



Gold Standard[®]
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TEMPLATE

KEY PROJECT INFORMATION & PROJECT DESIGN DOCUMENT (PDD)

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VERSION **v. 1.2**

RELATED SUPPORT

- TEMPLATE GUIDE Key Project Information & Project Design Document v.1.2

This document contains the following Sections

Key Project Information

Q – Description of project

Q – Application of approved Gold Standard Methodology (ies) and/or demonstration of SDG Contributions

Q – Duration and crediting period

Q – Summary of Safeguarding Principles and Gender Sensitive Assessment

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Appendix 1 – Safeguarding Principles Assessment (mandatory)

Q – Contact information of Project participants (mandatory)

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KEY PROJECT INFORMATION

GS ID of Project	GS11441
Title of Project	Bundled household biogas plants project in Jammu and Punjab
Time of First Submission Date	23/11/2021
Date of Design Certification	
Version number of the PDD	1.0
Completion date of version	12/11/2021
Project Developer	Value Network Ventures Advisory Services Pte. Ltd.
Project Representative	Value Network Ventures Advisory Services Pte. Ltd.
Project Participants and any communities involved	Shanker Rural Women Development Society, Jammu and Kashmir
Host Country (ies)	India
Activity Requirements applied	<input checked="" type="checkbox"/> Community Services Activities <input type="checkbox"/> Renewable Energy Activities <input type="checkbox"/> Land Use and Forestry Activities/Risks & Capacities <input type="checkbox"/> N/A
Scale of the project activity	<input type="checkbox"/> Micro scale <input checked="" type="checkbox"/> Small Scale <input type="checkbox"/> Large Scale
Other Requirements applied	N/A
Methodology (ies) applied and version number	AMS-I.E.: Switch from non-renewable biomass for thermal applications by the user -Version 12.0
Product Requirements applied	<input checked="" type="checkbox"/> GHG Emissions Reduction & Sequestration <input type="checkbox"/> Renewable Energy Label <input type="checkbox"/> N/A
Project Cycle:	<input type="checkbox"/> Regular

Retroactive

Table 1 – Estimated Sustainable Development Contributions

Sustainable Development Goals Targeted	SDG Impact (defined in B.6.)	Estimated Annual Average	Units or Products
13	Emission reductions	40,129	tCO ₂ e
3	Good health & well being	100% users are expected to have positive impact on health and illness due to the project.	Percentage
7	Affordable and clean energy	100% users are expected to access clean and affordable energy.	Percentage

SECTION A. DESCRIPTION OF PROJECT

A.1 Purpose and general description of project

The project activity is targeting to bundle 8424 household biogas plants located in rural parts of Jammu and Punjab states of India commissioned from December 2020 to October 2021.

The project biogas plants replace commonly used inefficient wood fired mud stoves thereby replacing firewood consumption.

The household biogas plants utilize cattle dung in the digester for the production of biogas which is burnt in gas stoves for household cooking's. This leads to reduction of greenhouse gas emissions by displacing conventionally used non-renewable biomass with renewable biogas. In addition, the hygienic conditions in the rural areas will be improved by an appropriate disposal of waste. Further, residue from the bio digesters can be used as organic fertilizer and will improve soil fertility in rural areas.

Project activity will contribute towards sustainable development by replacing firewood with biogas generated from the biodigesters.

Pre project Scenario:

Household survey was conducted to assess the baseline fuel and quantity used. As per the Survey, firewood is found to be the primary fuel for domestic cooking needs in both the states. Usage of inefficient firewood leads to indoor air pollution and land use patterns have been showing a decrease in forest land cover and increase in degraded land. Increasing pressure from human and livestock population and indiscriminate and illegal exploitation of forest resources are among factors that have led to further intensification of the problem. A trend of forests turning into open scrubs has been observed. Degradation of forest lands has exacerbated the already existing problem of desertification. There is a need to maintain adequate forest cover in the state to mitigate climate change effects.

Project Scenario:

Project activity is targeting to bundle 8424 household biogas plants installed in rural areas of Punjab and Jammu.

A.1.1. Eligibility of the project under Gold Standard

>>As per section 4.1.3 of GS4GG Principles & Requirements version 1.2 of October 2019 'A Project type is automatically eligible for Gold Standard Certification if there are Gold Standard published Activity Requirements and/or Gold Standard Approved Methodologies associated with it or as referenced in Gold Standard Product Requirements'.

The project falls under GG4GG Community Services Activity Requirements as described below:

Eligible Project Types & Scope:

The projects leads to climate change mitigation by providing access to resources (biogas) to households.

Types of project: The project falls under 'Renewable energy" type: Waste management and handling: Management of animal waste (cattle dung) to deliver biogas.

Project Area, Boundary and Scale:

Project Area and Boundary is described under section A.4 below.

Scale: The project falls under waste handling and disposal with emission reductions 40,129 tCO₂ with installed energy output of 26.19 MW_{thermal} (Below the threshold of 45 MW_{thermal}). Hence, the project falls under small scale projects.

The project activity as a whole or any project digester is not part of any other registered carbon credit project (such as CDM, VCS etc.) project. This is confirmed through end user agreement and can be cross checked from publicly available sources such as UNFCCC, VCS etc.

A.1.2. Legal ownership of products generated by the project and legal rights to alter use of resources required to service the project

Implementation of the proposed project doesn't involve any activity that causes alteration of any resource; therefore, acquiring any specific legal right to do so is not applicable. However, the entitlement of the emission reductions generated by the project shall be transferred to the project developer from the beneficiary households through a signed covenant.

A.2 Location of project

A.2.1. Host Country

>> India

A.2.2. Region/State/Province etc.

>> State: Punjab and Jammu

A.3 Technologies and/or measures

>>

The existing traditional stoves used in the baseline are simple structures made from clay or having stone or metal tripods with poor combustion air supply or flue gas ventilation system i.e. without a grate or a chimney. These stoves use non-renewable biomass (firewood). The target group of the project are households with at least one head of cattle (generally cows or buffalos) who currently use non-renewable woody biomass (firewood) for cooking purposes. The project aims to utilize the methane produced from household biogas digesters to replace the current non-renewable energy sources that is used by households.

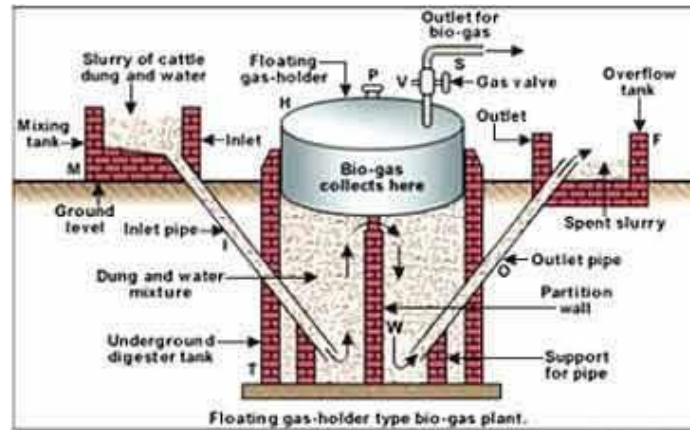
The project activity involves bundling of household bio-digesters with KVIC model technology installed in the state of Punjab. The bio-digester models of various sizes (2m³,3m³, 4m³and 6m³). The major feed cattle dung is mixed with water and fed into the plant through the inlet chamber of the plant. This waste is converted into biogas with the help of a special type of anaerobic bacteria. The digested material, which comes out of the plant, is enriched manure.

KVIC floating model:

KVIC model, consists of a deep well, and a floating drum, usually made of mild steel. The system collects the gas, which is kept at a relatively constant pressure. As more gas is produced, the drum gas holder consequently rises. As the gas is consumed, the drum then falls. The biomass slurry moves through the system, as the inlet is higher than the outlet tank, creating hydrostatic

pressure. Only completely digested material can flow up a partition wall, which prevents fresh material from 'short-circuiting' the system, before flowing into the outlet tank.

Figure 1: KVIC type Biogas plant



The cattle dung otherwise would have been left to decay in open which leads to methane emissions and by utilizing the same for generation of biogas leads to capture of methane and utilize as fuel. The biogas thus generated replaces firewood that otherwise would have been used for cooking and heating purposes. The project is expected to reduce 40,129 tCO₂ per annum.

The project contributes directly in achieving the SDG#3 & 7 in addition to SDG#13 as required by Principle-1 of GS4GG. The project will have following benefits:

- Environmental Benefits: Reduction in firewood consumption and emission of greenhouse gases, forest and biodiversity conservation (SDG#13).
- Health Benefits: Sufficiently enhance indoor air quality thereby improving health of family members and reducing incidences of smoke and fire related injuries (SDG#3).
- Social Benefits: The project will provide affordable and clean fuel compared to baseline scenario (SDG #7)



A.4 Scale of the project

The project falls under waste handling and disposal with emission reductions of 40,129 tCO₂ per annum with installed energy output of 26.19 MW_{thermal} (below the threshold of 45 MW_{thermal}). Hence, the project falls under small scale projects.

A.5 Funding sources of project

No public funding from parties included in Annex I to the UNFCCC, is available to the project. No Official Development Assistance involves in the project activity.

SECTION B. APPLICATION OF APPROVED GOLD STANDARD METHODOLOGY (IES) AND/OR DEMONSTRATION OF SDG CONTRIBUTIONS

B.1. Reference of approved methodology (ies)

Methodology : AMS-I.E - Switch from non-renewable biomass for thermal applications by the user

Version : Version 12

Reference:

<https://cdm.unfccc.int/methodologies/DB/XA6RFKB3QM9T8S6ELI0V4P8SY8RR2>

U

B.2. Applicability of methodology (ies)

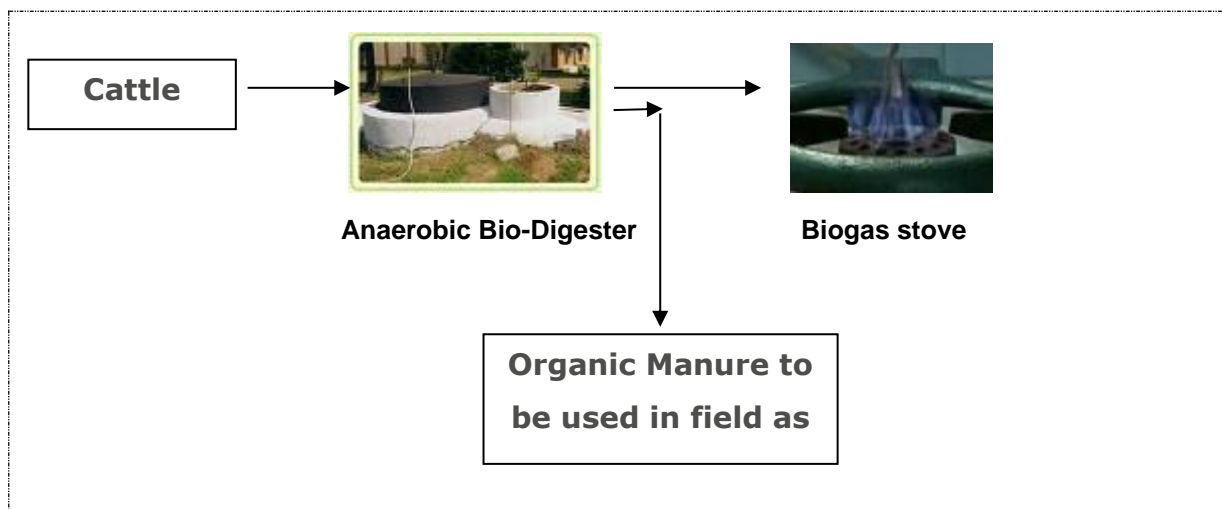
>>

Conditions	Applicability
The methodology is applicable for technologies displacing use of non-renewable biomass by renewable energy	Project activity involves installation of biodigesters and biogas thus produced will displace the use of non renewable biomass to major extent. Therefore, condition is justified.
Project participants or coordinating and managing entities shall describe in the PDD/PoADD how the double counting of emission reductions has been addressed (e.g. between end users, distributors and producers of stoves).	Each of the bio-digesters shall be allocated a unique id against each end users. End user and project implementer shall have a agreement to avoid any double counting.
For project activities introducing bio-ethanol cookstoves, project participants or coordinating and managing entities shall demonstrate that the bioethanol cookstoves are redesigned, constructed and	Not applicable.

<p>operated to the requirements (e.g. with regard to safety) of arelevant national or local standard or comparable literature. Latest guidelines issued by arelevant national authority or an international organisation may also be used.</p>	
<p>The CDM-PDD or CDM-PoA-DD/CPA-DD shall explain the proposed method for distribution of project devices including the method to avoid double counting of emission reductions such as unique identifications of product and end-user locations (e.g. programme logo)</p>	<p>As an when a digester is commissioned and agreed for joining the project, a unique id is allotted and end user agreement is executed to avoid any double counting</p>
<p>The CDM-PDD or CDM-PoA-DD/CPA-DD shall also explain how the proposed procedures prevent double counting of emission reductions, for example to avoid that project stove manufacturers, wholesale providers or others also claim credit for emission reductions from the project devices</p>	<p>Avoidance of double counting measures are explained in above point.</p>

B.3. Project boundary

>> The project boundary is the physical, geographical site of the use of biomass or the renewable energy. Therefore, the project boundary encompasses the sum of all the 8424 physical geographical sites of all individual biogas plants (digester system, pipe leading to the stove and the stove itself) realized by the project activity. However, the baseline emissions from methane avoidance have been excluded to be conservative.



For the purpose of GHG mitigation/sequestration following table shall be completed (delete if not required)

Source		GHGs	Included?	Justification/Explanation
Baseline scenario	Firewood	CO ₂	Yes	The major source of emissions in the baseline due to burning of firewood
		CH ₄	No	Excluded for simplification, this is conservative.
		N ₂ O	No	Not applicable for the project activity
Project scenario	Fire wood	CO ₂	Project emissions form continued use of fire-wood shall be accounted.	
Leakage scenario	The use/diversion of non-renewable woody biomass saved under the project activity by non-project households/users	CO ₂	Yes	Default option as per methodology to be applied.
		CH ₄	No	Not applicable for the project activity
		N ₂ O	No	Not applicable for the project activity

B.4. Establishment and description of baseline scenario

>>As per AMS I.E- Switch from non-renewable biomass for thermal applications by the user, Version 12 'the baseline scenario would be the use of fossil fuels for meeting similar thermal energy needs'.

A project specific baseline survey reveals the alternative option in absence of biogas use is firewood based cooking practice and therefore, firewood based thermal application is considered as baseline scenario.

The project activity involves the installation of anaerobic biodigesters for the production of biogas which replaces non-renewable biomass, used as a fuel for household cooking purposes. A baseline survey has been done to estimate the average firewood consumption prior to project activity at user point following sampling standard as per UNFCCC 'Sampling and surveys for CDM project activities and programmes of activities' version 09 and guideline 'Sampling and surveys for CDM project activities and programmes of activities' version 04.

B.5. Demonstration of additionality

As described in section A.2 above, the project falls under GG4GG Community Services Activity Requirements. As per Annex-B Positive list under 'GG4GG Community Services Activity Requirements' the project meets the criteria 3 'Project activities solely composed of isolated units where the users of the technology/measure are households or communities or institutions and where each unit results in <= 600 MWh of energy savings per year or <=600 tonnes of emission reductions per year' as explained below:

Emission reduction:

Considering a biogas plant can save around 5.50 ton/HH/year of firewood in Punjab and 5.1 ton/HH/year of firewood in Jammu which is used for cooking in baseline, the emission reduction as per applied methodology (AMS-I.E, version 12) is calculated as below:

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

Where,

B_y	=	Quantity of woody biomass that is substituted or displaced in tonnes
N_{HH}	=	Number of households in the project activity, number. It is considered 1 considering a single unit.
$BC_{BL,HH,y}$	=	Average annual consumption of woody biomass per household before the start of the project activity, tonnes/household/year 4.3 tonnes/HH/year is considered.
$BC_{PJ,HH,y}$	=	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. It is considered conservatively that entire firewood is replaced.

For Punjab,

$$B_y = 1 * (5.50 - 0) \\ = 5.50 \text{ tonnes}$$

Therefore, emission reduction is

$$BE_y = B_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossil_fuel} \\ = 5.50 * 100\% (\text{most conservative value}) * 0.0156 * 64.4 \\ = 5.20 \text{ tCO}_2 \text{ per year}$$

For Jammu,

$$B_y = 1 * (5.10 - 0) \\ = 5.10 \text{ tonnes}$$

Therefore, emission reduction is

$$BE_y = B_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossil_fuel} \\ = 5.10 * 100\% \text{ (most conservative value)} * 0.0156 * 64.4 \\ = 4.53 \text{ tCO}_2\text{per year}$$

Therefore, with conservative assumptions, the emission reduction for an individual unit is far below 600 tonnes of emission reduction per year. Hence, the proposed project activity falls under the 'Positive List' and hence under Principle 5 – Financial Additionality & Ongoing Financial Need, the project is considered deemed additional and therefore not required to prove Financial Additionality at the time of Design Certification.

B.5.1 Prior Consideration


As per GS4GG rule for retroactive projects, project documents need to submit to GS within one year of the project start date to meet prior consideration. Only biogas plants commissioned from one year prior to GS submission shall be considered.



B.5.2 Ongoing Financial Need

Ongoing Financial Need shall be demonstrated at Design Certification Renewal (Refer clause 3.5.2.2 of GS4GG 'principle and requirements').

B.6. Sustainable Development Goals (SDG) outcomes

Relevant Target/Indicator for each of the three SDGs

SDGs	Targets
 <p>3 GOOD HEALTH AND WELL-BEING</p>	<p>The project will contribute to the SDG target 3.9 “By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination”. The project replaces firewood consumption with biogas. Therefore, the indoor air quality at user point will improve and will contribute to the SDG target. The indicator would be 3.9.1 'Mortality rate attributed to household and ambient air pollution'</p>

	<p>The project will contribute towards below SGD targets:</p> <ul style="list-style-type: none"> ▪ By 2030, ensure universal access to affordable, reliable and modern energy services (7.1) ▪ By 2030, increase substantially the share of renewable energy in the global energy mix (7.2)
	<p>The project will contribute towards below SDG target (13.2):</p> <ul style="list-style-type: none"> ▪ Integrate climate change measures into national policies, strategies and planning

B.6.1 Explanation of methodological choices/approaches for estimating the SDG Impact

>>SDG 13:

As per “AMS I.E- Switch from non-renewable biomass for thermal applications by the user, Version 12, the baseline emissions (BE_y) are calculated as:

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

Where,

- BE_y = Baseline emissions during the year y in t CO₂e
- 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 (fNRB)
- $NCV_{biomass}$ = 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 the substitution of non-renewable woody biomass by similar consumers. Use a value of 64.4 tCO₂/TJ for South Asia.

B_y is determined by using option (a) paragraph 27 (a) of the methodology as follows:

“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)”;

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

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

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

$BC_{BL,HH,y}$ has been determined as per third party survey for the sample of households explained in section B.4 above.

Fraction of woody biomass used in the absence of the project activity in year y that can be established as non-renewable biomass ($f_{NRB,y}$) is determined as per methodological tool 'Calculation of the fraction of non-renewable biomass' version 02 as follows:

The fraction of woody biomass that can be established as non-renewable, is:

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

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)

f_{NRB} is calculated for Punjab to be 99% and for Jammu Kashmir is 93%.

SDG 3:

Based on publicly available literature¹ it is evident that firewood based smoke contains thousands of health-damaging substances. Small particles of less than 10 microns in diameter (PM₁₀), are among the most dangerous. Such pollutants penetrate deep into the lungs and are an important factor in the development of acute lower respiratory disease, chronic obstructive pulmonary disease, cancers, and other illnesses. Therefore, in baseline scenario the firewood based cooking system poses a threat to health risks.

SDG 7: Firewood based conventional cooking system is not considered as clean source of energy. Therefore, in baseline scenario entire project houses were accessed to unclean source of energy.

Project Emissions (PE_y):

SDG 13:

As per applied methodology AMS-I.E, version 12, project emissions are accounted for below activities:

- a) CO₂ emissions from on-site consumption of fossil fuels due to the project activity
- b) CO₂ emissions from electricity consumption by the project activity
- c) Methane emission from solid waste disposal or waste water
- d) Project emissions related to cultivation of feedstock
- e) Project emissions from transportation

¹ <https://www.who.int/heli/risks/indoorair/en/>

The project activity does not involve any of the above activity and hence, project emissions for the project activity is not applicable.

SDG 3: Based on publicly available sources² it is evident use of biogas as cooking fuel reduces indoor air pollution related health risks. Therefore, ex-ante it is assumed with 100% operational status of project biodigesters, 8424 families to be benefitted from indoor air pollution related illness. Ex-post monitoring methods are discussed in section B.7.1 below.

SDG 7: The projects has set up a network of team to operate and maintain project bio-digesters. Therefore, it is expected with 100% operational status of project bio-digesters 8424 families to access clean and affordable fuel.

Leakage Emissions (LEy):

SDG 13:

Leakage emissions (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: 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.

PP has opted default option, and By shall be adjusted with adjustment factor of 0.95 to account leakage.

SDG 3: Not applicable

SDG 7: Not applicable

Emission reductions:

SDG13:

Emission reductions are to be estimated based on the equation below:

$$ERy = BEy - PEy - LEy$$

B.6.2 Data and parameters fixed ex ante

² <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4215499/>

Relevant SDG Indicator	13 (Climate Action)- Specific indicator- 13.2.1
Data/parameter	$f_{NRB,y}$
Unit	-
Description	Fraction of woody biomass saved by the project activity during year that can be established as non-renewable biomass
Source of data	Calculated following requirements of Methodological tool: Calculation of the fraction of non-renewable biomass version 02
Value(s) applied	99% for Punjab and 93% for Jammu & Kashmir
Choice of data or Measurement methods and procedures	Methodological tool: Calculation of the fraction of non-renewable biomass
Purpose of data	Baseline emissions estimation.
Additional comment	This value will be fixed for the crediting period and will be reviewed during renewal of crediting period.

Relevant SDG Indicator	13 (Climate Action). Specific indicator- 13.2.1
Data/parameter	N_{HH}
Unit	Number
Description	Number of households in the project activity in year y
Source of data	As per PP's project database
Value(s) applied	10,000
Choice of data or Measurement methods and procedures	Project database as per the commissioning reports and end user agreements.
Purpose of data	Baseline emissions estimation.
Additional comment	

Relevant SDG Indicator	13 (Climate Action)- Specific indicator- 13.2.1
Data/parameter	$BC_{BL,HH,y}$
Unit	tonnes/household/year
Description	Average annual consumption of woody biomass per household before the start of the project activity
Source of data	Baseline survey
Value(s) applied	5.5 and 5.1

Choice of data or Measurement methods and procedures	The survey was conducted to know the firewood consumption pattern in line with the methodology in the potential households that uses traditional cookstoves (baseline technologies). Survey was conducted following UNFCCC sampling standard 'Sampling and surveys for CDM project activities and programmes of activities' version 9 and guideline 'Sampling and surveys for CDM project activities and programmes of activities' version 04. A 90% confidence interval and 10% error margin applied for sample calculation.
Purpose of data	Baseline emissions estimation.
Additional comment	This value will be fixed for the first crediting period

Relevant SDG Indicator	13 (Climate Action)- Specific indicator- 13.2.1
Data/parameter	$NCV_{biomass}$
Unit	TJ/tonne
Description	Net calorific value of the non-renewable woody biomass that is substituted
Source of data	AMS-I.E, version 12
Value(s) applied	0.0156 TJ/tonne
Choice of data or Measurement methods and procedures	IPCC default for wood fuel
Purpose of data	Baseline emissions estimation.
Additional comment	

Relevant SDG Indicator	13 (Climate Action)- Specific indicator- 13.2.1
Data/parameter	$EF_{projected_fossilfuel}$
Unit	tCO ₂ /TJ
Description	Emission factor for the substitution of non-renewable woody biomass
Source of data	Default value as per AMS-I.E, version 12
Value(s) applied	64.4 tCO ₂ /TJ
Choice of data or Measurement methods and procedures	Default value as per AMS-I.E, version 12
Purpose of data	Baseline emissions estimation.
Additional comment	

B.6.3 Ex ante estimation of SDG Impact

>>

SDG 13:

Baseline Emissions:

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

Where,

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

	Total Population (N _{HH})	By (ton/yr)	fNRB	NCVbiomass	EF	Leakage factor	ER	ERs
Punjab	2978	5.5	99%	0.0156	64.4	0.95	5.20	15476
Jammu	5446	5.1	93%	0.0156	64.4	0.95	4.53	24653
Total	8424							40129

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) is considered zero during design certification stage. The same shall be monitored ex-post certification.

The fraction of woody biomass that can be established as non-renewable, is:

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

Accordingly, the fNRB would be: 99% for Punjab and 93% for J& K

Accordingly, BE_y would be:

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

Project Emissions (PE_y): Nil as explained in section B.6.2 above.

Leakage Emissions: By is multiplied by a net to gross adjustment factor of 0.95 to account for leakages.

Emission reductions = BE_y – PE_y – LE_y

SDG 3:

Baseline estimation	Ex-ante estimation
Prone to illness due to smoke released from burning of fire-wood	Reduction in smoke related illness due to use of biogas instead of firewood. Since, biogas is smokeless; 100% users are expected to get rid of kitchen smoke related illness. Ex-post monitoring methods are discussed in section B.7.1 below.

SDG 7:

Baseline estimation	Ex-ante estimation
All users used fire-wood based cooking system which is not clean energy.	100% users are accessed to clean energy sources. This shall be monitored. It is assumed that with 100% operational status all users are accessed to clean energy source. Ex-post monitoring methods are discussed in section B.7.1 below.

B.6.4 Summary of ex ante estimates of each SDG Impact

Year	Baseline estimate	Project estimate	Net benefit
Year 1	42240	2112	40,129
Year 2	42240	2112	40,129
Year 2	42240	2112	40,129
Year 4	42240	2112	40,129
Year 5	42240	2112	40,129
Total	211,200	10560	200643
Total number of crediting years			
Annual average over the crediting period	42240	2112	40129

B.7. Monitoring plan

B.7.1 Data and parameters to be monitored

Relevant SDG Indicator	13 (Climate Action)- Specific indicator- 13.2.1
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	Survey
Value(s) applied	To be monitored
Measurement methods and procedures	Monitoring shall consist of estimation of all project devices or a representative sample thereof, at least once every two years (biennial)
Monitoring frequency	At least once every two years (biennial)
QA/QC procedures	Third party survey to be conducted following standard sampling approach.
Purpose of data	Baseline Emissions estimation
Additional comment	

Relevant SDG Indicator	13 (Climate Action)- Specific indicator- 13.2.1
Data / Parameter	$N_{HH,y}$
Unit	Number
Description	Number of households (biogas system) in the project activity in operational per year.
Source of data	Survey
Value(s) applied	To be monitored
Measurement methods and procedures	Monitoring consist of checking of representative sample, to ensure that bio-digesters operating. Calculated as $N_{HH} * P_y$, where N_{HH} is the number of biodigesters installed in the project and P_y is Proportion of Bio-digesters operationalestimated based on the sample survey.
Monitoring frequency	At least once every two years (biennial)
QA/QC procedures	Third party survey to be conducted following standard sampling approach.
Purpose of data	Baseline Emissions estimation
Additional comment	

Relevant SDG Indicator	1 – Good health and well being (SDG 3)- Specific indicator 3.9.1
Data / Parameter	Improvement in health and decrease in illness
Unit	Qualitative
Description	Indoor air quality at usage point
Source of data	Sampling survey/annual usage survey/monitoring survey
Value(s) applied	To be monitored

Measurement methods and procedures	Improvement in health and decrease in illness will be assessed through interview with end users due to project implementation. Users opinion on indoor air quality due to biogas usage shall be collected during monitoring survey. In addition, training to the operation and maintenance technicians and field supervisors to be provided to increase awareness in safe operation and handling emergency situations.
Monitoring frequency	At least once every two years (biennial)
QA/QC procedures	Third party survey to be conducted following standard sampling approach. Publicly available data may be referred.
Purpose of data	Sustainable development assessment
Additional comment	

Relevant SDG Indicator	2 – Affordable and clean energy (SDG 7)- Specific indicator 7.1.2
Data / Parameter	Access to affordable and clean energy services
Unit	Numbers
Description	Number of biogas system operational under the project activity
Source of data	Biogas User Survey
Value(s) applied	To be monitored
Measurement methods and procedures	Sample survey to confirm if project biogas systems are operational. Operational status will confirm that the users are accessed to affordable and clean energy.
Monitoring frequency	At least once every two years (biennial)
QA/QC procedures	Required sample size shall be determined following UNFCCC sampling standard
Purpose of data	Sustainable development assessment
Additional comment	

B.7.2 Sampling plan

(a) >> **Sampling Approach:**

- i. **Objectives and reliability requirements:** The objective of the sampling plan is to achieve unbiased and reliable estimates of the proportion or the mean value of the key variables over the crediting period. The methodology applied for the project (AMS.I.E version 12) requires the project proponent achieving 95 percent confidence interval and a 10 percent margin of error when biennial inspection is chosen and when annual inspection is chosen 90 per cent. The table below provides the monitoring parameters that will be monitored annually:

Parameter	Type	Description
N_{HH}	Proportional parameter	Number of households (biogas system) in the project activity in operational per year
$BC_{PJ,HH,y}$	Mean value parameter	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.
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- ii. **Target Population:** The target population for different parameters discussed in the table above are given below:
 - For the proportional parameter; the target population is the bio-digester users listed in the project database.
 - For the mean value parameter; the target population is the total number of operational biogas digester for which the emission reductions will be accounted for the monitoring period in question.
- iii. **Sampling frame:** All the households with biogas digester within the project will be the sampling frame.
- iv. **Sampling Method:** A simple random sampling will be adopted for estimating the sample size for the monitoring surveys. Simple random sampling is suited to populations that are homogenous (EB 86 annex 04).
- v. **Sample Size:** The calculation of the required sample size for each parameter will be calculated at 90/10 confidence/precision as required for the annual monitoring. The sample size is determined using the Guidelines for Sampling and Surveys for CDM Project activities and Programme of Activities Ver. V4.0 (EB86, Annex 4).

Proportional Paramaters (Operational status)

The minimum sample size to determine number of biogas system in operation using the procedure outlined in para 12 of appendix 1, EB 86 Annex 4, Guidelines for Sampling and Surveys for CDM Project activites and Programme of Activities Ver. 4.0.

$$n \geq \frac{1.645^2 N \times p(1 - p)}{(N - 1) \times 0.1^2 \times p^2 + 1.645^2 p(1 - p)}$$

Where:

n= Sample size

N = Total number of biogas system of type *i* installed under the project

p = expected proportion

1.645 = represents the 90% confidence required

0.1 = represents the 10% relative precision

Mean Value parameters (average annual consumption of woody biomass after project activity)

The minimum sample size for the monitoring parameters is determined using the equation given in para 51 of appendix 1, EB 86 Annex 4, Guidelines for Sampling and Surveys for CDM Project activities and Programme of Activities Ver. 4.0.

$$n \geq \frac{1.645^2 NV}{(N - 1) \times 0.1^2 + 1.645^2 V}$$

Where,

$$V = (SD/Mean)^2$$

n = Sample Size

N = Total number of Population

SD = Standard deviation

Mean = Mean for the average annual woody biomass consumption by pre-project device during project activity

1.645 = Represent 90% confidence required

0.1 = Represent the 10% relative precision

Out of the sample calculated above, conservative number of sample will be taken with appropriate enlargement of samples.

(b) Data:

(i) Field Measurements:

1. Checking of a representative sample of biogas system within the project to ensure that they are still operating (N_{HH}).

The selection of households will be done using rand function in excel to generate random number and taking households from first up to the number of sample required by arranging the random number in ascending or descending order.

2. Determine 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. The survey will be conducted annually with the objective to target 10 percent precision and to achieve 90 percent confidence.

(ii) Quality Assurance/Quality Control:

A survey questionnaire will be prepared to seek responses of operating status (yes or no) of biogas digesters within the project activity. Users will be asked to provide their estimates on consumption of woody biomass after project activity. The survey will be performed by the project developer appointing a third party. During the survey, in order to anticipate any low response rate and answers bias, 10% oversampling will be applied.

(iii) Analysis:

The project developer will collect, compile and analyze the data to derive the number of biogas digesters within the project still operational and average firewood consumption at each biogas digester user (if any). The developer will prepare "monitoring report" based on the survey report.

(c) Implementation:

The survey questionnaire will be prepared, pre-tested and field personnel will be trained in conducting the survey to ensure the quality of data collected and the survey will be carried out as per defined frequency covering required data information. The schedule for implementing the sampling effort shall be defined prior to the field activity.

B.7.3 Other elements of monitoring plan

>> N/A

SECTION C. DURATION AND CREDITING PERIOD

C.1. Duration of project

C.1.1 Start date of project

>> 15/12/2020

C.1.2 Expected operational lifetime of project

>> 20 Years

C.2. Crediting period of project

C.2.1 Start date of crediting period

>>15/12/2020. The date represents first batch of biogas digesters installed within the project activity.

C.2.2 Total length of crediting period

>>The project falls under GS community service activity and hence eligible for total 15 years issuance with certification renewal every 5 years. So the length of crediting period will be 5 year* 3 times.

SECTION D. SUMMARY OF SAFEGUARDING PRINCIPLES AND GENDER SENSITIVE ASSESSMENT

D.1 Safeguarding Principles that will be monitored

A completed Safeguarding Principles Assessment is in [Appendix 1](#), ongoing monitoring is summarised below.

Principles	Mitigation Measures added to the Monitoring Plan
N/A	

D.2. Assessment that project complies with GS4GG Gender Sensitive requirements

Question 1 - Explain how the project reflects the key issues and requirements of Gender Sensitive design and implementation as outlined in the Gender Policy?	The project respects the key gender issues and requirements of gender-sensitive design and implementation of the project. SDG#5 is one of the impact
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	<p>areas of the project. The project is aimed to replace conventional wood fired mud stoves technology with biogas primarily for cooking. This will result in reducing use of firewood consumption or replacement of complete firewood usage at user place.</p> <p>Primarily in rural areas of India, cooking activity at household level is managed by women. Therefore, women are more exposed to the indoor air pollution and the associated hazard. Women in rural areas in most cases are also responsible for taking care of their children specially infants who need mother’s support most of the time are bound to accompany their mother in kitchen. This situation leads to enhanced exposure of the women and children to kitchen smoke and associated health consequences. Since the project aims to replace the polluting traditional cooking stoves with biogas cooking system, the primary beneficiary would be the women and children. Furthermore, the project is focused to the economically dis-advantaged group of people, which also justifies the dimension of social inclusion in the project design.</p>
<p>Question 2 - Explain how the project aligns with existing country policies, strategies and best practices</p>	<p>The Government of India reaffirms its commitment to work for the realization of constitutional guarantee of equality, social justice and non-discrimination on the basis of sex, caste, community,</p>

	<p>language and religion. Ministry of women & child development, Govt. of India has taken various measures for gender equality/socio-economic development/empowerment of women³. Out of these, the project positively contributes towards the national mission for empowerment of women through improvement of health and attaining vision for empowerment of women under national policy for women 2016 (Women participation will be ensured in the efficient use and spreading the use of solar energy, biogas, smokeless chulas and other technological applications to have positive influence on their life styles and a long term impact on meeting sustainable development goals) ⁴</p>
<p>Question 3 - Is an Expert required for the Gender Safeguarding Principles & Requirements?</p>	<p>Not required.</p>
<p>Question 4 - Is an Expert required to assist with Gender issues at the Stakeholder Consultation?</p>	<p>Not required.</p>

SECTION E. SUMMARY OF LOCAL STAKEHOLDER CONSULTATION

³<http://pib.nic.in/newsite/PrintRelease.aspx?relid=132945>

⁴http://wcd.nic.in/sites/default/files/women%20empowerment%20poliy_Final_17May.pdf

E.1 Summary of stakeholder mitigation measures

>> Stakeholder consultation meeting is under planning stage.

E.2 Final continuous input / grievance mechanism

Method	Include all details of Chosen Method (s) so that they may be understood and, where relevant, used by readers.
Continuous Input / Grievance Expression Process Book (mandatory)	
GS Contact (mandatory)	help@goldstandard.org
Other	

APPENDIX 1 - SAFEGUARDING PRINCIPLES ASSESSMENT

Complete the Assessment below and copy all Mitigation Measures for each Principle into [SECTION D](#) above. Please refer to the instructions in the [Guide to Completing](#) this Form.

Assessment Questions/ Requirements	Justification of Relevance (Yes/potentially/no)	How Project will achieve Requirements through design, management or risk mitigation.	Mitigation Measures added to the Monitoring Plan (if required)
Principle 1. Human Rights			
<ol style="list-style-type: none"> 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 The Project shall not discriminate with regards to participation and inclusion 	No	<ol style="list-style-type: none"> India adopted 'The protection of human rights Act' 1993 and the project is bound to follow the rules and ruglation of host country. In addition, India has ratified 'International Convention on the Elimination of All Forms of Racial Discrimination :1969' 'International Covenant on Civil and Political Rights :1976', 'International Covenant on Economic, Social and Cultural Rights :1976' 'Convention on the Elimination of All Forms of Discrimination against Women :1981'. 	Not applicable.

		<p>Therefore, the project developer and the project do respect nationally and internationally proclaimed human rights and shall not be complicit in violence or human rights abuses of any kind.</p> <p>2. India has ratified 'International Convention on the Elimination of All Forms of Racial Discrimination :1969', 'Convention on the Elimination of All Forms of Discrimination against Women :1981' in addition to its national human rights Act' 1993. Therefore, the project will not discriminate with regards to participation and inclusion.</p>	
Principle 2. Gender Equality			
<ol style="list-style-type: none"> 1. The Project shall not directly or indirectly lead to/contribute to adverse impacts on gender equality and/or the situation of women 2. Projects shall apply the principles of 	No	<p>The project happens in individual households. It does not involve any women workforce which may lead to sexual harassment</p> <p>The project does not has any scope to apply gender strategy</p>	Not applicable.

<p>nondiscrimination, equal treatment, and equal pay for equal work</p> <p>3. The Project shall refer to the country’s national gender strategy or equivalent national commitment to aid in assessing gender risks</p> <p>4. (where required) Summary of opinions and recommendations of an Expert Stakeholder(s)</p>		<p>as such. Although the project positively contributes towards the national mission for empowerment of women through improvement of health and attaining vision for empowerment of women under national policy for women 2016.</p>	
<p>Principle 3. Community Health, Safety and Working Conditions</p>			
<p>1. The Project shall avoid community exposure to increased health risks and shall not adversely affect the health of the workers and the community</p>	<p>No</p>	<p>The project leads to safe working condition and improvement in health as it will replace firewood as fuel with biogas which is clean and safe</p>	<p>Not Applicable</p>
<p>Principle 4.1 Sites of Cultural and Historical Heritage</p>			
<p>Does the Project Area include sites, structures, or objects with historical, cultural, artistic, traditional or religious</p>	<p>No</p>	<p>The project area covers households which does not have any structures, or objects with historical, cultural,</p>	<p>Not applicable</p>

values or intangible forms of culture?		artistic, traditional or religious values or intangible forms of culture. Hence, not applicable	
>>			
Principle 4.2 Forced Eviction and Displacement			
Does the Project require or cause the physical or economic relocation of peoples (temporary or permanent, full or partial)?	No	The project activity takes place within individual households. Therefore, no relocation of people takes place	Not applicable
>>			
Principle 4.3 Land Tenure and Other Rights			
a. Does the Project require any change, or have any uncertainties related to land tenure arrangements and/or access rights, usage rights or land ownership? b. For Projects involving land use tenure, are there any uncertainties with regards to land tenure, access rights, usage rights or land ownership?	No	The project area covers households which does not have any structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture. Hence, not applicable	Not applicable
>>			
Principle 4.4 - Indigenous people			

<p>Are indigenous peoples present in or within the area of influence of the Project and/or is the Project located on land/territory claimed by indigenous peoples?</p>	<p>No</p>	<p>No. The project involves household biogas digesters. Therefore, it does not involve any influence towards indigenous people</p>	<p>Not applicable</p>
<p>>></p>			
<p>Principle 5. Corruption</p>			
<p>1. The Project shall not involve, be complicit in or inadvertently contribute to or reinforce corruption or corrupt Projects</p>	<p>No</p>	<p>The project benefits households with clean fuel (biogas). There is no corruption provision in the project activity.</p>	<p>Not applicable</p>
<p>Principle 6.1 Labour Rights</p>			
<p>1. The Project Developer shall ensure that all employment is in compliance with national labour occupational health and safety laws and with the principles and standards embodied in the ILO fundamental conventions</p>	<p>No</p>	<p>The project does not require labour force for implementation of the project. Trained technicians are involved in construction and operation and maintenance of plants. Therefore, no forced labour is involved in the project. No child labour is involved</p>	<p>Not applicable</p>

<p>2. Workers shall be able to establish and join labour organisations</p> <p>3. Working agreements with all individual workers shall be documented and implemented and include:</p> <ul style="list-style-type: none"> a) Working hours (must not exceed 48 hours per week on a regular basis), AND b) Duties and tasks, AND c) Remuneration (must include provision for payment of overtime), AND d) Modalities on health insurance, AND e) Modalities on termination of the contract with provision for voluntary resignation by employee, AND f) Provision for annual leave of not less than 			
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<p>10 days per year, not including sick and casual leave.</p> <p>4. No child labour is allowed (Exceptions for children working on their families' property requires an Expert Stakeholder opinion)</p> <p>5. The Project Developer shall ensure the use of appropriate equipment, training of workers, documentation and reporting of accidents and incidents, and emergency preparedness and response measures</p>			
<p>Principle 6.2 Negative Economic Consequences</p>			
<p>1. Does the project cause negative economic consequences during and after project implementation?</p>	<p>No</p>	<p>The project has lifetime of 20 years and expected to run beyond the project certification period. With carbon finance it is further strengthen to operate 100% project systems with continuous maintenance</p>	<p>Not applicable</p>
<p>>></p>			

Principle 7.1 Emissions			
Will the Project increase greenhouse gas emissions over the Baseline Scenario?	No	No. The project will replace firewood use with biogas. Hence, it will reduce greenhouse gas emissions over the Baseline Scenario.	Not applicable
>>			
Principle 7.2 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	No. The project uses inhouse cattle dung only.	Not applicable
>>			
Principle 8.1 Impact on Natural Water Patterns/Flows			
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	No. Water in huge quantity is not required for the project which can impact the ground water level or any seasonal flow. Water is needed to mix with cattle dung while feeding in digester	Not applicable
>>			

Principle 8.2 Erosion and/or Water Body Instability			
a. Could the Project directly or indirectly cause additional erosion and/or water body instability or disrupt the natural pattern of erosion? b. Is the Project’s area of influence susceptible to excessive erosion and/or water body instability?	No	No. Water in huge quantity is not required for the project which can impact the ground water level or any seasonal flow. Water is needed to mix with cattle dung while feeding in digester	Not applicable
>>			
Principle 9.1 Landscape Modification and Soil			
Does the Project involve the use of land and soil for production of crops or other products?	No	No. Since the project takes place in individual households, no net degradation in existing landscape function and services takes place	Not applicable
>>			
Principle 9.2 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	No. The project happens at individual households. There is no activity which can affect adversely the natural system to cause earthquake, landslides, erosion, flooding,	Not applicable

>>		draught or other extreme climatic conditions	
Principle 9.3 Genetic Resources			
Could the Project be negatively impacted by or involve genetically modified organisms or GMOs (e.g., contamination, collection and/or harvesting, commercial development, or take place in facilities or farms that include GMOs in their processes and production)?	No	Not applicable. The project does not involve any crop production or cultivation	Not applicable
>>			
Principle 9.4 Release of pollutants			
Could the Project potentially result in the release of pollutants to the environment?	No	No. The project does not release any pollutants to the environment	Not applicable
>>			
Principle 9.5 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	Not applicable. The project does not involve any production process	Not applicable
>>			

Principle 9.6 Pesticides & Fertilisers			
Will the Project involve the application of pesticides and/or fertilisers?	No	No	Not applicable
>>			
Principle 9.7 Harvesting of Forests			
Will the Project involve the harvesting of forests?	No	Not applicable. The project happens at individual households	Not applicable
>>			
Principle 9.8 Food			
Does the Project modify the quantity or nutritional quality of food available such as through crop regime alteration or export or economic incentives?	No	Not applicable	Not applicable
>>			
Principle 9.9 Animal husbandry			
Will the Project involve animal husbandry?	No	Not applicable	Not applicable
>>			
Principle 9.10 High Conservation Value Areas and Critical Habitats			

<p>Does the Project physically affect or alter largely intact or High Conservation Value (HCV) ecosystems, critical habitats, landscapes, key biodiversity areas or sites identified?</p>	<p>No</p>	<p>Not applicable</p>	<p>Not applicable</p>
<p>>></p>			
<p>Principle 9.11 Endangered Species</p>			
<p>a. Are there any endangered species identified as potentially being present within the Project boundary (including those that may route through the area)?</p> <p>b. Does the Project potentially impact other areas where endangered species may be present through transboundary affects?</p>	<p>No</p>	<p>Not applicable</p>	<p>Not applicable</p>
<p>>></p>			

APPENDIX 2- CONTACT INFORMATION OF PROJECT PARTICIPANTS

Organization name	Value Network Ventures Advisory Services Pte. Ltd.
Registration number with relevant authority	201903830Z
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Department	
Mobile	
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APPENDIX 4-SUMMARY OF APPROVED DESIGN CHANGES

Please refer to Design Change [Requirements](#) for more information on procedures governing Design Changes

Revision History

Version	Date	Remarks
1.2	14 October 2020	Hyperlinked section summary to enable quick access to key sections Improved clarity on Key Project Information Inclusion criteria table added Gender sensitive requirements added Prior consideration (1 yr rule) and Ongoing Financial Need added Safeguard Principles Assessment as annex and a new section to include applicable safeguards for clarity Improved Clarity on SDG contribution/SDG Impact term used throughout Clarity on Stakeholder Consultation information required Provision of an accompanying Guide to help the user understand detailed rules and requirements
1.1	24 August 2017	Updated to include section A.8 on 'gender sensitive' requirements
1.0	10 July 2017	Initial adoption