PROGRAMME DESIGN DOCUMENT FORM FOR SMALL-SCALE CDM PROGRAMMES OF ACTIVITIES (F-CDM-SSC-PoA-DD) Version 02.0

PROGRAMME OF ACTIVITIES DESIGN DOCUMENT (PoA-DD)

PART I. Programme of activities (PoA)

SECTION A. General description of PoA

A.1. Title of the PoA

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National Biogas Programme of Activities in Fiji

Version: 01
Date of PoA-DD completed: 25/11/2012

A.2. Purpose and general description of the PoA

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1. Policy/measure or stated goal of the PoA

   The main objective of the National Biogas Programme of Activities in Fiji (hereafter referred to as "PoA") is to reduce a significant amount of GHG emissions from the wastewater treatment plants in Fiji. The PoA is aimed to recover the biogas from biogenic organic matter in Wastewater Treatment Plant (WTP) effluent as well as in sludge from sludge treatment process, which is rich in methane content. Currently, most of the WTPs in Fiji are operating without biogas recovery system, all the related biogas is released from the wastewater treatment process and/or sludge treatment process in WTPs. However, the emitted biogas is rich methane contents which will lead a great impact on the environment. The PoA is designed to utilize recovered biogas for thermal energy and electricity purpose. By implementing the PoA, this would result in a better wastewater treatment system in terms of performance, management and quality control.

2. Framework for the implementation of the proposed PoA

   The National Biogas Programme of Activities in Fiji is a small-scale CDM PoA developed by the Water Authority of Fiji (WAF) as the coordinating/managing entity. Only small scale CDM projects will participate in this PoA. Each CDM Programme Activity (hereafter referred to as "CPA") will consist of an individual wastewater treatment plant and the wastewater treatment plant owner or project participant will sign an agreement with WAF prior to being included in the PoA. WAF will provide complete CDM service and technical support in terms of management and monitoring to the participating wastewater treatment plants. The technical capacity provided by WAF will ensure long-term sustainability of the CPAs.

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

   The PoA is a voluntary action by the WAF since there are no mandatory law or regulation in Fiji enforcing the capture of biogas at WTP treatment systems and WAF is not obliged by law to implement the PoA. WAF also does not have any contractual obligation to implement the PoA. According to Fiji's National Report to the United Nations Conference on Environment and

Development (UNCED)[1], one of the major environmental problems in Fiji is poor sewage disposal; the increase in population and industrialization in urban areas also means an increase in the amount of refuse generated. Solid and liquid waste disposal is a major problem in all municipal centers in Fiji. The PoA will help Fiji to overcome liquid waste disposal problems and to achieve sustainable energy development. The direct and indirect benefits are categorized into three aspects as following:

Environmental:

- Decrease methane emissions from wastewater treatment process and the sludge treatment process to the atmosphere to avoid the GHG emissions;
- Improve the potential of utilizing captured biogas by introducing the renewable technology to the WTPs;
- Contribute to the sustainable energy development of republic of Fiji, as there is no mandatory law or regulation for the WTPs to utilize biogas generated from the wastewater and sludge treatment process.
- Currently, most of generated electricity comes from fossil fuel power plant in the National Grid (FEA Grid). The proposed PoA is designed to utilize recovered biogas for electricity and/or thermal energy purpose. By substitution of fossil fuels, especially carbon dioxide emissions and local air pollution through dust or other particles if coal or other polluting fossil fuels would be combusted can be reduced.
- Reducing the odours and hygiene problems. The PoA will capture the biogas which generated from the wastewater treatment process and/or sludge treatment process to avoid them emitted into atmosphere.
- Reducing the potential pollution to drinking water and creating of clean environment.

Economic:

- By utilizing the captured biogas, extra revenue from biogas will be gained. Hence, operation cost of WTP will be saved;
- The PoA will also lead to reduce the local energy cost, as the recovered biogas will be captured and utilized for thermal energy and/or electricity.
- Technology transfer involves working of two or more parties from different geographies together for project implementation, including facilities provider for the wastewater treatment system, and sub-contractor. By implementing the proposed PoA, the equipments and facilities with excellent performances will be introduced to Fiji.

Social:

- The environment awareness of local residents will be improved during the implementation of the proposed PoA. As the environmental impacts and technical training will be provide to local residents and WTPs staff.
- The knowledge, expertise, technical and management skills will be enhanced and shared among the parties involved. Training will be introduced to Fiji through the proposed PoA as well.

A.3. CMEs and participants of PoA

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The WAF is a commercial statutory body since 01/01/2010[2]. The objective of WAF is to enhance the sustainable delivery of water and sewerage services to appropriate levels of service. It dedicates to the delivery of water supply and sewerage services, autonomous and be able to mobilise the necessary resources to meet the demand, effectively and efficiently at required quality standards. With respect to

[1] Fiji National Report to UNCED, South Pacific Environmental Programme (SPREP), Apia, Western Samoa, June 1992.

[2] http://www.waterauthority.com.fj/en/history/

the PoA, WAF will act as Coordinating and/or Managing Entities (CME) which communicates with the Board.

On the other hand, WAF will act as project participant to the PoA. It will be involved in one of the CPAs related to the PoA.

A.4. Party(ies)

Name of Party involved (host) indicates a host Party	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Republic of Fiji (host)	Water Authority of Fiji	No

A.5. Physical/ Geographical boundary of the PoA

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The geographical boundary of this PoA is the Republic of Fiji. All small-scale CDM programme activities (SSC-CPAs) included in the PoA will be within the Geographical boundary;

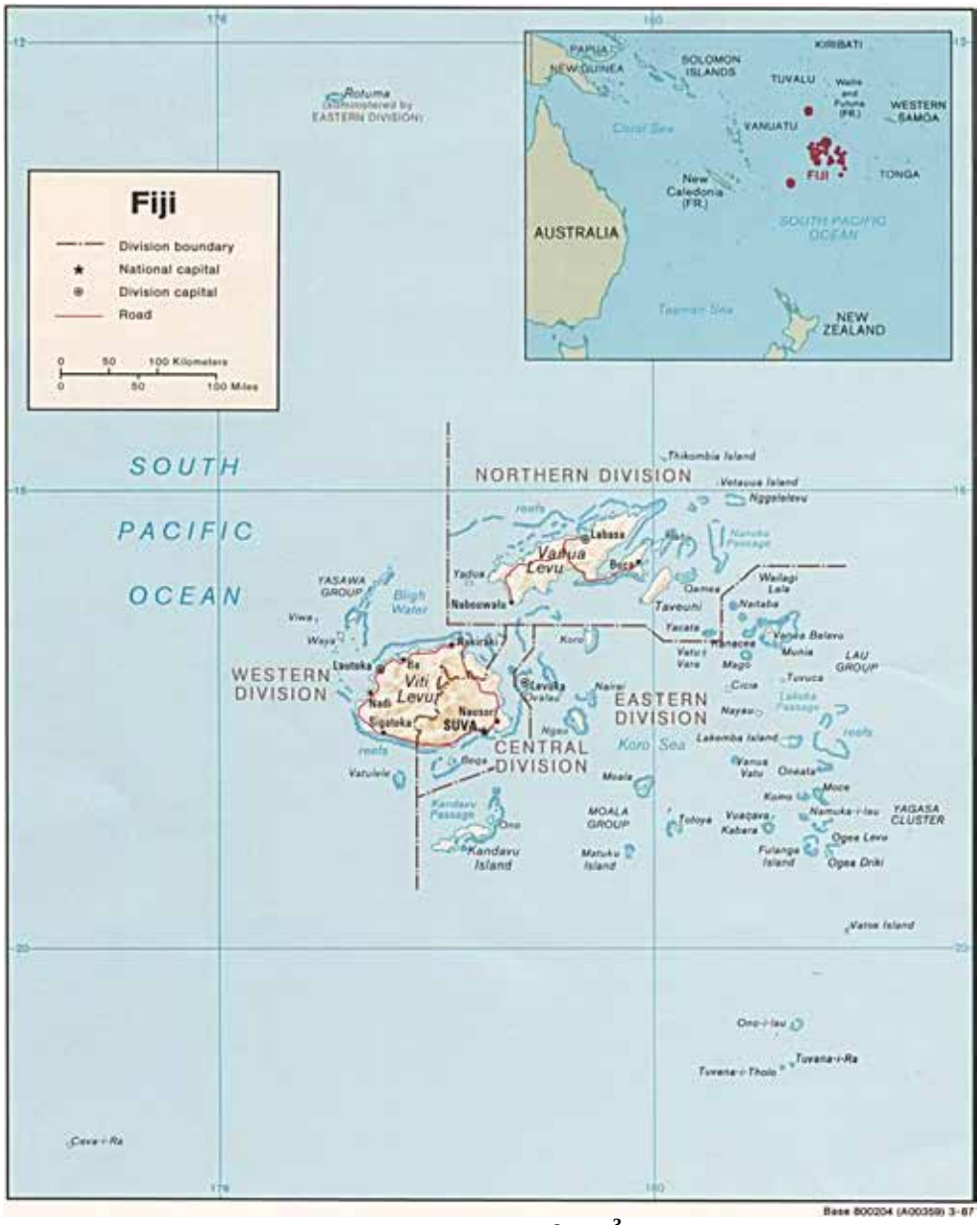

Figure 1 Map of Fiji[3]

A.6. Technologies/measures

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A typical CPA of the PoA will be an individual wastewater treatment plant. The CPAs can be implemented by applying one, or a combination, of the following options:

(a) Substitution of aerobic wastewater or sludge treatment systems with anaerobic systems with biogas recovery and combustion;

(b) Introduction of anaerobic sludge treatment system with biogas recovery and combustion to a wastewater treatment plant without sludge treatment;

(c) Introduction of biogas recovery and combustion to a sludge treatment system;

(d) Introduction of biogas recovery and combustion to an anaerobic wastewater treatment system such as anaerobic reactor, lagoon, septic tank or an onsite industrial plant;

(e) Introduction of anaerobic wastewater treatment with biogas recovery and combustion, with or

[3] http://www.lib.utexas.edu/maps/islands_oceans_poles/fiji.jpg

without anaerobic sludge treatment, to an untreated wastewater stream;

(f) Introduction of a sequential stage of wastewater treatment with biogas recovery and combustion, with or without sludge treatment, to an anaerobic wastewater treatment system without biogas recovery.

A typical CPA will introduce biogas recovery system with or without utilizing of biogas to the existing wastewater treatment plant. It is expected that one technology or several combined technologies will be implemented for each CPA. In the baseline of wastewater treatment, biogas is emitted into atmosphere directly. Therefore, the biogas recovery technology will always be comprised in each CPA. Each CPA under the PoA will cover following options:

1. Recovered biogas from WTP will be directly fired in flaring unit.
2. Recovered biogas from WTP will be used for electricity generation, all the generated electricity will be supplied to FEA Grid.
3. Recovered biogas from WTP will be used for thermal energy.

Each CPA is expected to reduce less than 60,000 tCO_2e of methane annually from the type III portion. Other additional emission reductions will come from type I activities at particular project site. In terms of biogas utilization, the biogas engines, cogeneration units and flaring unit will be introduced to WTPs in Fiji. Accompany with the equipment and facilities, technological training to staff will be provided as well. This is aimed to provide a continuous maintenance and operation performance for each CPA under the PoA.

A.7. Public funding of PoA

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There is no public funding for this proposed PoA.

SECTION B. Demonstration of additionality and development of eligibility criteria

B.1. Demonstration of additionality for PoA

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This section demonstrates that the anthropogenic emissions of GHG by sources are reduced by a SSC-CPA below those that would have occurred in the absence of the PoA. This constitutes the demonstration of the additionality of the PoA as a whole.

The following is demonstrated in this section:

1. The PoA is a voluntary coordinating action from WAF to promote the biogas technology implementation for the wastewater treatment plants.

2. It would not be implemented in the absence of the PoA, facing the following barrier:

   Barrier due to prevailing practice:
   Common practice in wastewater treatment facilities in the Fiji involves releasing all the biogas (mainly methane) resulting from the decomposition of organic matter in wastewater treatment facilities to the atmosphere. This prevalent practice is compliant with the relevant regulations (Environment Management (Waste disposal and Recycling) Regulation 2007) in the host country (ies).

   In the absence of PoA, wastewater treatment plants would continue to emit methane to atmosphere legally. There is no mandatory regulation for WTPs to collect emitted biogas from wastewater treatment process. According to The Environment Management (Waste disposal and Recycling)

Regulation 2007 in Fiji, WTPs in Fiji must hold the solid and liquid waste permit to discharge treated wastewater. WTPs must reach emission standards within this regulation as well. However, methane is classified into Category 4 - Non-Toxic and Non-Persistent Substances in the Emission Standards of Environment Management (Waste disposal and Recycling) Regulation 2007. Therefore, in the absence of incentive support of CERs, the PoA would not happen. Legally, the WTPs will be operated as usual without utilizing recovered biogas.

On the other hand, in the absence of the PoA, the referred voluntary coordinated action will not be implemented. The construction of biogas recovery facilities for preventing the release of methane to the atmosphere requires substantial investment in equipment and civil works, as well as the onsite operation and maintenance costs. Moreover, using recovered gas to generate electricity or thermal energy involves a significant additional investment to be made in power generation as well as in the electrical equipment needed to connect the power plant to a grid in order to export the power that is produced. Although, additional revenues are generated from the sale of electricity, these have not proven to be sufficient to enable such projects to be implemented in the geographical boundary of Fiji. Without the additional revenue from the PoA, it is expected that such projects will not be economically viable.

By facing the barrier of prevailing practice in the governmental and commercial aspects, all WTPs will be continuously operated as usual. The biogas generated from the treatment process in WTP will be vented into the atmosphere directly. Therefore, the PoA is additional in Fiji.

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

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In line with Annex 3, CDM EB 65, *"Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities"*, the formulation of the eligibility criteria takes into account the following:

1) Guidelines on the demonstration of additionality of small-scale project activity, Annex 27, EB68.
2) The compliance with the additionality-related eligibility criteria and the additionality-related guidelines, tools or any requirements embedded in the applied methodology (ies) shall be shown;
3) For PoA involving combinations of technologies and/or methodologies, the eligibility criteria relative to each of them shall be proposed to demonstrate additionality;
4) The eligibility criteria shall be verifiable.

The eligibility criteria shall cover as a minimum the following:

(a) The geographical boundary of the CPA including any time-induced boundary consistent with the geographical boundary set in the PoA;
(b) Conditions that avoid double counting of emission reductions like unique identifications of product and end-user locations (e.g. programme logo);
(c) The specifications of technology/measure including the level and type of service, performance specifications including compliance with testing/certifications;
(d) Conditions to check the start date of the CPA through documentary evidence;
(e) Conditions that ensure compliance with applicability and other requirements of single or multiple methodologies applied by CPAs;
(f) The conditions that ensure that CPAs meet the requirements pertaining to the demonstration of additionality;
(g) The PoA-specific requirements stipulated by the CME including any conditions related to undertaking local stakeholder consultations and environmental impact analysis;
(h) Conditions to provide an affirmation that funding from Annex I parties, if any, do not result in a diversion of official development assistance;
(i) Where applicable, target group (e.g. domestic/commercial/industrial, rural/urban, grid connected/off-

grid) and distribution mechanisms (e.g. direct installation);

(j) Where applicable, the conditions related to sampling requirements for a PoA in accordance with the approved guidelines/standard from the Board pertaining to sampling and surveys;

(k) Where applicable, the conditions that ensure that every CPA in aggregate meets the throughout the crediting period of the CPA;

(l) Where applicable, the requirements for the debundling check, in case CPAs belong to small-scale (SSC) or microscale project categories.

No.	Eligibility criteria for inclusion of a CPA in the PoA
(a)	All of the CPAs will be developed within the geographical boundary of Fiji.
(b)	Each CPA will be managed by CME with a unique identification code to avoid double counting of emission reductions. Those identification codes will be properly archived by CME electronically and in hard copy.
(c)	All the CPA is designed to utilize recovered biogas for energy purpose (electricity and/or thermal energy). The biogas recovery systems will be introduced to existing wastewater treatment system in each CPA. In terms of electricity generation in a CPA, the biogas engines and generators will be included; If the CPA is designed to supply thermal energy, the cogeneration unit will be designed in the CPA. Or the recovered biogas will be directly fired in a flaring unit. CME will select the implemented technology and service strictly and make sure each CPA is applicable to methodologies.
(d)	To check the start date of CPA, this will implemented by CME. The start date of CPA can be sourced from the contract which has been signed for the equipment and facilities.
(e)	CPA implementer shall demonstrate that the methane recovery component shall not exceed 60,000 tCO_2e/year and comply with the applicability criteria of AMS-III.H version 16. The CPA must comprise measures that recover biogas from biogenic matter in wastewater as per AMS-III.H version 16. In terms of different technologies combination in a specific CPA, it may comprise measures in AMS-I.D and/or AMS-I.C and equipped with biogas flaring unit. Detailed eligibility criteria of technologies combination will be demonstrated in the specific CPA-DD.
(f)	Each CPA shall demonstrate the CPA would not have occurred anyway due to at least one of following barriers (Investment barrier; Technological barrier; Barrier due to prevailing practice; Other barriers. At the moment, there is no mandatory law for WTPs to apply biogas recovery system. The prevailing practice is to emit the biogas into atmosphere without biogas utilization.
(g)	Local stakeholder consultation will be carried out at each CPA level. Environment Impact Analysis was exempted by Department of Environment in host country. As the operating WTPs had waste emit permit, no further permit is required according to the environment management regulation in Fiji.
(h)	There is not any public funding for the PoA.
(i)	Target group will be the domestic WTPs in each CPA and local biogas users.
(j)	Not applicable. Sampling and survey is not required.
(k)	CME will confirm that each CPA will be implemented after date of the registration of PoA.
(l)	Debundling check will be carried out in each CPA case and demonstrated in each CPA-DD.
(m)	If the baseline system is anaerobic lagoon, the lagoon shall be ponds with a depth greater than two meters without aeration. Ambient temperature shall above 15℃ at least during part of year, on a monthly average basis; The minimum interval between two consecutive sludge removal events shall be 30 days.

Every CPA shall meet all the criteria mentioned above to ensure the eligibility to participate in this PoA. CME will carry out the preliminary eligibility criteria of inclusion screening for each CPA with CPA implementer.

B.3. Application of methodologies

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In the proposed PoA, the methodologies combination may also be used by a particular CPA included:

1. AMS-III.H. "Methane recovery in wastewater treatment" (Version 16) "Scope 13 – Waste Handling and Disposal" will be applied. All the captured biogas will be directly fired.

2. AMS-III.H. and AMS-I.C. 'Thermal energy production with or without electricity' Version 19.0; All the recovered biogas will be utilized for thermal energy purpose. The combination of AMS-III.H. and AMS-I.C. was approved by CDM EB.

3. AMS-III.H. and AMS-I.D. 'Grid connected renewable electricity generation' Version 17.0 All the recovered biogas will be accessed to biogas engines for electricity generation. The combination of AMS-III.H. and AMS-I.D. was approved by CDM EB.

The following tools shall be considered according to the implemented technology in each CPA case.

'Tool for the demonstration and assessment of additionality' – version 6.1.0;
'Project and leakage emissions from anaerobic digesters' – version 1;
'Tool to determine project emission from flaring gases containing methane' - version 1.0;
'Tool to calculate baseline, project, and/or leakage emission from electricity consumption'- version 01;
'Tool to calculate the emission factor for an electricity system'- version 02.2.1;

Each CPA shall apply the AMS III.H. and applicable for following requirements:

No.	AMS-III.H. version 16 applicability requirement	Compliance of a SSC-CPA
1	Measures that recover biogas from biogenic organic matter in wastewater by means of one, or a combination, of the following options: a. Substitution of aerobic wastewater or sludge treatment systems with anaerobic systems with biogas recovery and combustion; b. Introduction of anaerobic sludge treatment system with biogas recovery and combustion to a wastewater treatment plant without sludge treatment; c. Introduction of biogas recovery and combustion to a sludge treatment system; d. Introduction of biogas recovery and combustion to an anaerobic wastewater treatment system such as anaerobic reactor, lagoon, septic tank or an on-site industrial plant e. Introduction of anaerobic wastewater treatment with biogas recovery and combustion, with or without anaerobic sludge treatment, to an untreated wastewater stream; f. Introduction of a sequential stage of wastewater treatment with biogas recovery and combustion, with or without sludge treatment, to an anaerobic wastewater treatment system without biogas recovery (e.g. introduction of treatment in an anaerobic reactor with biogas recovery as a sequential treatment step for the wastewater that is presently being treated in an anaerobic lagoon without methane recovery).	Each CPA will introduce biogas recovery system to an existing anaerobic wastewater treatment system without biogas recovery. In terms of combination of technology and measures, it will depend on each specific CPA and properly demonstrated in each CPA-DD. The CME will double check if the measures applied in each CPA are applicable and meet the AMS-III.H. version 16 applicability requirements.

2	In cases where baseline system is anaerobic lagoon the methodology is applicable if: a. The lagoons are ponds with a depth greater than two meters, without aeration. b. Ambient temperature above 15°C, at least during part of the year, on a monthly average basis; c. The minimum interval between two consecutive sludge removal events shall be 30 days.	For the baseline system of CPA is anaerobic lagoon digesters, the CME will confirm that the lagoons depth is greater than two meters without aeration; Ambient temperature above 15°C and minimum interval between two consecutive sludge removal events is 30 days.
3	The recovered biogas from the above measures may also be utilized for the following applications instead of combustion/flaring: a. Thermal or electrical energy generation directly; b. Thermal or electrical energy generation after bottling of upgraded biogas; or c. Thermal or electrical energy generation after upgrading and distribution: i. Upgrading and injection of biogas into a natural gas distribution grid with no significant transmission constraints; ii. Upgrading and transportation of biogas via a dedicated piped network to a group of end users; or iii. Upgrading and transportation of biogas (e.g. by trucks) to distribution points for end users. d. Hydrogen production e. Use as fuel in transportation application after upgrading	The application 3 (a) thermal or electrical energy generation directly will be utilized in CPAs. The CPA shall cover the applicability of methodology AMS-I.C. and/or AMS-I.D which will be demonstrated in table below. Other recovered biogas utilizations 3(b), 3(c), 3(d) and 3(e) are not designed in the PoA and CPA.
4	The location of wastewater treatment plants as well as the source generating the wastewater shall be uniquely defined and described in the PDD.	CME will record each WTPs location and GPS coordinates, source of wastewater will also be identified by CME and will be described in each CPA-DD.
5	Measures are limited to those that result in aggregate emissions reductions of less than or equal to 60,000 tCO_2 equivalent annually from all Type III components of the project activity.	The emissions reductions of each CPA shall be less than or equal to 60,000 tCO_2 equivalent annually from Type III components. This will be demonstrated in each CPA-DD.

If the AMS-I.C. is applied, the CPA shall be applicable for following requirements:

No.	AMS I.C. version 19 applicability requirement	Compliance of the proposed SSC-CPA
1	Biomass-based cogeneration systems are included in this category. For the purpose of this methodology cogeneration shall mean the simultaneous generation of thermal energy and electrical energy in one process. Project activities that produce heat and power in separate element	The cogeneration unit must be used. The electrical energy will be generated simultaneously with thermal energy in one process. It will be confirmed by CME.

	processes (for example heat from a boiler and electricity from a biogas engine) do not fit under the definition of cogeneration project.	
2	Emission reductions from a biomass cogeneration system can accrue from one of the following activities: (a) Electricity supply to a grid; (b) Electricity and/or thermal energy (steam or heat) production for on-site consumption or for consumption by other facilities; (c) Combination of (a) and (b).	In terms of cogeneration system in CPA, the emission reductions from it shall accrue from options (b).
3	The total installed/rated thermal energy generation capacity of the project equipment is equal to or less than 45 MW thermal.	The thermal energy generation capacity of each CPA shall not exceed 45 MW thermal.
4	For co-fired systems, the total installed thermal energy generation capacity of the project equipment, when using both fossil and renewable fuel, shall not exceed 45 MW thermal.	Not applicable.
5	The following capacity limits apply for biomass cogeneration units: (a) If the project activity includes emission reductions from both the thermal and electrical energy components, the total installed energy generation capacity (thermal and electrical) of the project equipment shall not exceed 45 MW thermal. For the purpose of calculating this capacity limit the conversion factor of 1:3 shall be used for converting electrical energy to thermal energy (i.e. for renewable energy project activities, the maximal limit of 15 MW(e) is equivalent to 45 MW thermal output of the equipment or the plant); (b) If the emission reductions of the cogeneration project activity are solely on account of thermal energy production (i.e. no emission reductions accrue from the electricity component), the total installed thermal energy production capacity of the project equipment of the cogeneration unit shall not exceed 45 MW thermal; (c) If the emission reductions of the cogeneration project activity are solely on account of electrical energy production (i.e. no emission reductions accrue from the thermal energy component), the total installed electrical energy generation capacity of the project equipment of the cogeneration unit shall not exceed 15 MW.	The capacity of CPA will not exceed 15MW(e), the total installed energy generation capacity (thermal and electrical) of the project equipment shall not exceed 45 MW thermal. If the emission reductions of the cogeneration are solely on account of thermal energy production, the total installed energy generation capacity shall not exceed 45 MW thermal. If the emission reductions of the cogeneration are solely on account of electrical energy production, the total installed energy generation capacity shall not exceed 15 MW.
6	The capacity limits specified in the above	Not applicable. None of the CPAs are

	paragraphs apply to both new facilities and retrofit projects. In the case of project activities that involve the addition of renewable energy units at an existing renewable energy facility, the total capacity of the units added by the project should comply with capacity limits in paragraphs 4 to 6, and should be physically distinct from the existing units.	retrofitted.
7	Project activities that seek to retrofit or modify an existing facility for renewable energy generation are included in this category.	Not applicable. None of the CPAs seek to retrofit or modify an existing facility for renewable energy generation.
8	New Facilities (Greenfield projects) and project activities involving capacity additions compared to the baseline scenario are only eligible if they comply with the related and relevant requirements in the .General Guidelines to SSC CDM methodologies.	Not applicable. None of CPAs are designed for capacity additions.
9	If solid biomass fuel (e.g. briquette) is used, it shall be demonstrated that it has been produced using solely renewable biomass and all project or leakage emissions associated with its production shall be taken into account in the emissions reduction calculation.	Not applicable. Each CPA is a WTP without solid biomass fuel.
10	Where the project participant is not the producer of the processed solid biomass fuel, the project participant and the producer are bound by a contract that shall enable the project participant to monitor the source of the renewable biomass to account for any emissions associated with solid biomass fuel production. Such a contract shall also ensure that there is no double-counting of emission reductions.	Not applicable. There are no solid biomass producer and not bound by a contract with project participant.
11	If electricity and/or steam/heat produced by the project activity is delivered to a third party i.e. another facility or facilities within the project boundary, a contract between the supplier and consumer(s) of the energy will have to be entered into that ensures there is no double-counting of emission reductions.	Not applicable. Generated electricity will be delivered to Nation Grid in Fiji.
12	If the project activity recovers and utilizes biogas for power/heat production and applies this methodology on a stand-alone basis i.e. without using a Type III component of a SSC methodology, any incremental emissions occurring due to the implementation of the project activity (e.g. physical leakage of the anaerobic digester, emissions due to inefficiency of the flaring), shall be taken into account either as project or leakage emissions.	Not applicable. Each CPA is applied AMS-III.H methodology, utilized biogas from wastewater treatment process and/or sludge treatment process.
13	Charcoal based biomass energy generation project activities are eligible to apply the methodology	Not applicable, each CPA is a WTP without charcoal based biomass energy generation.

	only if the charcoal is produced from renewable biomass sources provided: (a) Charcoal is produced in kilns equipped with methane recovery and destruction facility; or (b) If charcoal is produced in kilns not equipped with a methane recovery and destruction facility, methane emissions from the production of charcoal shall be considered. These emissions shall be calculated as per the procedures defined in the approved methodology AMS-III.K. Alternatively, conservative emission factor values from peer reviewed literature or from a registered CDM project activity can be used, provided that it can be demonstrated that the parameters from these are comparable e.g. source of biomass, characteristics of biomass such as moisture, carbon content, type of kiln, operating conditions such as ambient temperature.	

If the AMS-I.D is applied, the CPA shall be applicable for following requirements:

<table>
<tr><th>No.</th><th>AMS-I.D version 17 applicability requirement</th><th>Compliance of the proposed SSC-CPA</th></tr>
<tr><td>1</td><td>This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass:
(a) Supplying electricity to a national or a regional grid; or
(b) Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling.</td><td>The recovered biogas will be utilized for electricity generation and directly supply to FEA Grid in the CPA. Therefore, the option 1(a) is applicable for the proposed CPA.</td></tr>
<tr><td>2</td><td>Illustration of respective situations under which each of the methodology (i.e. AMS-I.D., AMS-I.F. and AMS-I.A.) applies is included in Table 2.
Table 2 in the methodology AMS-I.D.;
<table>
<tr><th></th><th>Project type</th><th>AMS-I.A.</th><th>AMS-I.D.</th><th>AMS-I.F.</th></tr>
<tr><td>1</td><td>Project supplies electricity to a national/regional grid</td><td></td><td>ü</td><td></td></tr>
<tr><td>2</td><td>Project displaces grid electricity consumption (e.g. grid import) and/or captive fossil</td><td></td><td></td><td>ü</td></tr>
</table></td><td>All the generated electricity will be directly supplied to FEA Grid (National Grid in Fiji). Therefore, the AMS-I.D. is applicable under the proposed CPA.</td></tr>
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		fuel electricity generation at the user end (excess electricity may be supplied to a grid)				
	3	Project supplies electricity to an identified consumer facility via national/regional grid (through a contractual arrangement such as wheeling)		ü		
	4	Project supplies electricity to a mini grid[17] system where in the baseline all generators use exclusively fuel oil and/or diesel fuel			ü	
	5	Project supplies electricity to household users (included in the project boundary) located in off grid areas	ü			
3	This methodology is applicable to project activities that: (a) Install a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant); (b) Involve a capacity addition; (c) Involve a retrofit of (an) existing plant(s); or (d) Involve a replacement[5] of (an) existing plant(s).					The CPA is designed to install biogas recovery system to Navakai wastewater treatment plant where there was no renewable energy power plant operating prior to the implementation of this CPA. The option (a) is applicable for this CPA.
4	Hydro power plants with reservoirs[6] that satisfy at least one of the following conditions are eligible to apply this methodology: · The project activity is implemented in an existing reservoir with no change in the volume of reservoir;					Not applicable. As the CPA is not a hydro power plant.

	· The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the project emissions section, is greater than 4 W/m^2; · The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the project emissions section, is greater than 4 W/m^2.	
5	If the new unit has both renewable and non-renewable components (e.g. a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the new unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.	Not applicable. As CPA is not designed to install non-renewable components.
6	Combined heat and power (co-generation) systems are not eligible under this category.	Not applicable. Only electricity is generated in the proposed CPA.
7	In the case of project activities that involve the addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct[9] from the existing units.	Not applicable. There were no renewable energy generation units at the facility prior to the development of this CPA. And no capacity addition occurred in the CPA.
8	In the case of retrofit or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement unit shall not exceed the limit of 15 MW.	Not applicable. As the CPA is not a retrofit or replacement activity.

SECTION C. Management system

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CME Guidelines/Manual shall be developed. In summary the following tasks will be defined in this document:

1. Identification of interested and eligible wastewater treatment plants

The CPA implementer and the CME will discuss general requirements to be an eligible CPA in the PoA, and then CME will double check the eligibility of a typical CPA. CPA implementer is the CPA owner; WAF will be the CME of PoA responsible for voluntary coordination/management and consultation. CME will carry out the technical review and inclusion process. Each CPA shall compliance with the methodology applications. If any eligibility criteria are not satisfied, then the WTP is deemed to be not applicable for the CPA under CPA.

2. Data Gathering

The CME will do a preliminary gathering of data like Chemical Oxygen Demand (COD) and forecast of volume of wastewater, source of the wastewater, climate data, etc. Based on these data the CME will generate a preliminary estimate of expected costs and emission reductions.

3. Negotiations about arrangements for training and capacity development for personnel

The CME and the CPA implementer will enter into negotiations about the training arrangements/schedule and capacity development for personnel. General training will be listed as following:

- CDM background introduction
- Relevant methodology study
- Technology and technical service supply (from equipment supplier)
- CPA management and monitoring procedure
- Data recording and management

4. Double-Counting Avoidance System

In order to avoid double-counting, the WTP owner is invited to confirm in writing that the wastewater treatment plant is not part of another registered CDM-project activity or another registered PoA. For cross-check purposes, the CME verifies this with the official CDM website of the UNFCCC about registered CDM-activities (CPA and CDM Programme Activity). The geo-coordinates of the activities thereby serve as unique identifier. For each CPA, CME will issue a unique identification code to avoid double-counting as well.

5. CPA-DD Preparation

After previous checks have been completed the CPA-DD is prepared. The documents required in the turn of the eligibility check are checked for their completeness. Once the CPA-DD is finished and all necessary documents are available, the information is submitted to the Designated of Entity (DOE), and the DOE is requested to include the CPA into the PoA.

6. CPA Implementation

The CME organizes and coordinates the implementation of the activity at the project site. After finalizing technical planning, equipment can be installed. As the CME is also responsible for advising or doing by his own the monitoring of the CPA, the CME will have familiarized with monitoring requirements according to the described monitoring plan and will provide monitoring guidance services.

7. Recording Keeping System for each CPA under the PoA

The CME establishes a centralized database electronically. This database will record the name of WTPs, the geo-coordinates for its unique identification, the date of inclusion into the PoA, the gas utilization if any, and the crediting period. Information of each CPA included into the PoA will be recorded in the database. Further, throughout the lifetime of the PoA, the verification of each CPA will be listed. Each CPA contained in the database will be assigned a unique identification code.

8. Monitoring

The maintenance and calibration of monitoring equipment will be according to the definitions in the monitoring plan. The CME will verify that the CPA has done an appropriate maintenance, and that the calibrations have been carried out on time. This ensures maximum accuracy through experienced staff managing also other comparable activities.

SECTION D. Duration of PoA

D.1. Start date of PoA

>>

Start date of the PoA will be the date on which the PoA is registered with the CDM Executive Board.

D.2. Length of the PoA

>>

The length of the PoA is 28 years.

SECTION E. Environmental impacts

E.1. Level at which environmental analysis is undertaken

>>

1	Environmental impacts analysis is undertaken at PoA level	
2	Environmental impacts analysis is undertaken at CPA level	ü

According to Environment Management (Waste disposal and Recycling) Regulation 2007, the PoA does not fall under the requirements of Environmental Impact Assessment (EIA) in host country. As the operation of WTP must keep a waste liquid disposal permit, which means the WTP had been approved through EIA by host country. The PoA will recover and capture the waste biogas which used to be directly emitted into atmosphere. Rather than causing negative impacts to the environment, the CPA will provide the following environmental benefits:

- Reduce the methane emissions;
- Encourage the multiple utilization of recovered biogas rather than emitted into atmosphere;
- Improve the air quality of local area.

Detailed EIA will be carried out at specific CPA level and demonstrated in each CPA-DD.

E.2. Analysis of the environmental impacts

>>

Not applicable

SECTION F. Local stakeholder comments

F.1. Solicitation of comments from local stakeholders

>>

1	Local stakeholder comments are undertaken at PoA level	
2	Local stakeholder comments are undertaken at CPA level	ü

Currently, the local stakeholder consultation is still under taken at the CPA level. Once the local stakeholder consultation meeting is closed, comments will be added into the CPA-DD.

F.2. Summary of comments received

>>

This will be addressed at the individual CPA-DD level.

F.3. Report on consideration of comments received

>>

This will be addressed at the individual CPA-DD level.

SECTION G. Approval and authorization

>>

Letter(s) of approval from Party(ies) which wishes to be involved in the PoA will be provided at the time of submitting the PoA-DD to the validating DOE.

PART II. Generic component project activity (CPA)

SECTION A. General description of a generic CPA

A.1. Purpose and general description of generic CPAs

>>

The <WTP name> Wastewater Treatment Plant (hereafter referred as "proposed CPA") will be developed by Water Authority of Fiji (WAF). It is under National Biogas Programme of Activities inFiji (hereafter referred as "PoA") coordinated and managed by WAF which also acts as Coordinating/Managing Entity (CME) of the PoA.

The proposed CPA will be implemented at <location, region/division, Fiji>. It aims to reduce the biogas (mainly methane) emissions, a highly potential Greenhouse Gas (GHG) source resulting from anaerobic digestion of wastewater in the <WTP name> Sewerage system, by introducing biogas recovery and combustion system to the existing wastewater treatment system of the proposed CPA. There is currently no methane recovery in <WTP name> Sewerage system. The CPA therefore involves an AMS-III.H. technology/measure 1(X) of <specific technology measures referred as AMS-III.H>. There is currently no legislation and regulation in Fiji that limits emission of biogas into atmosphere.

SECTION B. Application of a baseline and monitoring methodology

B.1. Reference of the approved baseline and monitoring methodology(ies) selected

>>

The methodology of AMS-III.H. "Methane recovery in wastewater treatment" (Version 16) under the type III project activities "Scope 13 – Waste Handling and Disposal" is applied.

Other combination of methodologies may be included as following table, please select on combination with tick.

AMS-III.H. and AMS I.C. 'Thermal energy production with or without electricity' Version 19.0;	
AMS-III.H. and AMS I.D. 'Grid connected renewable electricity generation' Version 17.0;	

The following tools shall be considered according to the implemented technology in each CPA case.

'Tool for the demonstration and assessment of additionality' – version 6.1.0;
'Project and leakage emissions from anaerobic digesters' – version 1;
'Tool to determine project emission from flaring gases containing methane' - version 1.0;
'Tool to calculate baseline, project, and/or leakage emission from electricity consumption'- version 01;
'Tool to calculate the emission factor for an electricity system'- version 02.2.1;

B.2. Application of methodology(ies)

>>

The CPA shall apply the AMS-III.H. and applicable for following requirements: <demonstrated the methodology applicability requirement of CPA in table below>

No.	AMS-III.H. version 16 applicability requirement	Compliance of a SSC-CPA
1	Measures that recover biogas from biogenic organic matter in wastewater by means of one, or a combination, of the following options: a. Substitution of aerobic wastewater or sludge	

	treatment systems with anaerobic systems with biogas recovery and combustion; b. Introduction of anaerobic sludge treatment system with biogas recovery and combustion to a wastewater treatment plant without sludge treatment; c. Introduction of biogas recovery and combustion to a sludge treatment system; d. Introduction of biogas recovery and combustion to an anaerobic wastewater treatment system such as anaerobic reactor, lagoon, septic tank or an on-site industrial plant e. Introduction of anaerobic wastewater treatment with biogas recovery and combustion, with or without anaerobic sludge treatment, to an untreated wastewater stream; f. Introduction of a sequential stage of wastewater treatment with biogas recovery and combustion, with or without sludge treatment, to an anaerobic wastewater treatment system without biogas recovery (e.g. introduction of treatment in an anaerobic reactor with biogas recovery as a sequential treatment step for the wastewater that is presently being treated in an anaerobic lagoon without methane recovery).	
2	In cases where baseline system is anaerobic lagoon the methodology is applicable if: a. The lagoons are ponds with a depth greater than two meters, without aeration. b. Ambient temperature above 15°C, at least during part of the year, on a monthly average basis; c. The minimum interval between two consecutive sludge removal events shall be 30 days.	
3	The recovered biogas from the above measures may also be utilized for the following applications instead of combustion/flaring: a. Thermal or electrical energy generation directly; b. Thermal or electrical energy generation after bottling of upgraded biogas; or c. Thermal or electrical energy generation after upgrading and distribution: i. Upgrading and injection of biogas into a natural gas distribution grid with no significant transmission constraints; ii. Upgrading and transportation of biogas via a dedicated piped network to a group of end users; or iii. Upgrading and transportation of biogas (e.g. by trucks) to distribution points for end users. d. Hydrogen production	

	e. Use as fuel in transportation application after upgrading	
4	The location of wastewater treatment plants as well as the source generating the wastewater shall be uniquely defined and described in the PDD.	
5	Measures are limited to those that result in aggregate emissions reductions of less than or equal to 60 kt CO_2 equivalent annually from all Type III components of the project activity.	

<If Type I component included in CPA, please also demonstrate the application of type I component>

No.	<Type I methodology> applicability requirement	Compliance of a SSC-CPA
1	<methodology applicability requirement>	<CPA conditions>
2		
3		

B.3. Sources and GHGs

>>

In terms of AMS-III.H., the sources and GHGs included in the project boundary as following table:

Source		Gas	Included ?	Justification / Explanation
Baseline	Emissions on account of electricity or fossil fuel used.	CO_2		
		CH_4		
		N_2O		
	Emissions from the wastewater treatment systems.	CO_2		
		CH_4		
		N_2O		
	<Add any other baseline source>			
Project activity	Emissions from electricity and fuel used by project facilities.	CO_2		
		CH_4		
		N_2O		
	Emissions from methane release in capture systems.	CO_2		
		CH_4		
		N_2O		
	<Add any other project activity source>			

<In terms of type I methodology, the sources and GHGs included in the project boundary as following table:>

Source		Gas	Included ?	Justification / Explanation
Baseline	<CO_2 emissions are displaced due to the CPA>	CO_2	Yes	Main emission source
		CH_4	No	Excluded for simplification
		N_2O	No	Excluded for simplification
Project activity	<CO_2 emissions from project activity.>	CO_2	Yes	Main emission source
		CH_4	No	Excluded for simplification
		N_2O	No	Excluded for simplification

<Also include a flow diagram of all equipment, systems and flow s of mass, where possible.>

B.4. Description of baseline scenario

>>

In terms of electricity generation, as described in the <methodology Type I>, the baseline scenario is defined as following:

<Describe the baseline scenario according to methodology type I.>

In terms of biogas recovery, as described in the methodology AMS-III.H., the baseline scenario is defined as following:

Baseline emissions for the systems affected by the project activity may consist of:

(i) Emissions on account of electricity or fossil fuel used ($BE_{power,y}$);
(ii) Methane emissions from baseline wastewater treatment systems ($BE_{ww,treatment,y}$);
(iii) Methane emissions from baseline sludge treatment systems ($BE_{s,treatment,y}$);
(iv) Methane emissions on account of inefficiencies in the baseline wastewater treatment systems and presence of degradable organic carbon in the treated wastewater discharged into river/lake/sea ($BE_{ww,discharge,y}$);
(v) Methane emissions from the decay of the final sludge generated by the baseline treatment systems ($BE_{s,final,y}$).

<Describe the baseline Scenario according to methodology AMS-III.H.>

B.5. Demonstration of eligibility for a generic CPA

>>

In line with Annex 3, CDM EB 65, *"Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities"*, the formulation of the eligibility criteria takes into account the following:

1) Guidelines on the demonstration of additionality of small-scale project activities.
2) The compliance with the additionality-related eligibility criteria and the additionality-related guidelines, tools or any requirements embedded in the applied methodology (ies) shall be shown;
3) For PoAs involving combinations of technologies and/or methodologies, the eligibility criteria relative to each of them shall be proposed to demonstrate additionality;
4) The eligibility criteria shall be verifiable.

The eligibility criteria shall cover as a minimum the following:

(a) The geographical boundary of the CPA including any time-induced boundary consistent with the geographical boundary set in the PoA;
(b) Conditions that avoid double counting of emission reductions like unique identifications of product and end-user locations (e.g. programme logo);
(c) The specifications of technology/measure including the level and type of service, performance specifications including compliance with testing/certifications;
(d) Conditions to check the start date of the CPA through documentary evidence;
(e) Conditions that ensure compliance with applicability and other requirements of single or multiple methodologies applied by CPAs;
(f) The conditions that ensure that CPAs meet the requirements pertaining to the demonstration of additionality;
(g) The PoA-specific requirements stipulated by the CME including any conditions related to undertaking local stakeholder consultations and environmental impact analysis;
(h) Conditions to provide an affirmation that funding from Annex I Parties, if any, does not result in a diversion of official development assistance;
(i) Where applicable, target group (e.g. domestic/commercial/industrial, rural/urban, grid connected/off-grid) and distribution mechanisms (e.g. direct installation);
(j) Where applicable, the conditions related to sampling requirements for a PoA in accordance with the approved guidelines/standard from the Board pertaining to sampling and surveys;
(k) Where applicable, the conditions that ensure that every CPA in aggregate meets the throughout the crediting period of the CPA;
(l) Where applicable, the requirements for the debundling check, in case CPAs belong to small-scale (SSC) or micro scale project categories.

<Describe the eligibility criteria as following table>

No.	Eligibility criteria for inclusion of a CPA in the PoA
(a)	
(b)	
(c)	
(d)	
(e)	
(f)	
(g)	
(h)	
(i)	
(j)	
(k)	
(l)	

B.6. Estimation of emission reductions of a generic CPA

B.6.1. Explanation of methodological choices

>>

The key methodological steps are as follows:

1. Calculating the Baseline Emission (BE_y)
2. Calculating the Project Emission (PE_y)
3. Calculating the Leakage Emission (LE_y)
4. Calculating the Emission Reduction (ER_y)

For the emission reduction calculation within AMS-III.H

1. Calculating the baseline emissions

Baseline emissions for the systems affected by the project activity may consist of:

(i) Emissions on account of electricity or fossil fuel used ($BE_{power,y}$);

(ii) Methane emissions from baseline wastewater treatment systems ($BE_{ww,treatment,y}$);

(iii) Methane emissions from baseline sludge treatment systems ($BE_{s,treatment,y}$);

(iv) Methane emissions on account of inefficiencies in the baseline wastewater treatment systems and presence of degradable organic carbon in the treated wastewater discharged into river/lake/sea ($BE_{ww,discharge,y}$);

(v) Methane emissions from the decay of the final sludge generated by the baseline treatment systems ($BE_{s,final,y}$).

$$BE_y = \{BE_{power,y} + BE_{ww,treatment,y} + BE_{s,treatment,y} + BE_{ww,discharge,y} + BE_{s,final,y}\}$$

Where:

BE_y	Baseline emissions in year *y* (tCO_2e)
$BE_{power,y}$	Baseline emissions from electricity or fuel consumption in year *y* (tCO_2e)
$BE_{ww,treatment,y}$	Baseline emissions of the wastewater treatment systems affected by the project activity in year *y* (tCO_2e)
$BE_{s,treatment,y}$	Baseline emissions of the sludge treatment systems affected by the project activity in year *y* (tCO_2e)
$BE_{ww,discharge,y}$	Baseline methane emissions from degradable organic carbon in treated wastewater discharged into sea/river/lake in year *y* (tCO_2e). The value of this term is zero for the case 1 (b)
$BE_{s,final,y}$	Baseline methane emissions from anaerobic decay of the final sludge produced in year *y* (tCO_2e). If the sludge is controlled combusted, disposed in a landfill with biogas recovery, or used for soil application in the baseline scenario, this term shall be neglected

(i) Emissions on account of electricity or fossil fuel used ($BE_{power,y}$);

According to the methodology AMS-III.H., baseline emissions from electricity consumption ($BE_{power,y}$) are determined as per the procedures described in the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption".

(ii) Methane emissions from baseline wastewater treatment systems ($BE_{ww,treatment,y}$);

$$BE_{ww,treatment,y} = \sum_i (Q_{ww,i,y} * COD_{\inf\ low,i,y} * h_{COD,BL,i} * MCF_{ww,treatment,BL,i}) * B_{o,ww} * UF_{BL} * GWP_{CH4}$$

Where:

$Q_{ww,i,y}$	Volume of wastewater treated in baseline wastewater treatment system *i* in year *y* (m^3).

$COD_{\text{inf } low,i,y}$	Chemical oxygen demand of the wastewater inflow to the baseline treatment system *i* in year *y* (t/m^3). Average value may be used through sampling with the confidence/precision level 90/10
$h_{COD,BL,i}$	COD removal efficiency of the baseline treatment system *i*
$MCF_{ww,treatment,BL,i}$	Methane correction factor for baseline wastewater treatment systems *i*
i	Index for baseline wastewater treatment system
$B_{o,ww}$	Methane producing capacity of the wastewater (IPCC value of 0.25 kg CH_4/kg COD)[4]
UF_{BL}	Model correction factor to account for model uncertainties (0.89)[5]
GWP_{CH4}	Global Warming Potential for methane (value of 21)

(iii) Methane emissions from baseline sludge treatment systems ($BE_{s,treatment,y}$);

<Describe the methane emissions from baseline sludge treatment systems, if sludge system is included in the CPA.>

(iv) Methane emissions on account of inefficiencies in the baseline wastewater treatment systems and presence of degradable organic carbon in the treated wastewater discharged into river/lake/sea ($BE_{ww,discharge,y}$);

<Describe the methane emissions on account of inefficiencies in the baseline wastewater treatment systems and presence of degradable organic carbon in the treated wastewater discharged into river/lake/sea, if treated wastewater is discharged into river/lake/sea.>

(v) Methane emissions from the decay of the final sludge generated by the baseline treatment systems ($BE_{s,final,y}$).

<Describe the methane emissions from the decay of the final sludge, if sludge system is included in the CPA.>

2. Calculating the project emissions

Project activity emissions from the systems affected by the project activity are:

(i) CO_2 emissions from electricity and fuel used by the project facilities ($PE_{power,y}$);

(ii) Methane emissions from wastewater treatment systems affected by the project activity, and not equipped with biogas recovery in the project scenario ($PE_{ww,treatment,y}$);

(iii) Methane emissions from sludge treatment systems affected by the project activity, and not equipped with biogas recovery in the project situation ($PE_{s,treatment,y}$);

[4] Project activities may use the default value of 0.6 kg CH_4/kg BOD, if the parameter $BOD_{5,20}$ is used to determine the organic content of the wastewater. In this case, baseline and project emissions calculations shall use BOD instead of COD in the equations, and the monitoring of the project activity shall be based in direct measurements of $BOD_{5,20}$, i.e. the estimation of BOD values based on COD measurements is not allowed.

[5] Reference: FCCC/SBSTA/2003/10/Add.2, page 25.

(iv) Methane emissions on account of inefficiency of the project activity wastewater treatment systems and presence of degradable organic carbon in treated wastewater ($PE_{ww,discharge,y}$);

(v) Methane emissions from the decay of the final sludge generated by the project activity treatment systems ($PE_{s,final,y}$);

(vi) Methane fugitive emissions due to inefficiencies in capture systems ($PE_{fugitive,y}$);

(vii) Methane emissions due to incomplete flaring ($PE_{flaring,y}$);

(viii) Methane emissions from biomass stored under anaerobic conditions which would not have occurred in the baseline situation ($PE_{biomass,y}$).[6]

$$PE_y = \begin{Bmatrix} PE_{power,y} + PE_{ww,treatment,y} + PE_{s,treatment,y} + PE_{ww,discharge,y} + PE_{s,final,y} + \\ PE_{fugitive,y} + PE_{biomass,y} + PE_{flaring,y} \end{Bmatrix}$$

Where:

PE_y	Project activity emissions in the year y (tCO_2e)
$PE_{power,y}$	Emissions from electricity or fuel consumption in the year y (tCO_2e). These emissions shall be calculated as per paragraph 19, for the situation of the project scenario, using energy consumption data of all equipment/devices used in the project activity wastewater and sludge treatment systems and systems for biogas recovery and flaring/gainful use
$PE_{ww,treatment,y}$	Methane emissions from wastewater treatment systems affected by the project activity, and not equipped with biogas recovery, in year y (tCO_2e). These emissions shall be calculated as per equation 2 in paragraph 20, using an uncertainty factor of 1.12 and data applicable to the project situation ($MCF_{ww,treatment,PJ,k}$ and $\eta_{,PJ,k,y}$) and with the following changed definition of parameters:
	$MCF_{ww,treatment,PJ,k}$ — Methane correction factor for project wastewater treatment system k (MCF values as per Table III.H.1)
	$\eta_{,PJ,k,}$ — Chemical oxygen demand removal efficiency of the project wastewater treatment system k in year y (t/m^3), measured based on inflow COD and outflow COD in system k
$PE_{s,treatment,y}$	Methane emissions from sludge treatment systems affected by the project activity, and not equipped with biogas recovery, in year y (tCO_2e). These emissions shall be calculated as per equations 3 and 4 in paragraph 22, using an uncertainty factor of 1.12 and data applicable to the project situation ($S_{l,PJ,y}$, $MCF_{s,treatment,l}$) and with the following changed definition of parameters:
	$S_{l,PJ,y}$ — Amount of dry matter in the sludge treated by the sludge treatment system l in the project scenario in year y (t)

[6] For instance in the baseline situation, Palm Kernel Shells (PKS) are used as fuel in a boiler. In the project situation PKS is replaced by biogas captured at a wastewater treatment system. The PKS will no longer be used as fuel in the boiler, but sold on the market. Before it is sold it is likely it will be stored for a period of time (few months or longer) on site which might lead to methane emissions from anaerobic decay.

	$MCF_{s,treatment,l}$ Methane correction factor for the project sludge treatment system l (*MCF* values as per Table III.H.1)
$PE_{ww,discharge,y}$	Methane emissions from degradable organic carbon in treated wastewater in year *y* (tCO_2e). These emissions shall be calculated as per equation 6 in paragraph 24, using an uncertainty factor of 1.12 and data applicable to the project conditions ($COD_{ww,discharge,PJ,y}$, $MCF_{ww,PJ,discharge}$) and with the following changed definition of parameters:
	$COD_{ww,discharge,PJ,y}$ Chemical oxygen demand of the treated wastewater discharged into the sea, river or lake in the project scenario in year *y* (t/m^3)
	$MCF_{ww,PJ,discharge}$ Methane correction factor based on the discharge pathway of the wastewater in the project scenario (e.g. into sea, river or lake) (*MCF* values as per Table III.H.1)
$PE_{s,final,y}$	Methane emissions from anaerobic decay of the final sludge produced in year *y* (tCO_2e). These emissions shall be calculated as per equation 7 in paragraph 25, using an uncertainty factor of 1.12 and data applicable to the project conditions ($MCF_{s,PJ,final}$, $S_{final,PJ,y}$). If the sludge is controlled combusted, disposed in a landfill with biogas recovery, or used for soil application in aerobic conditions in the project activity, this term shall be neglected, and the sludge treatment and/or use and/or final disposal shall be monitored during the crediting period with the following revised definition of the parameters:
	$MCF_{s,PJ,final}$ Methane correction factor of the disposal site that receives the final sludge in the project situation, estimated as per the procedures described in the "Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site"
	$S_{final,PJ,y}$ Amount of dry matter in final sludge generated by the project wastewater treatment systems in the year *y* (t)
$PE_{fugitive,y}$	Methane emissions from biogas release in capture systems in year *y*, calculated as per paragraph 30 (tCO_2e)
$PE_{flaring,y}$	Methane emissions due to incomplete flaring in year *y* (tCO_2e). For *ex ante* estimation, baseline emission calculation for wastewater and/or sludge treatment (i.e. equation 2 and/or equation 3) can be used but without the consideration of GWP for CH4. However, the *ex post* emission reduction shall be calculated as per the"Tool to determine project emissions from flaring gases containing methane" by using actual monitored data
$PE_{biomass,y}$	Methane emissions from biomass stored under anaerobic conditions. If storage of biomass under anaerobic conditions takes place in the project and does not occur in the baseline , methane emissions due to anaerobic decay of this biomass shall be considered and be determined as per the procedure in the "Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site" (tCO_2e)

(i) *CO_2 emissions from electricity and fuel used by the project facilities ($PE_{power,y}$);*

According to the methodology AMS-III.H., project emissions from electricity consumption ($BE_{power,y}$) are determined as per the procedures described in the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption".

(ii) *Methane emissions from wastewater treatment systems affected by the project activity, and not equipped with biogas recovery in the project scenario ($PE_{ww,treatment,y}$);*

<Described methane emissions from wastewater treatment systems affected by project activity, if applicable.>.

(iii) *Methane emissions from sludge treatment systems affected by the project activity, and not equipped with biogas recovery in the project situation ($PE_{s,treatment,y}$);*

<Describe the methane emissions from sludge treatment systems affected by the project activity, if sludge system is included in the CPA.>

(iv) *Methane emissions on account of inefficiency of the project activity wastewater treatment systems and presence of degradable organic carbon in treated wastewater ($PE_{ww,discharge,y}$);*

<Describe the methane emissions on account of inefficiency of the project activity wastewater treatment systems and presence of degradable organic carbon in treated wastewater, if treated wastewater is discharged.>

(v) *Methane emissions from the decay of the final sludge generated by the project activity treatment systems ($PE_{s,final,y}$);*

<Describe the methane emissions from decay of the final sludge generated by the project activity, if sludge system is included in the CPA.>

(vi) *Methane fugitive emissions due to inefficiencies in capture systems ($PE_{fugitive,y}$);*

$$PE_{fugitive,y} = PE_{fugitive,ww,y} + PE_{fugitive,s,y}$$

Where:

$PE_{fugitive,ww,y}$	Fugitive emissions through capture inefficiencies in the anaerobic wastewater treatment systems in the year *y* (tCO_2e)
$PE_{fugitive,s,y}$	Fugitive emissions through capture inefficiencies in the anaerobic sludge treatment systems in the year *y* (tCO_2e)

$$PE_{fugitive,ww,y} = (1 - CFE_{ww}) * MEP_{ww,treatment,y} * GWP_{CH4}$$

Where:

CFE_{ww}	Capture efficiency of the biogas recovery equipment in the wastewater treatment systems (a default value of 0.9 shall be used)
$MEP_{ww,treatment,y}$	Methane emission potential of wastewater treatment systems equipped with biogas recovery system in year *y* (t)

$$MEP_{ww,treatment,y} = Q_{ww,y} * B_{o,ww} * UF_{PJ} * \sum_{k} COD_{removed,PJ,k,y} * MCF_{ww,treatment,PJ,k}$$

Where:

$COD_{removed,PJ,k,y}$	The chemical oxygen demand removed[7] by the treatment system *k* of the project activity equipped with biogas recovery in the year *y* (t/m^3)

[7] Difference between the inflow COD and the outflow COD.

$MCF_{ww,treatment,PJ,k}$	Methane correction factor for the project wastewater treatment system *k* equipped with biogas recovery equipment (*MCF* values as per Table III.H.1)
UF_{PJ}	Model correction factor to account for model uncertainties (1.12)

The project activity emissions from methane release in capture systems are determined as follows:

(a) Based on the methane emission potential of wastewater and/or sludge.

(b) Optionally a default value of 0.05 m³ biogas leaked/m³ biogas produced may be used as an alternative to calculations.

<Describe the methane fugitive emissions due to inefficiencies in capture systems.>

(vii) *Methane emissions due to incomplete flaring ($PE_{flaring,y}$);*

<Describe the methane emissions due to incomplete flaring.>

(viii) *Methane emissions from biomass stored under anaerobic conditions which would not have occurred in the baseline situation ($PE_{biomass,y}$).*

<Describe the methane emissions from biomass stored under anaerobic conditions which would not have occurred in the baseline situation, if applicable.>

3. Leakage

In line with the methodology AMS-III.H., if the technology is using equipment transferred from another activity, leakage effects at the site of the other activity are to be considered and estimated (LE_y)

<Identify the leakage emissions according to the situation of CPA.>

4. Emission Reduction

Emission reductions are estimated ex ante as following:

$$ER_{y,ex\ ante} = BE_{y,ex\ ante} - \left(PE_{y,ex\ ante} + LE_{y,ex\ ante}\right)$$

Where:

$ER_{y,ex\ ante}$	*Ex ante* emission reduction in year *y* (tCO_2e)
$LE_{y,ex\ ante}$	*Ex ante* leakage emissions in year *y* (tCO_2e)
$PE_{y,ex\ ante}$	*Ex ante* project emissions in year *y* (tCO_2e)
$BE_{y,ex\ ante}$	*Ex ante* baseline emissions in year *y* (tCO_2e)

5. Emission Reduction from type I methodology

Emission reduction from type I methodology will be specified in CPA-DD, if type I methodology will be applied.

B.6.2. Data and parameters that are to be reported ex-ante

(Copy this table for each data and parameter.)

Data / Parameter	***XXX***
Unit	
Description	
Source of data	
Value(s) applied	
Choice of data or Measurement methods and procedures	
Purpose of data	
Additional comment	

<Copy table above and fill in data/information that are not monitored during the crediting period.>

B.6.3. Ex-ante calculations of emission reductions

>>

As described in section D.6.1., the ex-ante calculation of emission reductions as following:

For the Baseline Emission from AMS-III.H.

<Specific baseline emissions calculation as described in section B6.1.>

$$BE_y = \{BE_{power,y} + BE_{ww,treatment,y} + BE_{s,treatment,y} + BE_{ww,discharge,y} + BE_{s,final,y}\}$$

Annual Baseline Emssions: XXXX tCO_2e

For the Project Emissions from AMS-III.H.

<Specific baseline emissions calculation as described in section B.6.1.>

$$PE_y = \begin{cases} PE_{power,y} + PE_{ww,treatment,y} + PE_{s,treatment,y} + PE_{ww,discharge,y} + PE_{s,final,y} + \\ PE_{fugitive,y} + PE_{biomass,y} + PE_{flaring,y} \end{cases}$$

For the Leakage Emissions from AMS-III.H.

<Identify the leakage emissions according to the situation of CPA.>

The Emission Reductions from AMS-III.H.

$$ER_{y,ex\ ante} = BE_{y,ex\ ante} - \left(PE_{y,ex\ ante} + LE_{y,ex\ ante}\right)$$

<Calculate the emission reductions as described in section B.6.1>

B.7. Application of the monitoring methodology and description of the monitoring plan
B.7.1. Data and parameters to be monitored by each generic CPA
(Copy this table for each data and parameter)

Data / Parameter	***XXX***
Unit	
Description	
Source of data	
Value(s) applied	
Measurement methods and procedures	
Monitoring frequency	
QA/QC procedures	
Purpose of data	
Additional comments	

<Copy table above and fill in data/information that are monitored during the crediting period.>

B.7.2. Description of the monitoring plan for a generic CPA
>>

1. Monitoring Object
The monitoring is to justify the realistic amount of emission reduction from the CPA. The monitoring plan will provide credible, accurate, transparent and conservative monitoring data and ensure the real, measurable, long-term GHG emission reduction from this project.

2. Management Structure

<Owner of the CPA>, the owner of the proposed CPA under the PoA, will use this document as guideline in monitoring of the project emission reduction performance and will adhere to the guidelines set out in this monitoring plan to ensure that the monitoring is credible, transparent and conservative.

<Describe the management structure of the CPA in detail.>

3. Monitoring Equipments

<Describe the monitoring equipments and their location according to the specific CPA situation.>

A diagram shows how parameters are monitored is presented as follows:
<Insert a flow diagram shows how parameters are monitored in CPA>

4. Monitoring procedure

<Describe the monitoring procedure according to the specific CPA situation.>

5. Quality Assurance and Quality Control

<Describe the QA and QC procedure for the CPA.>

Emergency Procedure:

<Describe the emergency procedure for the CPA.>

6. Calibration of Meters & Metering

<Describe the standard for calibration of meters and metering in the CPA.>

7. Data Management System

<detailed describe the data management system for the CPA.>

8. Monitoring Report

After the CDM project manager collects and sorts the monitored data, the monitoring report is prepared by the project owner. The project owner has to make sure that the format and content of the monitoring report are consistent with the monitoring methodology in the registered PDD.

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Appendix 1: Contact information on entity/individual responsible for the PoA

Organization	Water Authority of Fiji
Street/P.O. Box	
Building	Mahoan Complex, Center point.
City	Suva, Fiji Islands
State/Region	
Postcode	
Country	Fiji Islands
Telephone	+679 3346777
Fax	+ 679 3343262
E-mail	
Website	
Contact person	Mr Opetai Ravai
Title	Chief Executive Officer
Salutation	
Last name	Ravai
Middle name	-
First name	Opetai
Department	Water Authority
Mobile	
Direct fax	+679 3343262
Direct tel.	
Personal e-mail	-

Appendix 2: Affirmation regarding public funding

There is no public funding for the PoA.

Appendix 3: Application of methodology(ies)

Please refer to section B.3 in Part I.

Appendix 4: Further background information on ex ante calculation of emission reductions

It will be specified in each CPA-DD.

Appendix 5: Further background information on the monitoring plan

It will be specified in each CPA-DD.

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History of the document

Version	Date	Nature of revision(s)
02.0	EB 66 13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the programme design document form for small-scale CDM programmes of activities" (EB 66, Annex 13).
01	EB33, Annex43 27 July 2007	Initial adoption.
Decision Class: Regulatory **Document Type:** Form **Business Function:** Registration		