scenario	Emissions from NRB use for cooking	CO_2	Included	Major emission
		CH_4	Not included	conservative
		N_2O	Not included	conservative
	Emissions from fossil fuel use for cooking	CO_2	Not included	conservative
		CH_4	Not included	conservative
		N_2O	Not included	conservative
Project scenario	Digester and biogas cooking stove	CO_2	Not included	Negligible
		CH_4	Not Included	Negligible

B.4. Establishment and description of baseline scenario

The baseline scenario has been determined at the PoA level. The baseline scenario is continued use of NRB i.e. firewood for cooking. Research indicates that use of firewood has a low sensitivity to economic determinants.

For the second crediting period of the PoA, the Methodological tool "Assessment of validity of the original/current baseline and update of the baseline at the renewal of a crediting period" Version 03.0.1 (EB 66, Annex 47) was used to assess the continued validity of the original baseline. This tool provides a stepwise procedure to assess the continued validity of the baseline and to update the baseline at the renewal of a crediting period. For detail, please refer section B.3 of the registered GS PoA-DD (version 3 dated 31/01/2020.

B.5. Demonstration of additionality

The additionality of the SSC CPA is demonstrated in line with "Standard on the Demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities, Version 03". If the above indicated eligibility criteria on technology and thresholds are met, additionality is complied with automatically (Please refer section B.1 of the registered GS PoA-DD (Version 3 dated 31/01/2020). Thus there is no need for further assessment and demonstration of additionality.

B.6. Sustainable Development Goals (SDG) outcomes

B.6.1. Relevant target for each of the three SDGs

The sustainable development goal outcome assessment was also done at PoA level as all the CPAs are similar in nature. Table below discusses the relevant SDG target for each three SDGs addressed by the project.

SDGs	Targets
3. Good Health and Well beings	• By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination
7. Affordable and Clean Energy	• By 2030, ensure universal access to affordable, reliable and modern energy services • By 2030, increase substantially the share of renewable energy in the global energy mix • By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support
13. Climate Action	• Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning • Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities

B.6.2. Explanation of methodological choices/approaches for estimating the SDG outcome

Baseline Emission

According to AMS-I.E. version 09, para 20, the baseline emission reductions under a CPA are calculated as the following:

$$BE_y = B_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected\_fossil\_fuel} \quad \text{Equation 1}$$

In which:

BE_y	Baseline Emissions during the year y (tCO_2e)
B_y	Quantity of woody biomass that is substituted or displaced in tonnes
$f_{NRB.y}$	Fraction of woody biomass used in the absence of the project activity in year y that can be established as non renewable biomass
$NCV_{biomass}$	Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel: 0.0156 TJ/tonne. The value is according to the methodology AMS I.E.
$EF_{projected.fossilfuel}$	Emission factor for substitution of non renewable woody biomass by similar consumers. Use a value of 63.7 tCO_2/TJ[3]

Following option a) of paragraph 21, B_y is "Calculated as the product of the number of households multiplied by the estimate of average annual consumption of woody biomass per household that is displaced by the project activity (tonnes/household/year)". Thus, B_y will be calculated as follows:

[3] This value represents the emission factor of the substitution fuels likely to be used by similar users, on a weighted average basis. The value is calculated, based on the global average ratio of cooking fuels (the normalized ratio of kerosene and liquefied petroleum gas (LPG) excluding coal), i.e. 9 per cent for kerosene (71.5 t CO_2/TJ) and 91 per cent for LPG (63.0 t CO_2/TJ).

$$B_y = N_{HH} \times (BC_{BL,HH,y} - BC_{PJ,HH,y})$$ Equation (2)

Where:

N_{HH}	=	Number of households in the project activity, number
$BC_{BL,HH,y}$	=	Average annual consumption of woody biomass per household before the start of the project activity, tonnes/household/year
$BC_{PJ,HH,y}$	=	If it is found that pre-project devices were not completely displaced but continue to be used to some extent, average annual consumption of woody biomass per household in the pre-project devices during the project activity, tonnes/household/year

B_y will be calculated multiplying with the actual household of this CPA that have operational digester in year y identified through survey method. Calculations will be carried out based on Excel spread sheets using the database of CPA that are already included. The database provides e.g. commissioning date.

Project Emissions

The AMS I.E Version 9 requires calculation of project emission using "TOOL16: Project and leakage emissions from biomass". As the fuelwood are basically sourced from the nearby and natural forest, which does not require processing of the feedstock and also does not include the cultivation, the project emissions (PE_y) is not applicable to this CPA and is taken as zero.

Leakage

As per para 24 of the AMS I.E version 9, the default factor of 0.95 is used to account for any potential leakage (i.e. By is multiplied by a net to gross adjustment factor of 0.95 to account for leakages).
Thus the leakage emission under a CPA is calculated as the following:

$$LE_y = 0.05 \times B_y . f_{NRB.y} . NCV_{biomass} . EF_{projected\_fossilfuel}$$ 3

Emission Reductions

As the methodology AMS IE version 09, para 27, the emission reductions are to be estimated based on the following equation:

$$ER_y = BE_y - PE_y - LE_y$$

Where:

ER_y	=	Emission reductions in year *y*, tonnes CO_2eq

B.6.3. Data and parameters fixed ex ante for monitoring contribution to each of the three SDGs

Relevant SDG Indicator	3.9.1 Mortality rate attributed to household and ambient air pollution
Data/parameter	$f_{NRB,y}$
Unit	%
Description	Fraction of woody biomass saved by the project activity during year y that can be established as non-renewable biomass
Source of data	Calculated as per "TOOL30: Calculation of the fraction of non-renewable biomass"
Value(s) applied	86.1%
Choice of data or Measurement methods and procedures	The value is calculated as 86.1% using the national statistics and also validated by the Ministry of Forest and Environment, Government of Nepal. This value is for the national level, so will not be monitored.
Purpose of data	Calculation of baseline emission
Additional comment	This parameter shall remain fixed for the crediting period.

Relevant SDG Indicator	13.1.1 Number of countries that have communicated the establishment or operationalization of an integrated policy/strategy/plan which increases their ability to adapt to the adverse impacts of climate change, and foster climate resilience and low greenhouse gas emissions development in a manner that does not threaten food production (including a national adaptation plan, nationally determined contribution, national communication, biennial update report or other)
Data/parameter	**$EF_{projected\_fossil\ fuel}$**
Unit	tCO_2/TJ
Description	Emission factor for the projected fossil fuel consumption in the baseline.
Source of data	Approved small scale methodology AMS.I.E (version 09)
Value(s) applied	63.7
Choice of data or Measurement methods and procedures	AMS-I.E. requires using this value.
Purpose of data	Emission Reduction calculation
Additional comment	NA

Relevant SDG Indicator	3.9.1 Mortality rate attributed to household and ambient air pollution
Data/parameter	**$BC_{BL,HH,y}$**
Unit	tonne/household/year
Description	Average annual consumption of woody biomass per household before the start of the project activity
Source of data	Based on survey (Biogas User Survey (BUS)) for similar project activities. The woody biomass substituted or displaced is conservatively taken as 4.5 tons/HH/years for ex-ante calculation of emission reduction for which the annual average consumption of woody biomass before the start of the project activities is 5.04 tons/HH/year and the average annual woody biomass consumption by pre-project device during the project activities is 0.54 tons/HH/Year.
Value(s) applied	5.04 tonne/household/year
Choice of data or Measurement methods and procedures	Calculated using option (b) Historical data or a sample survey conducted as per the latest version of the "Standards:Sampling and surveys for CDM project activities and programme of activities;" Biogas User Survey follows the standard sampling and surveys guidelines
Purpose of data	Calculation of baseline emission
Additional comment	This value is used in the calculations and shall remain fixed for the crediting period.

Relevant SDG Indicator	7.1.2 Proportion of population with primary reliance on clean fuels and technology
Data/parameter	**N_{HH}**
Unit	Numbers

Description	Number of households in each CPA in year y
Source of data	BSP database for the CPA
Value(s) applied	10,589 digesters
Choice of data or Measurement methods and procedures	The registration procedure of the database avoids double counting of digesters and the registration of digesters that have not been commissioned.
Purpose of data	Calculation of baseline emission
Additional comment	During calculation of Emission Reduction, it will be based on actual number of households having the biogas operational

B.6.4. Ex ante estimation of outcomes linked to each of the three SDGs

The emission reduction calculation is based on data that is specified to digester size and region. This section provides explanation of calculation made.

Baseline Estimates

Baseline Emission

According to AMS-I.E (version 09), the baseline emission under a CPA are calculated as the following:

$$BE_y = B_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected\_fossil\_fuel}$$

In which:

BE_y	Baseline Emissions during the year y (tCO_2e)
B_y	Quantity of woody biomass that is substituted or displaced in tonnes
$f_{NRB.y}$	Fraction of woody biomass used in the absence of the project activity in year y that can be established as non renewable biomass, Use 86.1%[4]
$NCV_{biomass}$	Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel: 0.0156 TJ/tonne). The value is according to the methodology AMS I.E.
$EF_{projected.fossilfuel}$	Emission factor for substitution of non renewable woody biomass by similar consumers. Use a value of 63.7 tCO_2/TJ[5]

Thus, B_y will be calculated as follows:

By is calculated as using the following values

N_{HH}	10,589 in CPA-10
Displacement of Woody Biomass ($BC_{BL,HH,y}$ - $BC_{PJ,HH,y}$)	4.50 tonne/household/year[6]
Operational status of Biogas	100% for the ex-ante calculation
Number of Household with operational digester	N_{HH} * Operational status of Biogas

By = 10,589*1*4.5 = 47,650.50 tonne/year

Substituting the values,

Baseline Emission (BE_y) = 47,650.50*0.861*0.0156*63.7 = 40,769 tCO_{2e}

[4] The value is calculated using "TOOL 30: Calculation of the fraction of non-renewable biomass" as given in section I.6.1 of PoA-DD and the value is fixed ex-ante. Use 86.1%

[5] This value represents the emission factor of the substitution fuels likely to be used by similar users, on a weighted average basis. The value is calculated, based on the global average ratio of cooking fuels (the normalized ratio of kerosene and liquefied petroleum gas (LPG) excluding coal), i.e. 9 per cent for kerosene (71.5 t CO_2/TJ) and 91 per cent for LPG (63.0 t CO_2/TJ).

[6] Conservative value taken as stipulated in section B.3 of the registered GS PoA DD and is fixed ex-ante.

Baseline estimation for SDG 13: 40,769 tCO2eq

Baseline estimation for SDG 3:

1) 3.9.1 Mortality rate attributed to household and ambient air pollution (Average annual consumption of woody biomass per household in the pre-project devices during the project activity): 0.54 tonne/household/year
2) 3.9.1 Mortality rate attributed to household and ambient air pollution (Quantity of woody biomass that is substituted or displaced): 47,650.50 tonnes/year (as mentioned in calculation above)
3) 3.9.1 Mortality rate attributed to household and ambient air pollution (Net calorific value of the non-renewable biomass that is substituted): 0.0156 TJ/tone
4) 3.9.1 Mortality rate attributed to household and ambient air pollution (Users' perception on reduction in indoor air pollution): 0% households (As using biomass for cooking)
5) 3.9.1 Mortality rate attributed to household and ambient air pollution (Users' perception on reduction in health problem): 0% houdeholds perceived in reduction of eye infection, respiratory disease, cough and fire related injury (as using biomass for cooking)
6) 3.9.1 Mortality rate attributed to household and ambient air pollution (User's perception in Time saving for the cooking (reduce exposure to indoor air pollution)): 0% households for men, women and children (as using biomass for cooking)
7) 3.9.2 Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene (exposure to unsafe Water, Sanitation and Hygiene for All (WASH) services) (Users' perception on connection of toilet to biogas): 0% connection of toilet to Biogas as No biogas was used before project activity
8) 3.9.3 Mortality rate attributed to unintentional poisoning (Users perception in reduction of chemical fertilizers): 0% reduction in use of chemical fertilizers (use of Farmyard manure, Bioslurry, Urea, DAP and Potash) as using no biogas slurry.

Baseline estimation for SDG 7:

1) 7.1.2 Proportion of population with primary reliance on clean fuels and technology (Users' perception on time saving due to project for firewood collection): 0% houseolds for men, women and children as no biogas was used in baseline
2) 7.1.2 Proportion of population with primary reliance on clean fuels and technology (Number of people trained to promote Biogas plants): 0 Mason trained as no biogas were in use in baseline

Project Estimates
Project Emissions
$PE_y = 0$

Leakage
The default factor of 0.95 is used to account for any potential leakage, as prescribed by the methodology. Thus the leakage emission under a CPA is calculated as the following:

$LE_y = 0.05*47,650.50*0.861*0.0156*63.7 = 2038\ tCO_{2e}$

Project estimates for SDG 13: 2038 tCO2eq (project leakage)
Project Estimate for SDG 3:

1) 3.9.1 Mortality rate attributed to household and ambient air pollution (Average annual consumption of woody biomass per household in the pre-project devices during the project activity): 0 tonne/household/year (Biogas will be in use)

2) 3.9.1 Mortality rate attributed to household and ambient air pollution (Quantity of woody biomass that is substituted or displaced): 0 tonnes/year (Biogas will be in use)

3) 3.9.1 Mortality rate attributed to household and ambient air pollution (Net calorific value of the non-renewable biomass that is substituted): 0 TJ/tones (No non renewable biomass in use during project activity)

4) 3.9.1 Mortality rate attributed to household and ambient air pollution (Users' perception on reduction in indoor air pollution): 100% households (As by using biogas, it is expected 100% users will perceive reduction)

5) 3.9.1 Mortality rate attributed to household and ambient air pollution (Users' perception on reduction in health problem): 100% houdeholds perceive reduction in eye infection, respiratory disease, cough and fire related injury (As by using biogas, it is expected 100% users will perceive reduction)

6) 3.9.1 Mortality rate attributed to household and ambient air pollution (User's perception in Time saving for the cooking (reduce exposure to indoor air pollution)): 100% households for for men, women and children by using biogas for cooking

7) 3.9.2 Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene (exposure to unsafe Water, Sanitation and Hygiene for All (WASH) services) (Users' perception on connection of toilet to biogas): 100% connection of toilet to Biogas

3.9.3 Mortality rate attributed to unintentional poisoning (Users perception in reduction of chemical fertilizers): 100% changes in use of chemical fertilizers ((use of Farmyard manure, Bio-slurry, Urea, DAP and Potash) using biogas slurry.

Baseline estimation for SDG 7:

1) 7.1.2 Proportion of population with primary reliance on clean fuels and technology (Users' perception on time saving due to project for firewood collection): 100% houseolds for men, women and children due to using biogas
2) 7.1.2 Proportion of population with primary reliance on clean fuels and technology (Number of people trained to promote Biogas plants): As and when required, 20 Mason will be trained for the biogas installation during crediting period of PoA

Net benefit

Emission Reductions

As the methodology AMS IE version 09, para 27, the ex-ante emission reduction is estimated as below:

$$ER_y = BE_y - PE_y - LE_y$$

= 40,769 – 0 – 2038

= 38,731 tCO_{2e} (round down value).

Please refer ER calculation spreadsheet for further details of the calculation.

Net benefit for SDG 13: 38,731 tCO2eq

Net benefit for SDG 3:

1) 3.9.1 Mortality rate attributed to household and ambient air pollution (Average annual consumption of woody biomass per household in the pre-project devices during the project activity): reduce by 0.54 tonne/household/year

2) 3.9.1 Mortality rate attributed to household and ambient air pollution (Quantity of woody biomass that is substituted or displaced): reduced by 47,650.50 tonnes/year.

3) 3.9.1 Mortality rate attributed to household and ambient air pollution (Net calorific value of the non-renewable biomass that is substituted): reduced by 0.0156 TJ/tones

4) 3.9.1 Mortality rate attributed to household and ambient air pollution (Users' perception on reduction in indoor air pollution): 100% households (As by using biogas, it is expected 100% users will perceive reduction)

5) 3.9.1 Mortality rate attributed to household and ambient air pollution (Users' perception on reduction in health problem): 100% houdeholds perceive reduction in eye infection, respiratory disease, cough and fire related injury (As by using biogas, it is expected 100% users will perceive reduction)

6) 3.9.1 Mortality rate attributed to household and ambient air pollution (User's perception in Time saving for the cooking (reduce exposure to indoor air pollution)): 100% households for for men, women and children by using biogas for cooking

7) 3.9.2 Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene (exposure to unsafe Water, Sanitation and Hygiene for All (WASH) services) (Users' perception on connection of toilet to biogas): 100% connection of toilet to Biogas

3.9.3 Mortality rate attributed to unintentional poisoning (Users perception in reduction of chemical fertilizers): 100% changes in use of chemical fertilizers ((use of Farmyard manure, Bio-slurry, Urea, DAP and Potash) using biogas slurry.

Net benefit for SDG 7:

2) 7.1.2 Proportion of population with primary reliance on clean fuels and technology (Users' perception on time saving due to project for firewood collection): 100% houseolds for men, women and children due to using biogas
3) 7.1.2 Proportion of population with primary reliance on clean fuels and technology (Number of people trained to promote Biogas plants): As and when required, 20 Masons will be trained for biogas installation during crediting period of PoA.

B.6.5. Summary of ex ante estimates of each SDG outcome

For SDG 13

Year	Baseline estimate	Project estimate	Leakage	Net benefit
Year A	40,769	0	2,038	38,731
Year B	40,769	0	2,038	38,731
Year C	40,769	0	2,038	38,731
Year D	40,769	0	2,038	38,731
Year E	40,769	0	2,038	38,731
Year F	40,769	0	2,038	38,731
Year G	40,769	0	2,038	38,731
Total	**285,383**	0	**14,266**	**271,117**
Total No of Crediting Years	7			
Annual average over the crediting period	40,769	0	2,038	38,731

For SDG 3 and SDG 7

Indicators	Baseline estimate	Project estimate	Net benefit
3.9.1 Mortality rate attributed to household and ambient air pollution (Average annual consumption of woody biomass per household in the pre-project devices during the project activity):	0.54 t/hh/year	0	0.54 t/hh/year
3.9.1 Mortality rate attributed to household and ambient air pollution (Quantity of woody biomass that is substituted or displaced)	47,650.50t/year	0	47,650.50t/y
3.9.1 Mortality rate attributed to household and ambient air pollution (Net calorific value of the non-renewable biomass that is substituted)	0.0156 TJ/t	0	0.0156 TJ/t
3.9.1 Mortality rate attributed to household and ambient air pollution (Users' perception on reduction in indoor air pollution)	0%	100%	100%

3.9.1 Mortality rate attributed to household and ambient air pollution (Users' perception on reduction in health problem)	0%	100%	100%
3.9.1 Mortality rate attributed to household and ambient air pollution (User's perception in Time saving for the cooking (reduce exposure to indoor air pollution)	0%	100%	100%
3.9.2 Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene (exposure to unsafe Water, Sanitation and Hygiene for All (WASH) services)	0%	100%	100%
3.9.3 Mortality rate attributed to unintentional poisoning (Users perception in reduction of chemical fertilizers)	0%	100%	100%
7.1.2 Proportion of population with primary reliance on clean fuels and technology (Users' perception on time saving due to project for firewood collection)	0%	100%	100%
7.1.2 Proportion of population with primary reliance on clean fuels and technology (Number of people trained to promote Biogas plants during crediting period of PoA)	0	20	20

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

Relevant SDG Indicator	3.9.1 Mortality rate attributed to household and ambient air pollution
Data / Parameter	$BC_{PJ,HH,y}$
Unit	tonnes/household/year
Description	Average annual consumption of woody biomass per household in the pre-project devices during the project activity, if it is found that pre-project devices were not completely displaced but continue to be used to some extent.
Source of data	Biogas User Survey
Value(s) applied	0.54 tonnes/household/year for the ex-ante calculation as per the Biogas User Survey for similar project activities. For this crediting period, this parameter will be determined using regular user survey.
Measurement methods and procedures	Biogas User Survey will be conducted on a sample of households. The sample size is determined to achieve 90% confidence interval and a 10% margin of error. During the survey, the estimates of the biogas users on the average annual consumption of woody biomass during the monitoring period will be captured.
Monitoring frequency	At least once every two years (biennial)
QA/QC procedures	Though the methodology requires sample survey biannually, PP conducts the user survey annually to ensure the number of biogas digesters operational for that particular year for each CPA and the consumption of the woody biomass by pre-project device if any during the project activities.
Purpose of data	Calculation of baseline emission
Additional comment	ERs will be accounted only for functional biogas in the particular monitoring period

Relevant SDG Indicator	3.9.1 Mortality rate attributed to household and ambient air pollution
Data / Parameter	By

Unit	tones/year
Description	Quantity of woody biomass that is substituted or displaced
Source of data	Biogas User Surveys
Value(s) applied	This will be calculated based on the operational status of the biogas digesters for particular monitoring period and the woody biomass consumed by pre-project devices during project activity. It ranges from zero when biogas is not in operation to 5.04 tonnes/household/year when BCPJ,HH,y is zero and biogas is operational.
Measurement methods and procedures	The calculation of the By depends on the operational status of the biogas units for the particular monitoring period and the operational status will be checked annually during the Biogas User Survey. From the total population of biogas units included in the project activity, statistically representative samples will be drawn for the purpose of carrying out the survey. The sample size is determined to achieve 90% confidence interval and a 10% margin of error. The percentage of biogas units found to be operational during the sample survey shall be used to calculate the weighted average operational status of the biogas which then will be used to calculate By as follows: By = NHH*(BCBL,HH,y - BCPJ,HH,y) where NHH will be the household with operational biogas digester for the particular monitoring period. NHH = N * P_Y, where N is the number of bio digesters installed in the project and Py is Proportion of Bio digesters operational estimated based on the sample survey
Monitoring frequency	Once in a Year
QA/QC procedures	Though the methodology requires sample survey biannually, PP conducts the user survey annually to ensure the number of biogas digesters operational for that particular year for each CPA.
Purpose of data	Calculation of baseline emission
Additional comment	Once the biogas included in the component project activity completes its operational lifetime, those biogas will not be considered for the next consecutive monitoring.

Relevant SDG Indicator	3.9.1 Mortality rate attributed to household and ambient air pollution
Data/parameter	**$NCV_{biomass}$**
Unit	TJ/tonne
Description	Net calorific value of the non-renewable biomass that is substituted
Source of data	This value will be kept up to date with the IPCC guidelines.
Value(s) applied	0.0156
Choice of data or Measurement methods and procedures	AMS-I.E. Ver 09 requires using this value.
Purpose of data	Emission Reduction calculation
Additional comment	NA

Relevant SDG Indicator	3.9.1 Mortality rate attributed to household and ambient air pollution
Data / Parameter	Users' perception on reduction in indoor air pollution
Unit	Qualitative

Description	Users' perception on reduction in indoor air pollution
Source of data	Biogas User Survey
Value(s) applied	To be monitored
Measurement methods and procedures	Air quality will be assess through users interviews during the Biogas User Survey.
Monitoring frequency	at least biennial
QA/QC procedures	The selection of households under the surveys will ensure that these percentages are met also for each individual CPA included in the PoA; survey will try to capture the view of the women actually involved in cooking.
Purpose of data	Sustainable Development Assessment.
Additional comment	Requirements as defined in the sampling plan shall be met.

Relevant SDG Indicator	3.9.1 Mortality rate attributed to household and ambient air pollution
Data / Parameter	Reduction in health problem
Unit	Qualitative
Description	Users' perception on reduction in health problem
Source of data	Biogas User Survey
Value(s) applied	To be monitored
Measurement methods and procedures	Reduction in health problem will be assess through users interviews during the Biogas User Survey.
Monitoring frequency	at least biennial
QA/QC procedures	The selection of households under the surveys will ensure that these percentages are met also for each individual CPA included in the PoA.
Purpose of data	Sustainable Development Assessment.
Additional comment	Requirements as defined in the sampling plan shall be met.

Relevant SDG Indicator	3.9.1 Mortality rate attributed to household and ambient air pollution
Data / Parameter	User's perception in Time saving for the cooking (reduce exposure to indoor air pollution)
Unit	Qualitative
Description	Users' perception on time saving for cooking due to project
Source of data	Biogas User Survey
Value(s) applied	To be monitored
Measurement methods and procedures	Assess through users interviews during the Biogas User Survey.
Monitoring frequency	at least biennial
QA/QC procedures	The selection of households under the surveys will ensure that these percentages are met also for each individual CPA included in the PoA; survey will try to capture the view of the women actually involved in cooking.
Purpose of data	Sustainable Development Assessment.
Additional comment	Requirements as defined in the sampling plan shall be met.

Relevant SDG Indicator	7.1.2 Proportion of population with primary reliance on clean fuels and technology
Data / Parameter	Time saving (Fuel wood collection)
Unit	Qualitative

Description	Users' perception on time saving due to project for firewood collection
Source of data	Biogas User Survey
Value(s) applied	To be monitored
Measurement methods and procedures	Assess through users interviews during the Biogas User Survey.
Monitoring frequency	at least biennial
QA/QC procedures	The selection of households under the surveys will ensure that these percentages are met also for each individual CPA included in the PoA
Purpose of data	Sustainable Development Assessment.
Additional comment	Requirements as defined in the sampling plan shall be met.

Relevant SDG Indicator/Safeguarding Principle	3.9.3 Mortality rate attributed to unintentional poisoning
Data / Parameter	Users perception in reduction of chemical fertilizers
Unit	Qualitative
Description	Users' perception on reduction in use of chemical fertilizers and use of bio-slurry
Source of data	Biogas User Survey
Value(s) applied	To be monitored
Measurement methods and procedures	Assess through users interviews during the Biogas User Survey.
Monitoring frequency	at least biennial
QA/QC procedures	The selection of households under the surveys will ensure that these percentages are met also for each individual CPA included in the PoA
Purpose of data	Sustainable Development Assessment.
Additional comment	Requirements as defined in the sampling plan shall be met.

Relevant SDG Indicator	3.9.2 Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene (exposure to unsafe Water, Sanitation and Hygiene for All (WASH) services)
Data / Parameter	Improved access to sanitation services
Unit	Number
Description	Users' perception on connection of toilet to biogas
Source of data	Biogas User Survey
Value(s) applied	To be monitored
Measurement methods and procedures	User Survey
Monitoring frequency	At least bi-Annual
QA/QC procedures	The selection of households under the surveys will ensure that these percentages are met also for each individual CPA included in the PoA
Purpose of data	Sustainable Development Assessment.
Additional comment	Requirements as defined in the sampling plan shall be met.

Relevant SDG Indicator	7.1.2 Proportion of population with primary reliance on clean fuels and technology
Data / Parameter	Trainings to Masons

Unit	Number of people trained to promote Biogas plants
Description	Masons involved in constructing the biogas plants shall receive training on the proper installation of biogas digesters.
Source of data	Training report
Value(s) applied	To be monitored
Measurement methods and procedures	Training report
Monitoring frequency	At least bi-annual
QA/QC procedures	N/A
Purpose of data	Sustainable Development Assessment.
Additional comment	

Relevant SDG Indicator/Safeguarding Principle	Safeguarding Principle 4.3.8
Data / Parameter	Impact on Crop Productivity
Unit	Qualitative
Description	Users' perception on Impact on crop productivity (comparing to baseline)
Source of data	Sampling Surveys/Annual usage survey/Monitoring survey
Value(s) applied	To be monitored
Measurement methods and procedures	Assess through users interviews during the Biogas User Survey.
Monitoring frequency	at least biennial
QA/QC procedures	The selection of households under the surveys will ensure that these percentages are met also for each individual CPA included in the PoA
Purpose of data	Sustainable Development Assessment.
Additional comment	Requirements as defined in the sampling plan shall be met.

B.7.2. Sampling plan

Internal monitoring activities as part of the overarching BSP programme

AEPC carries out thorough quality control activities to ensure that the biogas digesters are built according to set quality standards following the subsidy delivery mechanism and other set standard. This includes setting up random sampling, field visits, on the spot advice to biogas companies and biogas owners, collecting and analyzing data obtained through questionnaire during visits. Note that this quality control is carried out to ensure quality of the digesters but not necessarily to calculate the emission reductions.

Monitoring

1) Digester performance and average annual consumption of woody biomass

The performance of the bio-digesters and average annual consumption of woody biomass by project devices will be assessed based on the performance reports (Biogas User Survey). The corresponding survey may be conducted as part of the quality control procedures of AEPC.

A statistically representative sample will be surveyed individually for each CPA of the PoA. The Annual Biogas User Survey will be conducted following the Guidelines for Sampling and Surveys for CDM Project activities and Programme of Activities Ver. 4.0 (EB 86, Annex 4). As part of the survey, statistically representative sample of biogas users will be surveyed and in order to achieve 90% confidence interval and a 10% margin of error requirement for the sampled parameters. Stratified random sampling will be applied in conducting survey. The sample to be surveyed will be drawn randomly from the population of biogas digester distributed in each stratum (i.e. remote hill, hill and terai) spread within the project boundary of

the PoA. In order to have an unbiased and independent assessment, the survey will be carried out through an independent agency to check the operation/functioning of the biogas units installed as part of each CPA.

Thus, the at least biennial performance reports (Biogas User Survey) will be used for the identification of the proportion of biogas digesters included in the CPAs that are operational. The proportion of biogas digesters that are operational will be counted towards the emission reduction for the CPAs while the proportion of the non-operational plants will not be considered towards ER calculation.

2) Displacement of NRB

The fraction of the Non-renewable biomass displaced by the PoA has been determined ex-ante in the PoA-DD and has been fixed for the second crediting period. The following indicators will be monitored through Biogas User Survey to confirm the displacement of NRB by households and perceptions of the biogas users on these indicators would be captured through survey and analysed. These indicators include:

- Trends in distance travelled for firewood gathering or trends in time needed for firewood gathering indicating depletion of resources available
- Trends in price of firewood indicating demand and scarcity
- Trends in type of cooking fuel collected that could indicate scarcity of fire wood

At least two of the above indicators should confirm the displacement of non-renewable biomass. The survey will seek to collect the data pertaining to the indicators for monitoring year.

3) Monitoring of other Sustainable Development Parameters

The monitoring of other sustainable development parameters will be done through the Biogas User Survey as mentioned above. The same sampled household will be used to assess those parameters along with the digesters performance and monitoring of continued displacement of NRB. The corresponding sampling plan is given in Appendix 5 of registered CDM PoA-DD.

B.7.3. Other elements of monitoring plan

The various aspects to be monitored according to the methodology are presented in the table below:

Aspects to be monitored according to Methodology	Applicability to the Project	Parameter to be Monitored (YES/NO/NA)
Monitoring shall consist of checking of all appliances or a representative sample thereof, at least once every two years (biennial) to ensure that they are still operating or are replaced by an equivalent in service appliance.	Emission reductions is directly proportional to the number of appliances (digesters in case of the project) still performing. So this needs to be monitored.	Yes (based on operation reports carried out at least biennial)
In order to assess the leakages, monitoring shall include data on the amount of woody biomass saved under the project activity that is used by non project households/users (who previously used renewable energy sources). Other data on nonrenewable woody biomass use required for leakage assessment shall also be collected	The methodology allows the use of a default factor of 0.95 to account for leakage. So this will not be monitored in the project.	No (Instead a default factor of 0.95 shall be used)
Monitoring should confirm the displacement or substitution of the non-renewable woody biomass at each location.	This shall be ensured by monitoring the number of appliances (digesters in case of the project) still performing	Yes (based on the performance reports carried out at least biennial, e.g. BUS, and in addition to eligibility criteria that also confirm use of NRB)

Sustainable development parameters and safeguarding principles to be assessed as per PoA DD	This shall be ensured by different parameters listed in B.7.2 above	Yes (Biogas User Survey Report conducted at least Biennial following the applicable sampling guideline for PoA)

SECTION C. Duration and crediting period

C.1. Duration of project

C.1.1. Start date of project

13/07/2018
The CPA started with the construction of the first digester listed which is 13/07/2018.

C.1.2. Expected operational lifetime of project

The operational lifetime of each digester is 20 years.

C.2. Crediting period of project

C.2.1. Start date of crediting period

The crediting period starts at the date of inclusion of CPA in the CDM PoA which is 15/05/2019. The GS crediting period start date is the date before 2 years from the inclusion date (Design Certification) in GS. This pertains to the crediting period start date for first crediting period.

C.2.2. Total length of crediting period

Renewal crediting period of 7 years*3.

SECTION D. Safeguarding principles assessment

D.1. Analysis of social, economic and environmental impacts

Safeguarding principle	Assessment questions	Assessment of relevance to the project (Yes/potentially/no)	Justification	Mitigation measure (if required)
3.1. Human Right	a. The Project Developer and the Project shall respect internationally proclaimed human rights and shall not be complicit in violence or human rights abuses of any kind as defined in the Universal Declaration of Human Rights b. The Project shall not discriminate with regards to participation and inclusion.	a. No b. No	**a.** The project doesn't involve any activity that affects human right but promotes the human rights to have access to clean energy and environment. **Conclusion: the parameter will not be monitored.** b. The project shall not discriminate any people to have biogas plants rather it enhances the participation and inclusion. **Conclusion: the parameter will not be monitored.**	
3.2 Gender Equality and Women's Rights	1. The Project shall complete the following gender assessment questions in order to informRequirements 2-4, below: a) Is there a possibility that the Project might reduce or put at risk women's access to or control of resources, entitlements and benefits? b) Is there a possibility that the Project can adversely affect men and women in marginalised or vulnerable communities (e.g., potential increased burden on women or social isolation of men)? c) Is there a possibility that the Project might not take into account gender roles	a) No b) No	a) The project enhances the women's access and entitlement of benefits. Since the women will be direct user of the Biogas stoves, it will benefit women by reducing their exposure to the indoor air pollution thereby improving their health. In addition, the replacement of firewood after the installation of Biogas will reduce workload of women for the collection of firewood. Reduced workload for firewood collection results in time saving that the women can use for other productive activities. **Conclusion: the parameter will not be monitored** b) The project will not adversely affect men and women in marginalized or vulnerable communities. Implementation of the project will contribute towards	

	and the abilities of women or men to participate in the decisions/designs of the project's activities (such as lack of time, child care duties, low literacy or educational levels, or societal discrimination)? d) Does the Project take into account gender roles and the abilities of women or men to benefit from the Project's activities (e.g., Does the project criteria ensure that it includes minority groups or landless peoples)? e) Does the Project design contribute to an increase in women's workload that adds to their care responsibilities or that prevents them from engaging in other activities? f) Would the Project potentially reproduce or further deepen discrimination against women based on gender, for instance, regarding their full participation in design and implementation or access to opportunities and benefits? g) Would the Project potentially limit women's ability to use, develop and protect natural resources, taking into account different roles and priorities of women and men in accessing and managing environmental goods and services? **h)** Is there likelihood that the proposed Project would expose women and girls to further risksor hazards?	c) No d) Yes e) No f) No g) No	preservation of common resources in form of "firewood". Households duties related to firewood collection, cooking and cleaning utensils remain with women. The project therefore tends to decrease burden on women and won't result in social isolation of men. **Conclusion: the parameter will not be monitored** c) The project duly accounts the gender roles. Time saving is one of the key benefits from the project which the beneficiary can utilize to fulfill their gender roles. With the saved time, one can perform the respective gender role more effectively. **Conclusion: the parameter will not be monitored** d) The project shall make every effort to include landless people in its design. Benefits from the project is expected to culminate in form of creation of entrepreneurial opportunities. While the focus is on capacitating women to take advantage of the entrepreneurial opportunity, the project shall not deprive men from the families of minority groups or the landless people to take advantage of the capacity building activities. **Conclusion: the parameter will not be monitored as the CPAs are implemented already** e) No, the project is not designed such that it increased workload of women and their care responsibilities. By introducing Biogas , the overall performance of women in kitchen will be more efficient. This will enable them engage in other activities. **Conclusion: the parameter will not be monitored** f) The project will enhance social participation and decision making role of women. Moreover, the women are expected to develop entrepreneurial skills which will	

			enable them economically to deal with the household problems. The potential of the project to enable women economically will help reduce discrimination against women rather than deepening it. **Conclusion: The parameter will not be monitored**	
3.3 Community Health, Safety and Working Conditions	1. The Project shall avoid community exposure to increased health risks and shall not adversely affect the health of the workers and the community	Yes	The Project shall make every effort to avoid health risks of worker during construction of biogas . Emission reduction and reduction on indoor air pollution is one of the key benefits of the project for community that will improve the health of those communities. **Conclusion: Since the CPA is included already in CDM and all the biogas are constructed already, health risk of the worker will not be monitored but the emission reduction and improve in health condition will be monitored.**	
3.4.3 Land Tenure and Other Rights	a. Does the Project require any change to land tenure arrangements and/or other rights?	No	The project units are simple and small in dimension. This will not involve anything related to removal of sites, objects or structures of cultural significance. Therefore the safeguarding principle under discussion will not be triggered by the project. **Conclusion: the parameter will not be monitored**	
3.5 Corruption	1. The Project shall not involve, be complicit in or inadvertently contribute to or reinforce corruption or corrupt Projects.	No	The project implementation is guided by the government 's subsidy policy and duely followed the set quality standard. Quality assurance and quality control is an intregal part of the project impleentation ensuring the quality throughout the project cycle. **Conclusion: The parameter will not be monitored.**	
3.6.2 Negative Economic Consequences	a. The Project Developer shall demonstrate the financial sustainability of the Projects implemented, also including those that will occur beyond the Project Certification period. b. The Projects shall consider economic	No	The project units are simple and have less moving parts. So, it requires less repair and maintenance. Hence the operational cost is less in comparision to the energy access and the additional benefits that it offers. So, the project implemented is sustainable financially and has positive economic impacts by offering the time saving, ease in	

	impacts and demonstrate a consideration of potential risks to the local economy and how these have been taken into account in Project design, implementation, operation and after the Project. Particular focus shall be given to vulnerable and marginalised social groups in targeted communities and that benefits are socially-inclusive and sustainable.		cleaning the utensils, reducing health risk and indoor air pollution etc. This has no any negative economic impacts. **Conclusion: the parameter will not be monitored**	
4.1.1 Emissions	Will the Project increase greenhouse gas emissions over the Baseline Scenario?	No	The project will replace the use of non-renewable biomass. The baseline of the project is the use of firewood for cooking. So, this project will reduce the GHG over the baseline scenario. **Conclusion: The parameters will be calculated based on the operational status of the project units**	
4.1.2 Energy Supply	Will the Project use energy from a local grid or power supply (i.e., not connected to a national or regional grid) or fuel resource (such as wood, biomass) that provides for other local users?	No	The project will not use any fuel resources that provides for other local users. It uses the animal dung. Therefore the safeguarding principle under discussion will not be triggered by the project. **Conclusion: the parameter will not be monitored**	
4.2.1 Impact on natural water patterns and flow	Will the Project affect the natural or pre-existing pattern of watercourses, ground-water and/or the watershed(s) such as high seasonal flow variability, flooding potential, lack of aquatic connectivity or water scarcity?	No	The project requires very less water to make the slurry that can be fetched at household level itself. Therefore the safeguarding principle under discussion will not be triggered by the project. **Conclusion: the parameter will not be monitored**	
4.2.2 Erosion and/or water body stability	Could the Project directly or indirectly cause additional erosion and/or water body instability or disrupt the natural pattern of	No	The project units are installed at household level which will not directly or indirectly cause additional erosion or disrupt the water body. Therefore the safeguarding principle under	

	erosion?		discussion will not be triggered by the project. **Conclusion: the parameter will not be monitored**	
4.3.1 Landscapte modification and soil	Does the Project involve the use of land and soil for production of crops or other products?	No	The project doesn't involve use of land and soil for production or crops or other products. Therefore the safeguarding principle under consideration will not be triggered by the project. **Conclusion: the parameter will not be monitored.**	
4.3.2 Vulnerability to Natural Disaster	Will the Project be susceptible to or lead to increased vulnerability to wind, earthquakes, subsidence, landslides, erosion, flooding, drought or other extreme climatic conditions?	No	The project units are household based units and are less succesptible to the natural disasters. Therefore the safeguarding principle under consideration will not be triggered by the project. **Conclusion: the parameter will not be monitored.**	
4.3.3 Genetic Resources	Could the Project be negatively impacted by the use of genetically modified organisms or GMOs (e.g., contamination, collection and/or harvesting, commercial development)?	No	The project doesn't involve any activity related to GMOs. Therefore the safeguarding principle under consideration will not be triggered by the project. **Conclusion: the parameter will not be monitored.**	
4.3.4 Release of pollutants	Could the Project potentially result in the release of pollutants to the environment?	No	The project units generally yields the Biogas and Bio-slurry. The biogas is used for the cooking purposes whereas the bioslurry is used as nutrients (manure) in the agriculture field. Therefore the safeguarding principle under consideration will not be triggered by the project. **Conclusion: the parameter will not be monitored.**	
4.3.5 Hazardous and Non-hazardous Waste	Will the Project involve the manufacture, trade, release, and/ or use of hazardous and non-hazardous chemicals and/or materials?	No	The project unit does not require or releases any hazardous and non-hazardous chemicals. Therefore the safeguarding principle under consideration will not be triggered by the project. **Conclusion: the parameter will not be monitored.**	
4.3.6 Pesticides and fertilizers	Will the Project involve the application of pesticides and/or fertilisers?	Yes	The project units produces the bioslurry that potentially displaces the chemical fertilizers. Basically due to good content of nitrogen in the fertilizer the bio-slurry is a potent replacer of the Urea . **Conclusion: the parameter will be monitored through the**	

			perception survey with the users.	
4.3.7 Harvesting of forests	Will the Project involve the harvesting of forests?	No	The project doesn't involve any activity that requires harvesting of forest products. Therefore the safeguarding principle under consideration will not be triggered by the project. **Conclusion: the parameter will not be monitored.**	
4.3.8 Food	Does the Project modify the quantity or nutritional quality of food available such as through crop regime alteration or export or economic incentives?	Yes	The project units produces the bioslurry that potentially increases the productivity of crop as it has good content of nitrogen. **Conclusion: the parameter will be monitored through the perception survey with the users.**	
4.3.9 Animal Husbandry	Will the Project involve animal husbandry?	No	The project doesn't involve any activity that requires animal husbandry. Therefore the safeguarding principle under consideration will not be triggered by the project. **Conclusion: the parameter will not be monitored.**	

SECTION E. Local stakeholder consultation

E.1. Solicitation of comments from stakeholders

Please refer to the section F of the registered CDM-PoA-DD (version 17 dated 05/09/2019) for the stakeholder consultation as per CDM requirement.

The local stakeholder consultation as per GS requirement was conducted at PoA level. This is considered appropriate due to following reasons:

- CPAs are not geographically distinct; CPAs will be determined by stove numbers, not by geographic boundaries. The project area is Nepal for all project activities.
- The same technology (with different size of biogas plant) will be used in all CPAs covered by this LSC.
- The target population is rural households all over Nepal. Rural households in Nepal have very similar socio-economic characteristics and fuel wood collection. Therefore, project impacts on target population will be the same all over Nepal.
- Since the baseline scenario is replacement of non-renewable biomass, and fuel wood resources decrease in the whole country, the environmental impact of wood savings due to the use of Biogas stoves in not site dependent.

The LSC was organized in the meeting hall of Chetana Kendra, Dhulikhel Kavre. The meeting was conducted on 15 August 2014.

The stakeholder feedback round for the PoA was started on 9th October 2014. An invitation letter was sent to the stakeholders to comment on the PoA documents. But no comments were received from the stakeholders. Its outcome is described in section E of the PoA Passport.

E.2. Summary of comments received

Please refer to the section F of the registered CDM-PoA-DD (version 17 dated 05/09/2019) for the stakeholder consultation as per CDM requirement. The LSC for GS was conducted at PoA level. The detail of it is given in section E of the PoA Passport.

E.3. Report on consideration of comments received

Please refer to the section F of the registered CDM-PoA-DD (version 17 dated 05/09/2019) for the stakeholder consultation as per CDM requirement. The LSC for GS was conducted on PoA level. The detail of it is given in section E of the PoA Passport.

Appendix 1. Contact information of project participants

Organization name	Alternative Energy Promotion Centre (AEPC)
Registration number with relevant authority	NA
Street/P.O. Box	Mid Baneshwor, Kathmandu
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City	Kathmandu
State/Region	Bagmati
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Country	Nepal
Telephone	+977-1-4498013
Fax	
E-mail	Madhusudhan.adhikari@aepc.gov.np
Website	www.aepc.gov.np
Contact person	Madhusudhan Adhikari
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Salutation	Mr.
Last name	Adhikari
Middle name	-
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Appendix 2. Summary of post registration design changes

N/A

Document information

Version	*Date*	*Description*
03.0	**25 June 2014**	Revisions to: • Include the Attachment: Instructions for filling out the component project activity design document form for small-scale CDM component project activities (these instructions supersede the "Guidelines for completing the component project activity design document form for small-scale component project activities" (Version 01.0)); • Include provisions related to standardized baselines; • Add contact information on a CPA implementer and/or responsible person/ entity for completing the CDM-SSCCPA- DD-FORM in A.14. and Appendix 1; • Add general instructions on post-registration changes in paragraph 4 and 5 of general instructions and **Error! Reference source not found.**; • Change the reference number from *F-CDM-SSC-CPADD* to *CDM-SSC-CPA-DD-FORM*; • Editorial improvement.
02.0	**13 March 2012**	EB 66, Annex 17 Revision required to ensure consistency with the "Guidelines for completing the component project design document form for small-scale component project activities".
01.0	**27 July 2007**	EB33, Annex44 Initial adoption.

Decision Class: Regulatory
Document Type: Form
Business Function: Registration
Keywords: component project activity, project design document, SSC project activities