

Gold Standard for the Global Goals
Key Programme Information & Programme Design Document (PoA-DD)



July 2017, Version 1

KEY PROGRAMME INFORMATION

Title of Programme:	Nepal Biogas Support Program-PoA (UNFCCC Ref 9572, GS ID 3110)
Brief description of Programme:	Nepal Biogas Support Project-PoA is registered in UNFCCC as CDM PoA on 31/01/2013. Nine CPAs are included in CDM so far. This PoA is also registered in GS on 14/08/2015 with its first four CPAs. CPA-5, CPA-6 and CPA-7 are also included in GS on 24/12/2018 and the remaining CPAs were included in GS on 23/09/2019. The PoA is transited to GS4GG on 01/08/2018. The technologies used in the PoA 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 GGC 2047 model and its improvement. 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 PoA covers whole Nepal as project boundary. The PoA has already undergone 1,283,394 CERs out of which 812,332 CER are GS labelled.
Expected duration of Programme:	The total duration of the PoA is 28 years.
Coordinating & Management Entity:	Alternative Energy Promotion Centre
Project Representative:	Alternative Energy Promotion Centre
Project Participants and any communities involved:	atmosfair gGmbH
Version of PoA-DD:	3
Date of Version:	31/01/2020
Host Country (ies) / Location:	Nepal/Throughout Nepal
Certification Pathway (Project Certification/Impact Statements & Products	Impact Statement and Products
Activity Requirements applied: (mark GS4GG if none relevant)	GS4GG
Methodologies applied:	AMS I.E.: Switch from non-renewable biomass for thermal applications by the user Version 09
Product Requirements applied:	GS CER
Regular/Retroactive:	Regular (Renewal of Crediting Period)
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)

SECTION A. General description of PoA

A.1. Purpose and general description of the PoA

The Biogas Support Program (BSP) aims at implementing household biogas applications. These applications displace firewood and fossil fuels with biogas from animal waste and human excreta. The biogas is used as a fuel for cooking, therefore the displacement of non-renewable biomass (NRB) is counted as emission reduction under the Clean Development Mechanism (CDM).

The BSP is centrally managed by Alternative Energy Promotion Centre (AEPCC)¹ with the support of partner organizations like Biogas Sector Partnership Nepal (BSP-Nepal)² and Biogas Companies. AEPCC is a public entity that executes all renewable/alternative energy programs in Nepal including BSP. Its main objectives are disseminating and promoting renewable energy technologies and mitigating environmental degradation. AEPCC is responsible for administering the government subsidy, coordination with all relevant stakeholders and monitoring BSP. AEPCC is also the coordinating and managing entity of this PoA. AEPCC qualifies biogas manufacturing and installation companies to promote quality digesters and regularly monitors their work. The owners of the digesters are the households that invest in the digesters and thereby obtain an alternative fuel source to firewood and fossil fuel.

Hence, the objective of the PoA being an integral part of BSP is to further develop and disseminate biogas digesters as a renewable energy solution in rural Nepal, while better addressing poverty, social inclusion and regional balance issues and at the same time ensuring sustainability of the sector. AEPCC currently supports to implement up to 20,000 digesters for each CPA under this PoA, which assures to remain within the small scale threshold. Despite the support, the BSP has not been able to develop into a commercial activity in Nepal. The support is being provided according to the Government's Subsidy policy and delivery mechanism.

Target group under the PoA are households who currently use non-renewable biomass (firewood) and/or fossil fuels (kerosene and/or LPG) 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.

This PoA was registered on 31st January 2013 as CDM PoA and installations implemented under the BSP from 22 June 2007 are gradually included in Component Project Activities (CPAs) under this PoA. Until now, 9 CPAs are included in the CDM PoA. All further digesters should be included to subsequent CPAs. This PoA was also registered in Gold Standard (GS 2.2) on 14/08/2015 with its first four CPAs. CPA-5, CPA-6 and CPA-7 are also included in GS on 24/12/2018 and remaining two CPAs were included in GS on 23/09/2019. The PoA and its CPAs are transited to GS4GG on 01/08/2018. The first crediting period is going to be ended on 30th January 2020. So, this PoA-DD is prepared for the second crediting period.

A.2. CME and participants of PoA

The coordinating, managing entity of the Nepal Biogas Support Project-PoA is the Alternative Energy Promotion Centre (AEPCC). AEPCC is a government's nodal agency to promote renewable energy in Nepal. The detail address of the CME is given below:

Alternative Energy Promotion Centre
Khumaltar Height, Lalitpur, Nepal
Tel : +9771-5539390, 5539391
Fax : +9771-5542397, 5539392

¹ <https://www.aepc.gov.np/>

² Biogas Sector Partnership Nepal, web-site: <http://www.bspnepal.org.np>

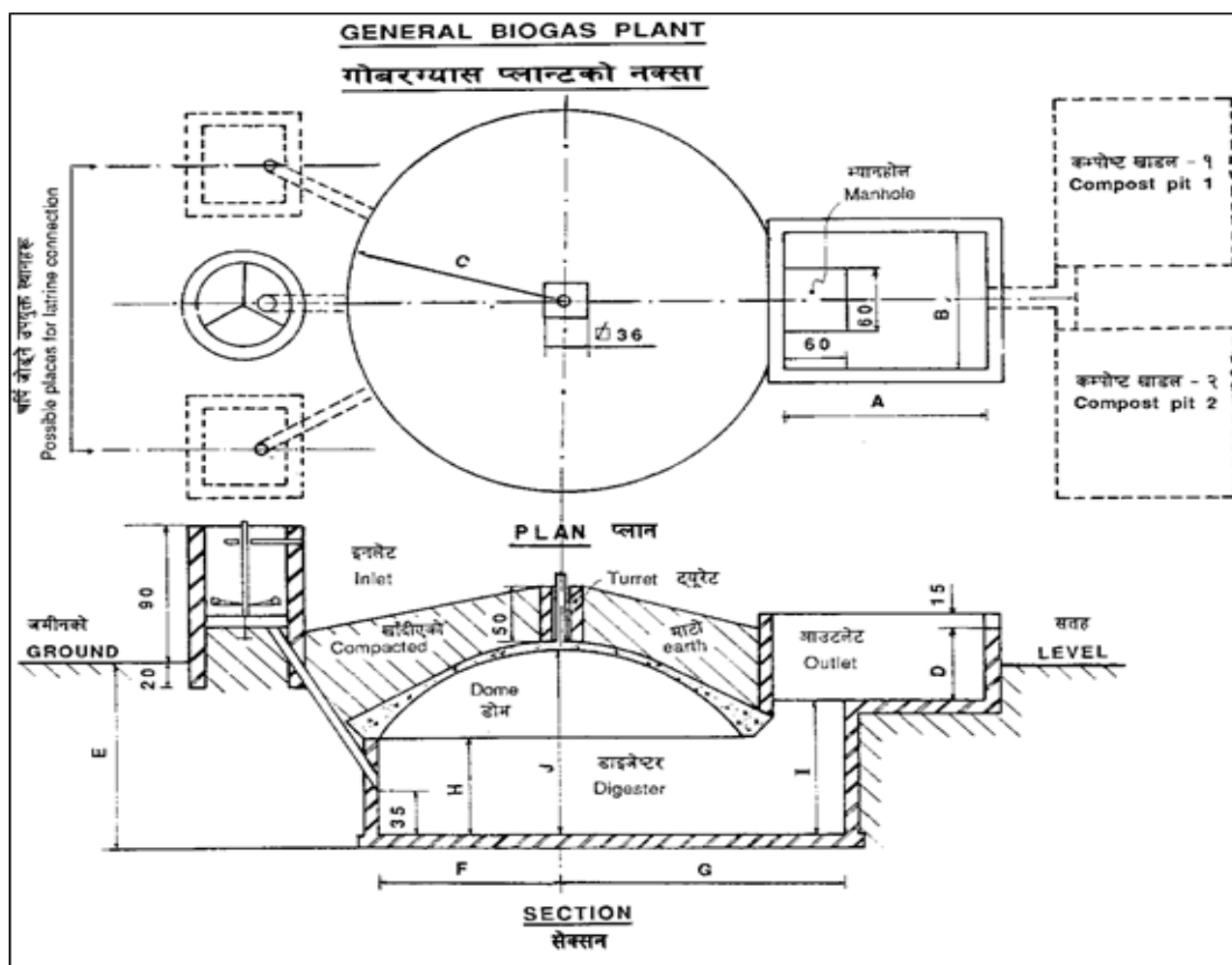
A.3. Physical/ Geographical boundary of the PoA

The geographical boundary of the PoA will be the Federal Democratic Republic of Nepal. The PoA and the VPAs can include digesters in all areas of Nepal.

A.4. Technologies/measures and eligibility under Gold Standard

The technologies used in the PoA are household biogas digesters with a sludge and gas holding capacity range of up to 10 m³. The different sizes of the digesters that would be included in the programme would be of 2³, 4, 6, 8 and 10 m³. The programme uses only one design i.e. GGC 2047 model/improvement. 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:



The 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

³ The first 2m³ digester was constructed in 5 May 2009

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.

In the PoA, the point of applications is a stove. The biogas is extracted from the digester and transported to the stove. The digester has an over pressure which creates a stable flow of gas for use in the cooking stoves.⁴ The biogas consumption capacity of each biogas stove is 400 litre/hour⁵. With an estimated methane content of 52%⁶ this gives an annual natural gas capacity of not more than 1.86 kWth per stove. To allow for quality monitoring and continuous digester improvement BSP has a strong Monitoring and Evaluation system in place. This monitoring is crucial to maintain high technical standards. It includes, among others, the following elements:

Internal quality inspection: For each plant the digester companies submits completion reports. Only after these reports have been received, AEPC analyse and recommends to release subsidy payment to the biogas user through the digester companies. AEPC, through third party or by itself or through partner organization like BSP-Nepal conducts quality control of newly constructed plants and of the implementation of After Sales Service.

Performance report (i.e. as part of BUS or internal reporting): For the all digesters included to a CPA the performance report assesses the share of the systems that are operational.

AEPC qualifies biogas manufacturing and installation companies to promote quality digesters and regularly monitors their work. Annually, it prepares the standing list of those companies that are eligible for the installation of Biogas. The owners of the digesters are the households that invest in the digesters and thereby obtain an alternative fuel source to firewood and fossil fuel.

The PoA aims to reduce the indoor air pollution, consumption of chemical fertilizers that can contribute to SDG 3. It also increases the access to renewable and clean energy to the household contributing to SDG 7. The PoA is able to reduce the GHG emission and hence mitigating the climate change and increasing adaptive capacity of people on climate change hence contributing to SDG 13. It has other multiple direct and indirect co-benefits that contribute for other SDGs.

A.5 Funding sources of PoA

The program was first initiated by receiving funding from three sources:

- The Government of Nepal,
- Kreditanstalt für Wiederaufbau (KfW),
- Netherlands Development Organisation (SNV) with funding from the DGIS (directorate general of International Cooperation).

Currently, Government of Nepal has mobilized the fund to implement the BSP and seeking supports from other sources in future.

⁴ The same stove types and capacity (biogas burners) are used by all the project participants. The stove and biogas burners are manufactured by various biogas companies with the uniform technical design approved by BSP- Nepal

⁵ The referred report uses a calculation that “one stove under normal condition consumes about 15 cft. of gas/hr”. One cubic feet volume is equivalent to 28.31 liters which thus result into circa 400 liters (15x28.31=424.65).

⁶ G.P. Devkota, “Final report on Analysis of Biogas Leakages from Household Digesters, submitted to Winrock International on August 2003, Kathmandu (sec 2.3, pp 3).

SECTION B. Demonstration of additionality and development of eligibility criteria

B.1. Demonstration of additionality for PoA

The additionality of the PoA is demonstrated by following the criteria outlined in "Guidelines for demonstrating additionality of small scale project activities" (version 09) EB 68 Annex 27. The paragraph 2 of this guideline states that,

"Documentation of barriers, as per paragraph 1 above is not required for the 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 (e.g. installed capacity up to 15 MW")

The sub-section 2 (c) of paragraph states that,

"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 size⁷ of each unit is no larger than 5% of the small-scale CDM thresholds."

Each unit of biogas digester has the capacity of not more than 1.86 kWth which is less than 5% of the small-scale CDM threshold, or 750 kW installed capacity. The PoA is thus additional and there is no need for further assessment and demonstration of additionality.

B.2. Eligibility criteria for inclusion of a VPA in the PoA

For this crediting period, following eligibility criteria apply for the inclusion of CPA in the PoA.

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion
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; and b) has GPS coordinates that are situated within the geographical boundaries of Nepal.	- Commissioning Report from Biogas Companies (BC). - CPA Database indicating digester code, address and GPS coordinate.
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 and GPS coordinate. - Unique GPS reading of each digester. - CDM website indicating potential further projects not included to BSP using the same technology.

⁷That is the size of each unit under 750 kW installed capacity or under 3000 MWh of energy saving per year or 3000 tonnes of emission reduction per year.

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 m³. - 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.
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 1 shall be 22 June 2007, which is the date of commissioning of the first digester in CPA 1. - 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
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)
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.
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.
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 45MWth.⁸	- BSP/AEPC database to confirm the number of digesters in a CPA is maximum 20,000.

⁸ Estimated maximum capacity of 1.86 kWth per stove. Considering that the limit for SSC is 45 MW_{th}, the maximum number of digesters allowed under a CPA (20,000) remains well below the SSC threshold.

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
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Also, the PoA will not involve any CPA where equipment would be transferred from other project activities. No equipment is transferred from other project activities as only new digester equipment is included in the PoA. In addition to the criteria above, all VPAs should meet the conditions of safeguarding principles described in section E.2 and the sustainable development outcome described in section E.3.

B.3. Application of technologies/measures and methodologies

>> (Describe the technology/measures and indicate the methodology chosen. In cases where multiple technologies/measures or multiple methodologies are being applied, list all the combinations of technologies/measures and methodologies that will be used in the PoA.

If applicable, provide a description of the sampling plan applied for monitoring.)

Applicability of methodology

The applied methodology AMS I E (version 9.0) has been used for this crediting period which requires methodological choices to be made. Key components of AMS-I.E. (version 9.0) are the calculation of the emission reductions, differentiation between NRB and renewable biomass and the occurrence of leakage.

The applicability of the methodology is outlined as below:

Criteria AMS-I.E.	Explanation
The methodology is applicable for technologies displacing use of non-renewable biomass by renewable energy.	The PoA will replace non-renewable biomass by introducing the biogas digester producing renewable energy.
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 will be limited to 20000 installations only.
This methodology comprises of 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, bio-ethanol stoves, solar cookers, passive solar homes.	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.
For project activities introducing bio-ethanol cook-stoves, project participants or coordinating and managing entities shall demonstrate that the bio-ethanol cook-stoves are designed, constructed and operated to the requirements (e.g. with regard to safety) of a relevant national or local standard or comparable literature. Latest guidelines issued by a relevant national authority or an international organisation may also be used.	The PoA does not include the bio-ethanol cookstoves and hence this is not applicable for this PoA

Also, the PoA will not involve any CPA where equipment would be transferred from other project activities. No equipment is transferred from other project activities as only new digester equipment is included in the PoA (included also to eligibility criteria for technology)

Validity of original baseline

As the small scale project activity displaces the use of non renewable biomass by introducing a renewable energy technology, AMS-I.E, Version 09 is used to estimate the emission reductions for the third crediting period. According to AMS-I.E, Version 09, "in the absence of the project activity, the baseline scenario would be the use of fossil fuels for meeting similar thermal energy needs". As per the methodology, the baseline scenario adopted for the project is the use of fossil fuels for thermal energy applications. This is a conservative approach to determine the baseline scenario. For the second crediting period, 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) is 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.

Step 1: Assess the validity of the current baseline for the next crediting period

The "Procedures for the renewal of the crediting period of a registered CDM project activity" requires assessing the impact of new relevant national and/or sectoral policies and circumstances on the baseline.

Step 1: Assess the validity of the current baseline for the next crediting period

Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies

There are no mandatory national and/or sectoral policies that affect the baseline scenario during the renewal of the crediting period. The relevant national and sectoral policies for the promotion of the biogas digester in the Nepal are the Rural Energy Policy, the Renewable (Rural) Energy Subsidy Policy and the Renewable (Rural) Energy Subsidy Delivery Mechanism. The Rural Energy Policy was published in the year 2006. The Renewable (Rural) Energy Subsidy Policy was initially published in 2000 (prior to PoA start date) and latest revision has happened in 2016. Similarly, the Renewable (Rural) Energy Subsidy Delivery Mechanism was initially published in 2000 (prior to PoA start date) and latest revised in 2017. The Renewable (Rural) Energy Subsidy Policy has made provisions of financial subsidy support for the installation of the household biogas plants. The Rural Energy Policy has put emphasis to increase efficiency, reduce cost of the household biogas production technology, and to promote it in high mountains.

The Renewable (Rural) Energy Subsidy Policy 2016 has made provisions of financial subsidy support for the installation of the household biogas plants in the range from 2, 4, 6, m³ and above. The subsidy support is

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categorised based on the location of the biogas plants in the Terai (Southern Plains), Hills and Remote Hills. The subsidy support provided would cover a maximum of around 40% cost of installation of the biogas plants. The Renewable (Rural) Energy Subsidy Delivery Mechanism, prepared based on the Subsidy Policy, has made arrangements to channel the subsidy to the biogas users through the pre-qualified biogas companies, which provide installation and after sales services related to biogas as per the standard and guidelines approved by the AEPC.

The above policies only provide the incentives for the installation of household biogas plants and do not provide any obligations or enforced targets, nor do they ban the use of fuel wood for cooking. The baseline scenario established for the PoA is therefore still valid.

Step 1.2: Assess the impact of circumstances

There is no impact of circumstances existing at the time of requesting renewal of the crediting period on the current baseline emissions.

As demonstrated in Step 1.1, the promotion of household biogas plants through national policies set up is on voluntary basis. The Renewable (Rural) Energy Subsidy Delivery Mechanism is part of the package design to enhance the Biogas Support Program. No other market transformation activities or circumstances outside the implementation of the BSP have influenced households shift from non-renewable biomass for cooking in rural areas or the shift to rural households biogas plants using renewable biomass. The deployment of BSP has continued during the first crediting period of the PoA with subsequent development of 8 CPAs using the same baseline. As described in Step 1.3, despite the policies, NRB continue to be the main energy source for cooking in rural areas. This is confirmed by the Biogas Users Survey 2017/18 for PoA. The conditions used to determine the baseline emission in the previous crediting period are still valid.

Step 1.3: Assess whether the continuation of use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which renewal is requested

This sub-step is applicable to the PoA since the baseline is the continuation of the existing practice, i.e. the households will rely on traditional cook stoves using non-renewable biomass in the absence of the project activity. The traditional stoves made from local materials are expected to continue in the absence of the project. Therefore, the continued use of baseline materials is possible.

To confirm that NRB based cook stoves continue to be used, the project participants conducted a survey to check whether the firewood replaced by the digesters is subject to the trends defined in AMS-I.E.: version 09 increasing amount of time needed or distance travelled for firewood gathering, increasing firewood prices or changes in the type of firewood used. The indicators selected to monitor the continued displacement of NRB in the project are:

- 1) Increase in time needed to gather firewood or increase in distance travelled to gather firewood
- 2) Increasing trend in fuel wood price.

The Biogas Users Survey 2017/18 reveals the following:

- ***Increase in time and distance travelled to gather firewood.***

Trends in distance travelled for firewood gathering or trends in time needed for firewood gathering indicating depletion of resources available was monitored through perception survey and the result is given in table below:

Type	% of people perceived							
	CPA-1	CPA-2	CPA-3	CPA-4	CPA-5	CPA-6	CPA-7	CPA-8
Increased	52	58	51	75	39	52	74	56

Same as Previous	39	23	14	23	54	43	26	21
Decreased	08	20	35	2	6	5	0	22

Source: Table 6, Biogas User Survey, 2018 (for all CPAs)

The result above indicates that the sourcing biomass from forest over the years have become even more difficult.

- ***Increase in fuel wood price:***

The households were interviewed on the perceived price of firewood in 1989, 2000 and 2018 during Biogas User Survey 2017/18 for the PoA. The results reveal that the average market price of one bhari⁹ of fuel wood in 1989, 2000 and in 2018 is in increasing trend.

Year	Average price of fuelwood (NPR)							
	CPA-1	CPA-2	CPA-3	CPA-4	CPA-5	CPA-6	CPA-7	CPA-8
1989	45	34	41	28	63	61	63	37
2000	182	180	149	126	208	184	208	139
2018	494	494	453	429	502	459	502	390

Source: Table 8, Biogas User Survey, 2018 (for all CPAs)

If the operational lifetime of the biogas digesters is completed within this crediting period, that particular biogas digester will not be considered for the baseline emission calculation from the next consecutive monitoring period. As it can be seen that, the continuation of use of current baseline equipment, (non-renewable biomass based cook stove) is the most likely scenario for the crediting period for which renewal is being requested.

Step 1.4: Assessment of the validity of the data and parameters

There are some parameters such as emission factors per fuel source (IPCC default values), emission reduction factor of the biogas units, which were determined at the start of the first crediting period and not monitored during the first crediting period, are not valid anymore. AMS-I.E, Version 09 provides new guidance on key parameters, different default values and emission reductions calculation formulas. So the current baseline is updated for the 2nd crediting period according to the AMS-I.E, Version 09. Application of Steps 1.1, 1.2, 1.3 and 1.4 confirmed that the current baseline is valid for the second crediting period, but data and parameters needs to be updated. Therefore, step 2 is used.

Step 2: Update the current baseline and the data and parameters

Step 2.1: Update the current baseline

As per the outcome of step 1, this step is not applicable as the current baseline is still valid.

Step 2.2: Update the data and parameters

As mentioned in step 1.4 above, many default parameters have been updated and new parameters have been used (as per AMS-I.E Version 09) for this crediting period. The updated values and parameters have been applied for this crediting period.

Emission reduction calculation

According to methodology AMS-I.E. version 09 para 20, baseline emission reductions would be calculated as:

⁹ 1 Bhari is about 35 kg in an average

$$BE_y = B_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossil_fuel}$$

Equation (1)

Where:

ER_y	Baseline emissions during the year y in 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)
$EF_{projected_fossilfuel}$	Emission factor for substitution of non renewable woody biomass by similar consumers. Use a value of 63.7 tCO ₂ /TJ ¹⁰

B_y can be determined by using one of the following options.

- 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).
- Calculated as the product of the number of persons served per household multiplied by the number of households and the estimate of the average annual consumption of woody biomass per person that is displaced by the project activities (tonnes/person/year).
- Calculated as the product of the number of persons served per institution¹¹ multiplied by the number of institutions and the estimate of average annual consumption of woody biomass per person that is displaced by the project activity (tonnes/person/year).

The methodology requires choosing one of the three options mentioned above for calculating the "Quantity of woody biomass that is substituted or displaced". Option a) has been selected, as it is feasible to determine B_y based on number of households multiplied by the estimate of average annual consumption of woody biomass per household substituted (tonnes/household/year) derived from historical data or estimated using survey methods.

As per para 21a of the methodology, B_y can be calculated as,

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

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

The Biogas User Survey for similar project activities were done in 2018 to identify the consumption of woody biomass in the absence of the project activity and the consumption of woody biomass during the project activity by pre-project devices. The results of survey shows the following results

¹⁰ 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 CO₂/TJ) and 91 per cent for LPG (63.0 t CO₂/TJ).

¹¹ Institutions such as schools, prisons and hospitals

Activity	PA-1 ¹²	PA-2 ¹³	PA-3 ¹⁴	PA-4 ¹⁵
Average consumption of Woody Biomass before project activity (ton/Year/household): $BC_{BL,HH,Y}$	5.06	5.2	5.04	5.09
Average consumption of Woody Biomass by Pre-project device after project activity (ton/year/household): $BC_{PJ,HH,Y}$	0.55	0.53	0.54	0.53
Total woody biomass displaced (ton/year/household)	4.51	4.67	4.5	4.56

The survey has found that the woody biomass consumption varies from 5.04 ton/household/year to 5.20 ton/household/year before the project activity whereas woody biomass consumption by pre-project device after the project activity varies from 0.53 ton/household/year to 0.55 ton/household/year. So, total woody biomass displaced are between 4.50 to 4.67 ton/household/year. These survey were done following the sampling and survey guidelines.

So, the quantity of woody biomass substituted by each household is taken as 4.5 tons/year for this PoA.

Differentiation between NRB and renewable biomass

The methodology requires the CME to determine the shares of renewable and non-renewable woody biomass in By (the quantity of woody biomass used in the absence of the project activity); the total biomass consumption using nationally approved methods (e.g. surveys or government data if available) and then determine $f_{NRB,y}$ as per TOOL30: Calculation of the fraction of non-renewable biomass (Version 02).

As per the tool, the shares of renewable and non-renewable woody biomass in the quantity of woody biomass consumption shall be determined following the steps described below:

$$f_{NRB} = \frac{NRB}{NRB + RB}$$

where

- f_{NRB} : Fraction of non-renewable biomass (fraction or %)
- NRB : Quantity of non-renewable biomass (t/yr)
- RB : Quantity of renewable biomass (t/yr)

The quantity of the NRB can be determined by calculating the total consumption of wood in the country or region and then deducting the quantity of renewable biomass from it.

$$NRB = H - RB$$

Where

- H : Total annual consumption of wood in the absence of the project activity (t/yr)

The total quantity of wood consumption is provided by the Ministry of Forest and Environment of Government of Nepal which is estimated as 128 Million Tonnes/Year. Renewable biomass (RB) in the country/region/area is estimated using the equation below:

¹² [Biogas Support Program - Nepal \(BSP-Nepal\) Activity-1](#) (Ref. 0136)

¹³ [Biogas Support Program - Nepal \(BSP-Nepal\) Activity-2](#) (Ref. 0139)

¹⁴ [Biogas Support Program - Nepal Activity-3](#) (Ref.5415)

¹⁵ [Biogas Support Program - Nepal Activity-4](#) (Ref.5416)

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$$RB = \sum (MAI_{forest,i} \times (F_{forest,i} - P_{forest})) + \sum (MAI_{other,i} \times (F_{other,i} - P_{other}))$$

Where:

$MAI_{forest,i}$	= Mean Annual Increment of woody biomass growth per hectare in sub-category i of forest areas (t/ha/yr)
$MAI_{other,i}$	= Mean Annual Increment of woody biomass growth per hectare in sub-category i of other wooded land areas (t/ha/yr)
$F_{forest,i}$	= Extent of forest in sub-category i (ha) ³
$F_{other,i}$	= Extent of other wooded land in sub-category i (ha) ²
P_{forest}	= Extent of non-accessible area (e.g. protected area where extraction of wood is prohibited, geographically remote area) within forest areas (ha)
P_{other}	= Extent of non-accessible area (e.g. protected area where extraction of wood is prohibited, geographically remote area) within other wooded land areas (ha)
i	= Sub-category i of forest areas and other wooded land areas ⁴

The forest area and the other wooded land area are taken from the “State of Nepal’s Forest” published on December 2015 by Ministry of Forest and Soil Conservation¹⁶, whereas the mean annual increment of woody biomass is calculated using Global Forest Resources Assessment 2000 by the FAO for “Distribution of total forest area by ecological zone” (Table 14) and 2006 IPCC Guidelines for National Greenhouse Gas Inventories for “Above-ground biomass growth rates (t/ha-yr) for different ecological zones” (Chapter 4, Table 4.9) as suggested in the tool. As per the tool the, fraction of NRB is calculated as 86.1%. This has also been calculated by the Ministry of Forest and Environment, Government of Nepal.

Project Emissions

As per the AMS IE Version 09, the project emissions (PE_y) from cultivation, use and processing of biomass shall be calculated using the latest version of “TOOL16: Project and leakage emissions from biomass”. In doing so, the following sources of project emissions shall be considered as applicable, bearing in mind that some sources may be only relevant for specific fuels (e.g. production of bio-ethanol):

- CO₂ emissions from on-site consumption of fossil fuels due to the project activity, including the consumption of fossil fuels for any processing of feedstock;
- CO₂ emissions from electricity consumption by the project activity including the consumption of electricity for any processing of feedstock;
- Methane emission from solid waste disposal or waste water in cases where the waste is disposed in anaerobic conditions;
- Project emissions related to cultivation of feedstock
- Project emissions from transportation, if the transportation distance is more than 200 km; otherwise they can be neglected.

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 above emissions are not applicable to this project activity. So, the project emission for this project activity is neglected and taken as zero.

¹⁶ [http://www.dfrs.gov.np/downloadfile/State%20of%20Nepals%20Forests%20\(DFRS\)_1457599484.pdf](http://www.dfrs.gov.np/downloadfile/State%20of%20Nepals%20Forests%20(DFRS)_1457599484.pdf)

Leakage

As per the methodology, leakage emissions (LE_y) shall be calculated using the latest version of "TOOL16: Project and leakage emissions from biomass". As the conditions for leakage given in the Tool 16 are not applicable for this project, para 24 of the methodology has been used to account the leakage. According to para 24 of the methodology, leakage related to the non-renewable woody biomass saved by the project activity shall be assessed based on ex-post surveys of users and the areas from which this woody biomass is sourced (using 90/30 precision for a selection of samples). The following potential source of leakage shall be considered:

a) The use/diversion of non-renewable woody biomass saved under the project activity by non-project households/users that previously used renewable energy sources. If this leakage assessment quantifies an increase in the use of non-renewable woody biomass used by the non-project households/users that is attributable to the project activity then By is adjusted to account for the quantified leakage. Alternatively, By is multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required.

In order to avoid expensive monitoring, the CME have opted to use the default factor of 0.95 to account for any potential leakage, as prescribed by the methodology.

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

Data and Parameter fixed ex-ante

Data and Parameters fixed ex-ante for CDM during the crediting period of the PoA and the corresponding CPAs included during crediting period of PoA will be as follows:

Relevant SDG Indicator	3.9.1 Mortality rate attributed to household and ambient air pollution
Data/Parameter	$f_{NRB,y}$
Data 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.
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_fossilfuel}
Data unit	tCO ₂ /TJ
Description	Emission factor for the projected fossil fuel consumption in the baseline.
Source of data	IPCC
Value(s) applied	63.7
Choice of data or measurement methods and procedures	AMS-I.E. Version 09 requires using this value.
Purpose of data	Calculation of emission reduction
Additional comment	The value will be 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}
Data unit	Number
Description	Number of households in each CPA in year y
Source of data	BSP database for each CPA
Value(s) applied	-
Choice of data or measurement methods and procedures	The registration procedure of the BSP 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

Relevant SDG Indicator	3.9.1 Mortality rate attributed to household and ambient air pollution
Data/Parameter	BC _{BL,HH,y}
Data 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.

Data and parameters to be monitored for CDM

Data and Parameters that will be monitored for CDM during the crediting period of the PoA and the corresponding CPAs included during crediting period of PoA will be as follows:

Relevant SDG Indicator	3.9.1 Mortality rate attributed to household and ambient air pollution
Data/Parameter	NCV _{biomass}
Data unit	TJ/tonne
Description	Net calorific value of the non-renewable woody biomass, briquettes or charcoal used in project devices
Source of data	Methodology AMS I.E. Version 09
Value(s) applied	0.0156
Measurement methods and procedures	De-fault value will be applied from the methodology AMS I.E version 09
Monitoring frequency	N/A
QA/QC procedures	N/A
Purpose of data	Calculation of baseline emission
Additional comment	N/A

Relevant SDG Indicator	3.9.1 Mortality rate attributed to household and ambient air pollution
Data/Parameter	BC _{PJ,HH,y}
Data 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
Data 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 * PY, 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.
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Sampling plan

For a matter of completeness, the various aspects to be monitored according to the methodology. Following parameters will be monitored:

1. Digester performance (Operational %) of the biogas digester in particular monitoring period to calculate the quantity of woody biomass that is substituted or displaced.
2. 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.
3. Monitoring should confirm the displacement or substitution of the non-renewable biomass

The annual Biogas User Survey (BUS) will be conducted to assess the parameters given above. The survey will be conducted following statistically sound sampling procedure. 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. To make it more representatives, different development regions and the size of the plants will also be considered while drawing the sample. 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. The corresponding sampling plan is given in Appendix 5 of PoA-DD.

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:

- a. Trends in distance travelled for firewood gathering or trends in time needed for firewood gathering indicating depletion of resources available
- b. Trends in price of firewood indicating demand and scarcity
- c. 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.

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, adopting "rewards or punishment" system to biogas companies etc. 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

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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 Standard 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. To make it more representatives, different development regions and the size of the plants will also be considered while drawing the sample. 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.

SECTION C. Management system

AEPC is responsible for overall coordination and the execution of the Nepal Biogas Support Program-PoA. AEPC administrates subsidy and biogas credit funds through Central Renewable Energy Fund (CREF), carry out biogas users' survey (BUS) through independent party, and monitor the program including quality assurance and quality control. The implementation of BSP is guided by the subsidy policy and respective delivery mechanisms of Government of Nepal.

The Government of Nepal and Development Partners provide financial support for subsidy to households for constructing biogas digesters.

The BSP-Nepal and/or any other support partners support AEPC to facilitate, backstop, and promote the programme to develop the sector. Besides, BSP-Nepal develops skill enhancement package and implements it for biogas companies (BCs) together with Nepal Biogas Promotion Association (NBPA).

BSP-Nepal, if necessary also helps quality control and regular monitoring of the subsidised biogas digesters, including BC's performance evaluation, grading, penalty, bonus as well as monitoring of after-sales services. The NBPA executes skill enhancement packages for masons.

BCs are responsible to promote market and construct quality biogas digesters, regularly visit households and deliver the promised after-sales service and other services fully respecting the promised guarantee. After the installation of digester, BCs handover the Users' Manual and other information materials, and train the users on operation and maintenance of the digesters. BCs also facilitate and coordinate with banks, Micro Finance Institutions (MFIs) and other Community Based Organizations (CBOs)/Non Government Organizations (NGOs) to ease credit flow to beneficiaries.

Further, the local and provincial governments also carry out the promotion and monitoring of the biogas digesters at the local level as and when necessary. The owners of a digester sign an agreement stating "The Biogas Household transfer 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."

SECTION D. Duration of PoA

D.1. Date of first submission of PoA to Gold Standard

Nepal Biogas Support Project-PoA is registered in UNFCCC as CDM PoA on 31/01/2013. This PoA is also registered in GS (GS 2.2) on 14/08/2015 with its first four CPAs. CPA-5, CPA-6 and CPA-7 are also included in GS on 24/12/2018 and the remaining two CPAs were included on 23 September 2019. The PoA is transitioned to GS4GG on 01/08/2018.

The first crediting period of PoA ends on 30/01/2020. So, this PoA-DD is prepared for the Gold Standard for the renewable of crediting period. The second crediting period start date is 31 January 2020 and is for 7 years.

D.2. Duration of the PoA

The duration of the PoA is 28 years

SECTION E. Safeguarding principles and SDG outcome assessment

E.1. Level at which safeguarding principles and SDG outcome assessment is undertaken

The assessment of the safeguarding principles and SDG outcome assessment was done at PoA level. Since the technology incorporated in all the VPAs are same and will be same for future CPA, and the safeguarding principles and SDG outcome from all the VPAs are similar, it was done at PoA level.

E.2. Assessment of safeguarding principles, if undertaken at PoA level

The PoA is already registered in UNFCCC and GS and the transition of PoA along with its VPAs to GS4GG is already completed, this has been confirmed that PoA and all the VPAs under the PoAs meets the following safeguarding principles and requirement. Please also see the transition document of the PoA DD.

Safeguarding principle	Assessment questions	Assessment of relevance to the project	Justification	Mitigation measure (if

		(Yes/potentially/no)		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 inform Requirements 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 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	a) No b) No c) No d) Yes e) 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 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.	

	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 risks or hazards?	f) No g) No	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.	
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			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 VPAs included are retroactive 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 duly followed the set quality standard. Quality assurance and quality control is an integral part of the project implementation 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 impacts and demonstrate a consideration of potential	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 comparison 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 cleaning the utensils, reducing health	

	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.		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	Could the Project directly or indirectly cause additional erosion and/or water body instability or disrupt the natural pattern of erosion?	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	

stability			under discussion will not be triggered by the project. Conclusion: the parameter will not be monitored	
4.3.1 Landscape 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 susceptible 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 Harvestin g 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 Husbandr y	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.	

E.3. SDG outcomes assessment, if undertaken at PoA level

>> (If SDG outcomes assessment is undertaken at PoA level then *specify the relevant SDG target for each of three or more SDGs addressed by the PoA. Refer most recent version of targets [here](#). Provide the inclusion criteria to be met by each VPA regarding SDG outcomes assessment in section B.2 above*)

Since the SDG outcomes assessment is undertaken at PoA level, table below discusses the relevant SDG target for each three SDGs addressed by the PoA and each VPAs.

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

The data and parameters that need to be monitored during the monitoring of each VPAs will be as follows:

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	Needs to be calculated
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	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 VPA 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 VPA 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 VPA 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 VPA 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 VPA 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 VPA 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 Indicator/Safeguarding Principle	SDG 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 VPA included in the PoA
Purpose of data	Sustainable Development Assessment.
Additional comment	Requirements as defined in the sampling plan shall be met.

SECTION F. Local stakeholder consultation

F.1. Level at which stakeholder consultation is undertaken

The local stakeholder consultation as per GS requirement was conducted on 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 is not site dependent.

F.2. Solicitation of comments from stakeholders, if undertaken at PoA level

A stakeholder consultation meeting was held on 15 August 2008 in Kathmandu for the registration in CDM. After an introduction of the PoA and its CDM background the stakeholder were invited to submit comments. Further, as per the DNA regulations, the stakeholder discussion on the PIN and PDD of the PoA was held on September 3, 2008 and on November 17, 2009 respectively. The stakeholders included digesters users, representatives from different government ministries, NGO's, Development Partners and BSP-Nepal and AEPC. The comments have been filed and taken into account in the design of the BSP. Since the BSP has been successfully operated for many years, there were little comments on the technical aspects or negative side effects of the program.

The LSC was organized in the meeting hall of Chetana Kendra, Dhulikhel Kavre for registration the PoA in Gold Standard. 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 detail in the LSC report as well as in section E of the PoA Passport.

F.3. Summary of comments received, if stakeholder consultation undertaken at PoA level

Please refer to the section D.3 of the registered CDM-SSC-PoA-DD for the stakeholder consultation as per CDM requirement. The LSC for GS was conducted on PoA level. The detail of it is given in the LSC report as well as in section E of the PoA Passport.

F.4. Report on consideration of comments received, if stakeholder consultation undertaken at PoA level

Please refer to the section D.4 of the CDM-SSC-PoA-DD for the stakeholder consultation as per CDM requirement.

The LSC for GS was conducted on PoA level. The detail of it is given in the LSC report as well as in section E of the PoA Passport.

Appendix 1. Contact information of coordinating/managing entity and responsible person(s)/ entity(ies)

CME and/or responsible person/ entity	☒ CME ☒ Responsible person/ entity for application of the selected methodology(ies) and, where applicable, the selected standardized baseline(s) to the PoA
Organization	Alternative Energy Promotion Centre
Street/P.O. Box	Khumaltar Heights
Building	Thakur Mansion
City	Lalitpur Sub-metropolitan city
State/Region	Bagmati
Postcode	
Country	Nepal
Telephone	+977-1-5539390
Fax	+977-1-5539392
E-mail	Madhusudhan.adhikari@aepc.gov.np
Website	www.aepc.gov.np
Contact person	Mr. Madhusudhan Adhikari
Title	Executive Director
Salutation	Mr.
Last name	Adhikari
Middle name	Madhusudhan