Project design document form for CDM project activities

(Version 05.0)

Complete this form in accordance with the Attachment "Instructions for filling out the project design document form for CDM project activities" at the end of this form.

PROJECT DESIGN DOCUMENT (PDD)	
Title of the project activity	Avoidance of Methane Emissions at Organic Compost Soil Amendment Facility from GEC Organics
Version number of the PDD	8.0
Completion date of the PDD	09 September 2016
Project participant(s)	M/s GEC Organics
Host Party	United States of America
Sectoral scope and selected methodology(ies), and where applicable, selected standardized baseline(s)	13 and 15 Revised Approved consolidated baseline methodology ACM0010 - "Revised Consolidated baseline methodology for GHG emission reductions from manure management systems and municipal solid waste"
Estimated amount of annual average GHG emission reductions	201,395 tonnes of CO_2e on an annual average

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

The proposed project activity is a Greenfield project involving aerobic decomposition of chicken manure composting in Castleberry Alabama in the South-Eastern Region of the United States. The Gold Standard Verified Emission Reduction (GS-VER) project activity has been undertaken by M/s GEC Organics ("GECO"), a fully reporting publicly traded company that is committed to the development, production and marketing of advanced technologies that address specific worldwide environmental challenges. The chicken manure is purchased from local companies and received at the compositing facility as raw material to produce a high potency organic compost, OSA1000TM that is pathogen free and odourless.

The composting facility has a waste processing capacity of 5000 TPM (tonnes per month) (chicken manure 4500 TPM + wood shavings 500 TPM) and will process the organic content of waste through windrow composting to produce the final product, organic compost. The entire process of the GS VER project will be as follows:

1. Delivery of waste.
2. Weighing of loaded truck containing waste in weigh bridge scale.
3. Formation of windrows and aerobic decomposition.
4. Curing and refinement of treated waste.
5. Screening.
6. Packing and storage of compost.

In the current situation, PP is operating 5 windrows in 70 acreage of leased land. In this project, the combination of the above waste streams are heated to 160 degrees, turned and blended with a dominate all natural microbe formula over a 30 to 45 day cycle. The result is organic USDA certified compost which is odourless, safe for the environment and will rebuild the soil while retaining moisture.

Pre-Project Scenario:

Prior to the implementation of project activity, disposal of the waste i.e. chicken manure in agricultural land is the common practice and the same has been identified as most plausible baseline scenario.

The following table breaks down the baseline disposal methods for chicken manure in the state of Alabama:

Management Systems	Broilers

M/s GEC Organics will be the responsible implementing and coordinating agency for the project activity. The compost thus produced will be applied to soil as a soil enricher for agricultural activities. In the absence of the project activity the generated waste would have continued to be dumped in an existing unscientific and ordinary way. This would have resulted in anaerobic decomposition of the waste materials and generation of methane due to anaerobic decay. Implementation of the project activity will thus avoid the emissions of methane by facilitating aerobic decomposition of the wastes and resulting in emission reductions.

The total estimate of GHG emission reductions of the project activity over the crediting period of 10 years is expected to be 2,013,952 tonnes CO_2e respectively.

In addition to this direct global benefit, the final product, compost, when applied to soil will help in stabilizing soil from erosion, provide nutrients and replenish depleted organic matter of the soil and also lead to paradigm shift from synthetic fertilizers to more sustainable organic agricultural production practices.

Contribution to Sustainable Development:

Environmental benefits:

1. Local benefits would be the recycling of resources, and better management of solid waste. Open disposal of given waste is prevented resulting in reduction in land-requirement for waste disposals, leading to improved environmental conditions.
2. In contrast to the anaerobic decay of biodegradable waste that occurs in SWDS, which result in methane generation. The composting project will contribute to mitigation of greenhouse gas (GHG) emissions through aerobic decomposition of the organic waste. The end product of the compost activity is used as organic compost that combat soil degradation, since its application will lead to recycling humus, the organic matter, back to soil thus improving soil productivity and reduce overuse of synthetic chemical fertilizers.

Social benefits:

1. This project will suitably assist in providing compost supply for urban agricultural & horticultural process and crop farming in and around the nearby region.
2. Improves health condition of the people with reduction in waste volume in agricultural farms sites and efficient processing of waste.

Economical benefits:

1. The proposed project activity will provide direct employment to the community at the composting facility.
2. Generating the compost to maintain the fertility of the soil, this is critical to the agricultural economy and food safety necessary to feed a billion of people.

Technological benefits:

1. Successful implementation of the project activity would lead to further diffusion of technology for treatment of waste generated in the poultry industry.
2. The design and operation of this project, in conjunction with the avoidance of methane emissions shall lead to the VER revenue through the project activity.

A.2. Location of project activity

A.2.1. Host Party

United States of America

A.2.2. Region/State/Province etc.

Alabama

A.2.3. City/Town/Community etc.

Conecuh Castleberry

A.2.4. Physical/Geographical location

The Project is located in 70 acreage of land at 630 Conecuh County Road, Castleberry Alabama 36432, United States of America (USA). The geo-coordinates of 70 acreage campus (31°19’ 23.75’’ N / 87°01’22.04’’ W). The detail geo-coordinates of the project are mentioned below.

#		Latitude	Longitude
	Project Area	31° 19’ 23.75’’N	87° 01’ 22.04’’W
1	Windrow 1	31° 19’ 17.22’’N	87° 02’ 05.12’’W
2	Windrow 2	31° 19’ 19.43’’N	87° 02’ 02.42’’W
3	Windrow 3	31° 19’ 21.23’’N	87° 02’ 00.53’’W
4	Windrow 4	31° 19’ 23.52’’N	87° 02’ 13.07’’W
5	Windrow 5	31°19’ 25.31’’N	87° 02’ 10.44’’W

AWMS Site:
The Chicken manure farm is operated by JEB Farms, located at 12773 Mt Zion Rd Ramer, Alabama 36069-5670. The geo-coordinates of the JEB Farms location is (32.048927, -86.152619).

A.3. Technologies and/or measures

GEC Organics is undertaking to set up a Greenfield Organic Compost (“OSA 1000”) (“OSA – CT1000”) Soil Amendment production unit using 5000 TPM of chicken waste and green waste (wood shavings) at Conecuh County Road, Conecuh County, in Castleberry Alabama, United States of America (USA). The technology to be adopted will be aerobic composting by Windrow method. The waste is collected and transported by third party transporters to the composting facility. The waste comprises in the ratio of 90% chicken manure and 10% green waste (wood shavings) by weight of raw materials. However, the green waste will not be accounted for as part of the emission reductions. The project is a Greenfield project.

The project activity involves aerobic treatment of the received raw material i.e. chicken manure and green waste. The compost recovered will be around 80%[1] by weight of the waste to be processed. The compost thus produced will be sold to local farmers as a soil enricher for agricultural activities.

The entire process of composting of fresh waste consists of the following important steps:

[1] http://www.seas.columbia.edu/earth/wtert/sofos/haaren_thesis.pdf (page no 16 & 17)

1. **Waste Reception:**

The raw material is delivered in trailer loads of 25 tons each and is stored on an open cement pad for a short time, approximately 2 to 3 days and treated immediately with liquid microbe blend to begin the de-oderization and degradation of the material. At the same time the bio-solids are being accumulated, the cellulosic biomass, or “green waste” will be received and weighed separately.

2. **Mixing of Waste:**

The tons of chicken manure will be sprayed on the cement pad to prevent excessive nutrient leaching into the local soil and preserve the proper consistency of the material. In parallel the green waste is staged in separate piles prior to being combined in windrows with the chicken manure. The green waste is processed to a size which will degrade quickly when the process begins.

3. **Windrow Formation and Aerobic Decomposition:**

The green waste is spread as a first layer on a windrow. A windrow is an open area 12 feet wide and up to 1000 feet in length. After the green waste (wood shavings) is in place the Chicken manure is distributed over the same area. This will be in a ratio of 9 parts bio-solids/animal manure and 1 part green waste (Carbon/Nitrogen Ratio 25:1). During this process, the windrows will be sprayed with soil inoculants, a proprietary blend of beneficial microbes and organic microbe growth enhancers to accelerate the process. After the spray is completed, a combine like machine known as a windrow turner will blend the raw material mixture and begin the heating process for the 30 to 45 day decomposition period. The windrow turner machine will mix and blend each odour free windrow approximately 3 times per week and the microbe formula will be added with each turning. The temperature will be maintained at a minimum of 140-160°C during this phase. The temperatures will be taken in each windrow twice daily during this process, which will last 30 to 45 days. At the end of this period, the waste materials will be blended and ready to be moved to the curing pile to cool at the ambient temperature and sprayed again with our soil inoculants. Additional raw material decomposition may also occur during this short phase of the process. When the pile reaches ambient temperature, it is sufficiently cooled and will be put through a sifting machine.

4. **Segregation:**

The produced compost will be fed through a sifting machine for coarse segregation containing a single screen of approx. 6.35 mm particle size). The pieces which have not been made small enough to go through a commercial spreader will be put back onto the new windrows. The material that has gone through the sifter machine is now ready for packaging.

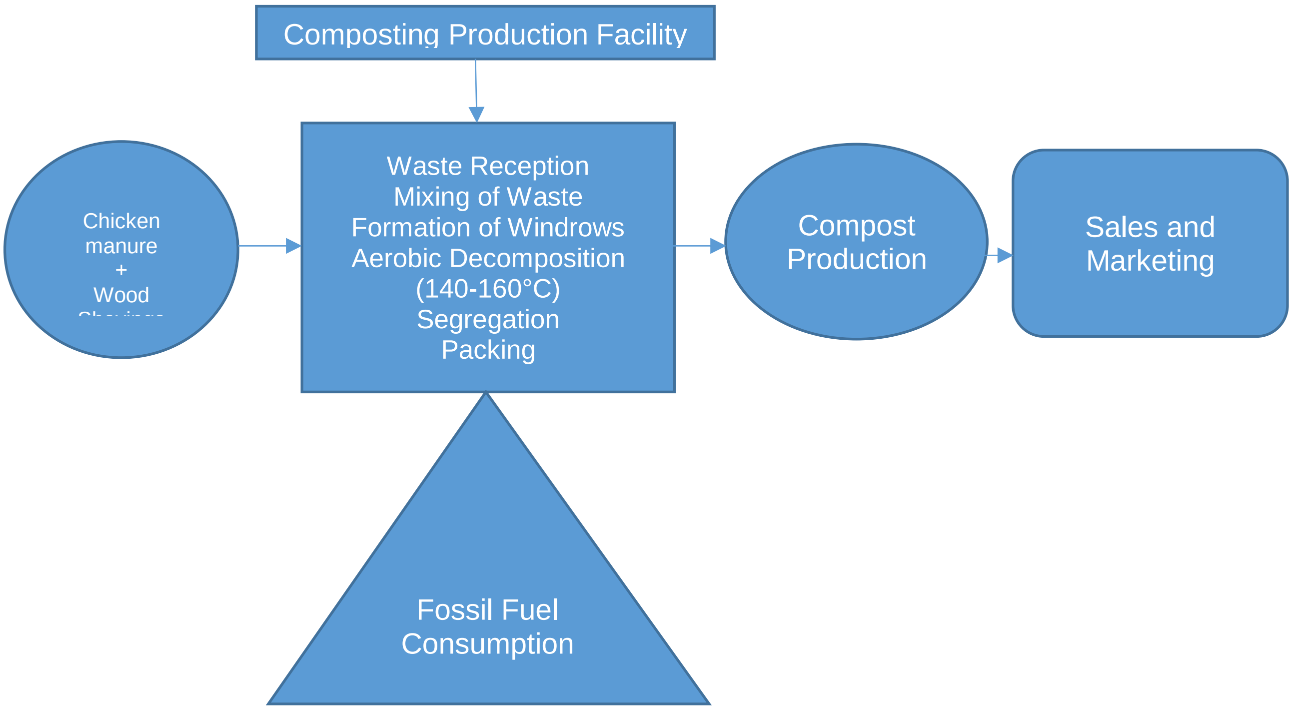
5. **Packing:**

The high quality compost prepared will be finally packed in for sales. Depending on the customer’s needs, the weight of pack is as follows; (1) 20 or 40 lb. bags, (2) ½ ton (3) bulk sales by truck load will be based on the size of the truck that the customer provides. A full size tractor trailer can hold 25 tons and smaller trucks with as little as 3 tons.

In the project activity, mimimum of surface water run-off is generated. This run off water goes to retention ponds including storm water, which are fed from drain. This is constructed around the perimeter of the property's operational areas. After that it naturally drains as per topography towards the adjacent creek.

Table A.2: Technical Specifications of major equipment used in the project activity:

Windrow Turner	Scarab Composter Make
Engine	TIER II Caterpillar
Drum & Wheel drives	Hydraulic drive systems
Tunnel	18' X 7'
Drum	32'' overall diameter, ½" drum wall thickness
Cab	Air Conditioned, heated, tilt console with controls electric over hydraulic



The technology used in the project activity is available in the Host country and there is no technology transfer. The technology is environmentally safe and sound.

A.4. Parties and project participants

Party involved (host) indicates 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)
United States of America (host)	Private entity: GEC Organics	No

A.5. Public funding of project activity

Not Applicable.

SECTION B. Application of selected approved baseline and monitoring methodology and standardized baseline

B.1. Reference of methodology and standardized baseline

Approved "Revised Consolidated baseline methodology for GHG emission reductions from manure management systems and municipal solid waste", (ACM0010), Version 7.0.0

Reference:

This consolidated baseline methodology is based on elements from the following methodologies:

- AM0006: "GHG emission reductions from manure management systems";
- AM0016: "Greenhouse gas mitigation from improved Animal Waste Management Systems in confined animal feeding operations".
- ACM0010: "Revised Consolidated baseline methodology for GHG emission reductions from manure management systems and municipal solid waste", Version 7.0.0
- ACM0022: "Alternative waste treatment processes"
- AM0073: GHG emission reductions through multi-site manure collection and treatment in a central plant --- Version 1.0

This methodology also refers to the latest approved versions of the following tools:

- "Project emissions from flaring";
- "Tool to calculate baseline, project and/or leakage emissions from electricity consumption";
- "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion";
- "Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period";
- "Combined tool to identify the baseline scenario and demonstrate additionality";
- "Project and leakage emissions from anaerobic digesters";
- "Project and leakage emissions from composting";
- "Tool to determine the baseline efficiency of thermal or electric energy generation systems";
- "Tool to determine the mass flow of a greenhouse gas in a gaseous stream";
- "Project and leakage emissions from transportation of freight".

B.2. Applicability of methodology and standardized baseline

The approved "Revised Consolidated baseline methodology for GHG emission reductions from manure management systems and municipal solid waste" - version 7.0.0:

#	Applicability of Revised GS ACM0010	Justification
1	The methodology is also applicable to the activities that involve co-digestion and/or co-composting of multiple organic matters that would have otherwise been left to decay anaerobically in an animal waste management system (AWMS) or a solid waste disposal site (SWDS)	The project activity utilises two different types of fresh waste i.e. chicken manure from chicken farms and wood shavings from nearby lumber operators. 1. The common practice in the region with respect to chicken manure is to dispose of in the agricultural land. 2. The wood shavings will not be used in the ER calculations.
2	Farms where livestock populations, comprising of cattle, buffalo, swine, sheep, goats, and/or poultry, is managed under confined conditions;	Manure managed at farms associated with the project activity and all farms within the State of Alabama are managed under confined conditions. Broilers manure is managed via dry lot, then solid storage and is finally spreaded.

3	Farms where manure is not discharged into natural water resources (e.g. rivers or estuaries);	The project activity does not involve any discharge into natural water resources. Also, farms in the baseline conditions are not discharging waste into the water resources
4	In case of anaerobic lagoons treatments systems, the depth of the lagoons used for manure management under the baseline scenario should be at least 1m;	Broiler manure is not managed via anaerobic lagoons in the state of Alabama.
5	The annual average ambient temperature at the site where the anaerobic manure treatment facility in the baseline existed is higher than 5°C;	The ambient temperature of the anaerobic manure treatment facilities and the ambient temperature for the state of Alabama is 18°C.
6	In the baseline case, the minimum retention time of manure waste in the anaerobic treatment system is greater than 1 month;	In the baseline case, the minimum retention time of manure waste in the anaerobic treatment system is verified to be greater than 1 month.
7	The AWMS(s) in the project case results in no leakage of manure waste into ground water, e.g. the lagoon should have a non-permeable layer at the lagoon bottom.	The AWMS's in the project case involve non-permeable layers below the manure storage. The project activity does not involve any generation of wastewater or leachate and hence there is no treatment of wastewater or leachate in the project activity. Hence, this condition is not applicable to the project activity. The project activity is a composting plant and does not release any waste water or any leachate. Thus the project does not involve any waste water treatment and hence this applicability criteria is not applicable for the proposed project activity.
8	If residues are stored in between collection activities, storage tanks shall comprise outdoor open equipments;	The proposed project activity does not involve any residues being stored in between collection activities, storage tanks shall comprise outdoor open equipments.
9	If the manure/ treated residue is used as fertilizer in the baseline, project proponents must ensure that this end use remains the same throughout the project activity;	The proposed project activity involve manure/ treated residue being used as fertilizer in the baseline after approximately 1 year. The output product of the project activity is compost to be used as an organic fertilizer.
10	In case residual waste from the digestion is handled aerobically and/or submitted to soil application, the proper conditions and procedures (not resulting in methane emissions) for storage and transportation and soil application must be ensured.	Final composting product from project activities is used as fertilizer for land application. The final product is stored on a cement pad under a covered storage area. Storage and transportation of final product is accounted for as indicated in this PDD.

11	In case of co-digestion, for one or more sources of substrates, it cannot be demonstrated that the organic matter would otherwise have been left to decay anaerobically, baseline emissions related to such organic matter shall be accounted for as zero, whereas project emissions shall be calculated according to the procedures presented in this methodology for all co-digested substrates;	In the absence of the project activity the most plausible baseline situation is as follows for both the waste products: The estimated amount of poultry manure produced annually in Alabama is more than 1,250,000 tons. Chicken manure waste generated from broiler farms is disposed of on the agricultural land. This practice is widely adopted in the entire state of Alabama. A national survey indicated that 90% of litter is disposed on the poultry grower's acreage in the south central and southeastern United States, this practice of waste disposal causes nutrient overloading and other environmental problems. The wood shavings will not be used in the ER calculations.
12	CERs shall be claimed by the Central Treatment Plant managing person/entity, only. Other parties involved must sign a legally binding declaration that they will not claim CERs from the improved animal waste treatment practices. The DOE shall check such declaration during the validation (during verification if new parties added after project registration) and these documents shall be valid throughout the whole crediting period.	CERs from the project activity shall be claimed by the Central Treatment Plant managing person/entity, only.
13	CERs are claimed from the reduction of synthetic fertilizers.	Since the project creates USDA certified organic compost, no synthetic fertilizers will be used in conjunction with the compost. Therefore, the use of the organic compost also reduces the carbon emissions for synthetic fertilizers that would have been used on the agricultural land.

As identified with the help of procedures mentioned in the methodology under section - Baseline Methodology procedure:

B.3. Project boundary

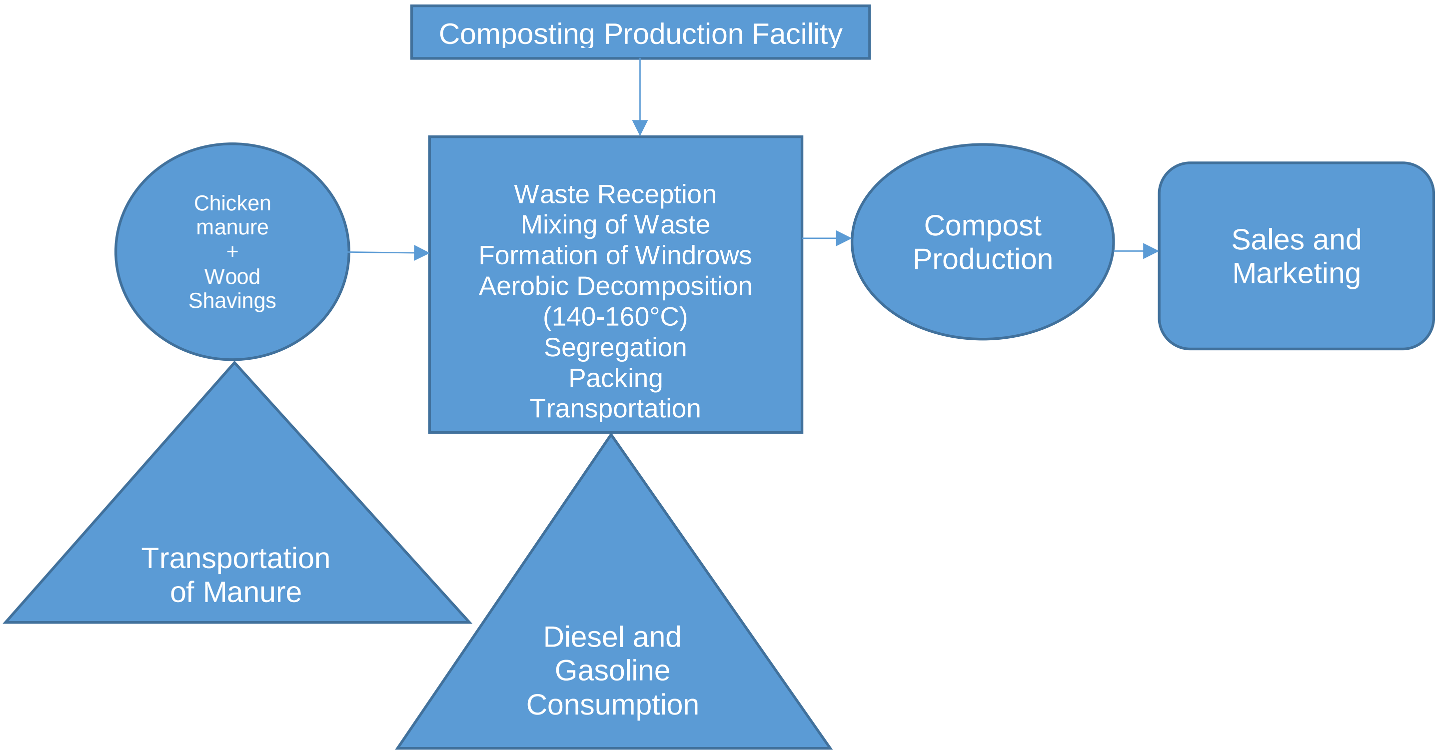
Table 3: Project Boundary

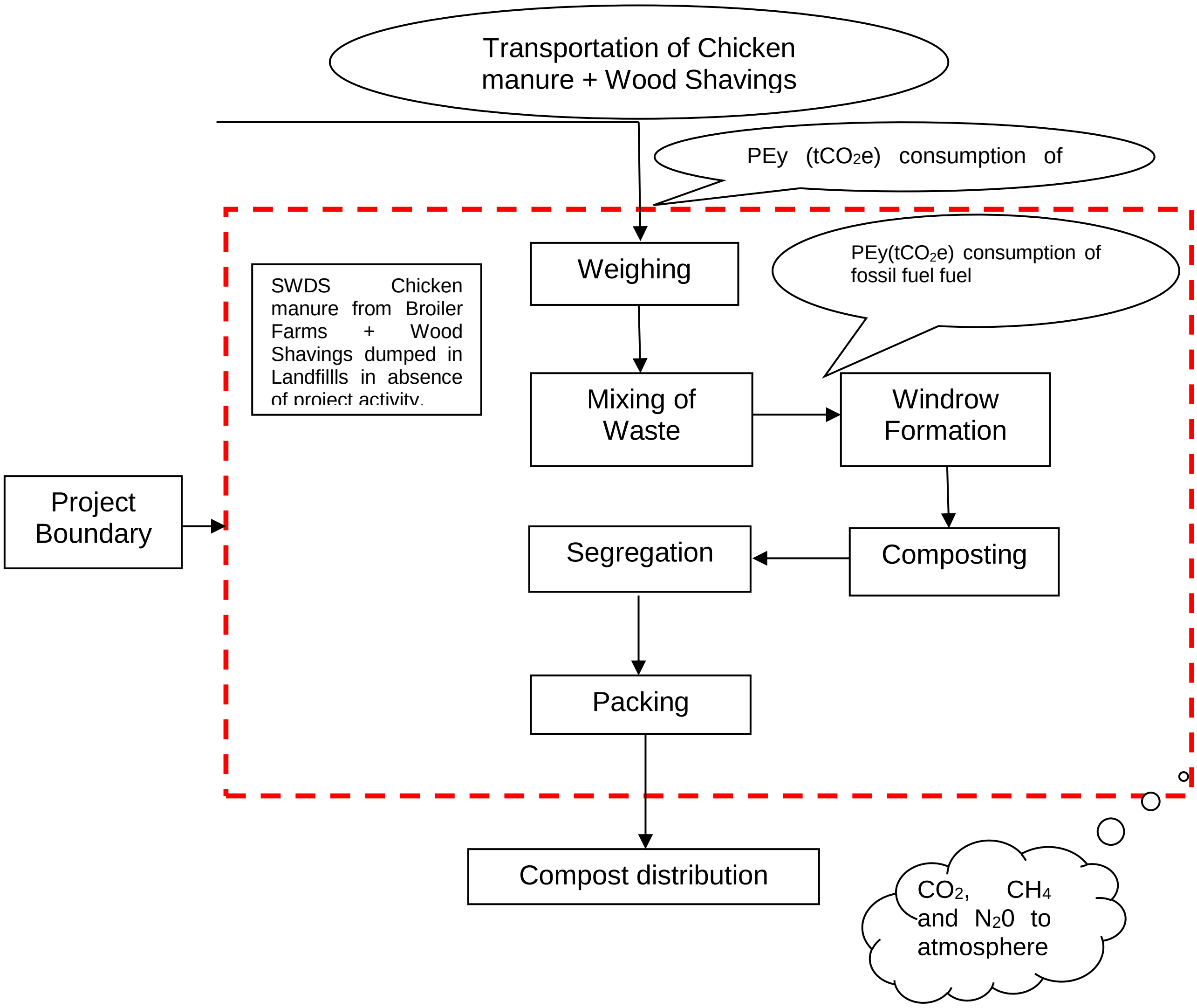
Source		Gas	Included?	Justification/Explanation
Baseline Emissions	Emissions from the waste treatment process	CO_2	No	CO_2 emissions from the decomposition of organic waste are not accounted
		CH_4	Yes	The major source of emissions in the baseline. Accounted for in baseline emissions.

		N_2O	Yes	Direct and indirect N_2O emissions are accounted. Accounted for in basline emissions.
	Emissions from Electricity consumption/generation	CO_2	Yes	Electricity may be consumed from the grid or generated onsite in the baseline scenario. Electricity consumption / generation is not applicable for baseline.
		CH_4	No	Excluded for simplification. This is conservative
		N_2O	No	Excluded for simplification. This is conservative
	Emissions from thermal energy generation	CO_2	Yes	If thermal energy generation is included in the project activity. Not applicable to project activity.
		CH_4	No	Excluded for simplification. This is conservative
		N_2O	No	Excluded for simplification. This ia conservative
Project Emissions	Emissions from thermal energy use	CO_2	Yes	May be an important emission source. Not applicable to project activity.
		CH_4	No	Excluded for simplification. This emission source is assumed to be very small
		N_2O	No	Excluded for simplification. This emission source is assumed to be very small
	Emissions from on-site electricity use	CO_2	Yes	May be an important emission source. If electricity is generated from collected biogas, these emissions are not accounted for. No electricity use is done on-site for project activity.
		CH_4	No	Excluded for simplification. This emission source is assumed to be very small
		N_2O	No	Excluded for simplification. This emission source is assumed to be very small
	Emissions from the waste treatment processes	CO_2	No	CO_2 emissions from the decomposition of organic waste are not accounted
		CH_4	Yes	The emission from anaerobic digesters

				and aerobic treatment. Only aerobic treatment is utilized for project activity.
		N_2O	Yes	Direct and indirect N_2O emissions are accounted for.
	Emissions from manure/ waste residue transportation	CO_2	Yes	May be an important emission source. Manure transportation has been accounted for in the project emissions.
		CH_4	No	Excluded for simplification. This emission source is assumed to be very small
		N_2O	No	Excluded for simplification. This emission source is assumed to be very small
	Emissions from residue from anaerobic digester composting	CO_2	No	CO_2 emissions from the decomposition of organic waste are not accounted.
		CH_4	Yes	May be an important emission source. However, no storage tanks utilized for the project activity.
		N_2O	Yes	May be an important emission source. However, no storage tanks utilized for the project activity.
	Emissions from manure storage tanks	CO_2	No	CO_2 emissions from the decomposition of organic waste are not accounted.
		CH_4	Yes	May be an important emission source. However, no storage tanks utilized for the project activity.
		N_2O	No	Excluded for simplification. This emission source is assumed to be very small.

The project boundary for project activity is given in the following figure:




Transportation of Chicken manure + Wood Shavings
PEy (tCO2e) consumption of
SWDS Chicken manure from Broiler Farms + Wood Shavings dumped in Landfillls in absence of project activity.
Weighing
PEy(tCO2e) consumption of fossil fuel fuel
Mixing of Waste
Windrow Formation
Project Boundary
Segregation
Composting
Packing
Compost distribution
CO2, CH4 and N20 to atmosphere

B.4. Establishment and description of baseline scenario

As per the applied methodology "Revised Approved consolidated baseline methodology ACM0010 - "Revised Consolidated baseline methodology for GHG emission reductions from manure management systems and municipal solid waste", Version 7.0.0, the "Combined tool to identify the baseline scenario and demonstrate additionality" version 06.0.0, has been used for baseline identification and demonstration of additionality.

Baseline Scenario for Managing the Manure

(i) For existing facilities

The baseline scenario includes common practices for manure management of chicken manure in the State of Alabama, USA.

(ii) For Greenfield facilities

The baseline scenario does not include Greenfield facilities, since common practice for broiler farms in the region is not uncovered anaerobic lagoons.

Step 1: Identification of alternatives Scenario

Sub-step 1a: Define alternatives scenarios to the proposed CDM project activity

For the *Revised Approved consolidated baseline methodology ACM0010* version 7.0.0 the Alternatives for the disposal/treatment of the fresh waste in the absence of the project activity is provided in table below:

Table B.1: Scenario relevant for estimating baseline methane emissions for MSW disposal, to be analyzed should include:

Representation	***Parameters***	***Plausible Baseline Scenario***	***Parameters***
M1	The project activity without being registered as a CDM project activity (i.e. any (combination) of the waste treatment options; Composting, Co-composting or anaerobic digestion);	***No***	This project activity is the processing of solid waste (chicken manure + wood shavings) in a compost plant which can be utilized as organic manure. The chicken manure and wood shavings used in the project activity are purchased from local companies. This is in compliance with mandatory applicable and regulatory requirements. Composting project requires high up-front investment costs and brings very little or no revenues since the compost market in Alabama is not well developed. Therefore, the carbon credits are necessary to make this a viable project. See Investment Analysis, Ver 5.0.

			Further, there are no mandatory regulatory or contractual requirements in the host country that require PP or any other authority to undertake the project activity. Neither do the regulations prevent/prohibit implementation of the project activity. Further, compost projects, which are located at existing farms, are developed as part of the farm operations with existing farm equipment. Leftover compost not used on the farm is sold to the public. Therefore, costs are already covered as part of the farming operations. Only under this situation is composting without being registered as a CDM project viable. These type of projects are identified as small scale projects, unlike the project activity, which is a large scale project. Hence this alternative has not been considered as realistic and credible.
M2	Disposal of the fresh waste in a SWDS with a partial capture of the LFG and flaring of the captured LFG;	***No***	This project activity is the processing of solid waste (chicken manure + wood shavings) in a compost plant which can be utilized a as organic manure. The chicken manure and wood shavings used in the project activity are purchased from local companies. Without this project, The baseline scenario for the chicken manure would be dry lot, solid storage and then spreading on agricultural fields. The wood shavings will not be used in the ER calculations. Furthermore, there are no mandatory regulatory or contractual requirements in the host country that require PP or any other authority to undertake the project activity, and the disposal of the waste and the managed landfill site requires huge investment. Further Installation of landfill gas collection and flaring system facilities requires huge capital investment without any monetary benefit, since there is no revenue inflow. Therefore this alternative is not considered as realistic and credible.

			Further, the baseline scenario in Alabama is dry lot, followed by solid storge and then spreading onto agricultural fields. The process prior to spreading takes a approximately one year for the manure to be spread on agricultural fields. The disposal of chicken manure in agricultural lands causes strong offensive odour and Nitrate leaching into the groundwater, nonpoint source P runoff into surface water bodies, and release of pathogenic microorganisms are three of the main problems encountered with improper management of this resource[2]. The wood shavings will not be used in the ER calculations. Hence this alternative has not been considered as realistic and credible.
M3	Disposal of the fresh waste in a SWDS without a LFG capture system;	***No***	The baseline scenario in Alabama is dry lot, followed by solid storge and then spreading onto agricultural fields. The process prior to spreading takes a approximately one year for the manure to be spread on agricultural fields. The wood shavings will not be used in the ER calculations. There are no mandatory regulatory or contractual requirements in the host country that require PP or any other authority to undertake this alternative. Neither do the regulations prevent /prohibit to implement this alternative without the capture of landfill gas. Since this practice does not require any capital investment or operation and maintenance cost or any associated cost and hence is a common practice in Alabama. Hence this alternative has not been considered as realistic and credible.
M4	Part of the fresh fraction of the solid waste is recycled and not disposed in the SWDS;	***No***	This project activity is the processing of solid waste (chicken manure + wood shavings) in a compost plant which can be utilized as organic manure. The baseline scenario in Alabama is dry lot, followed by solid storge and then spreading onto agricultural fields. The process prior to spreading takes a

2 http://agriculture.state.pa.us/portal/server.pt/gateway/PTARGS_6_2_75292_10297_0_43/AgWebsite/Files/General/sccfiles/odormanagement/D6._Poultry_Manure_Mgmnt.pdf

			approximately one year for the manure to be spread on agricultural fields. The other waste wood shavings generated from lumber operators is used in nursery, landscapers. The wood shavings will not be used in the ER calculations. Therefore, neither the chicken manure or the wood shavings are recycled during the baseline scenario.
M5	Part of the fresh fraction of the solid waste is treated aerobically and not disposed in the SWDS;	***No***	The chicken manure and wood shavings used in the project activity are purchased from local companies. The baseline scenario in Alabama is dry lot, followed by solid storge and then spreading onto agricultural fields. The process prior to spreading takes a approximately one year for the manure to be spread on agricultural fields. The other waste wood shavings generated from lumber operators is used in nursery, landscapers. The wood shavings will not be used in the ER calculations. There are no mandatory regulatory or contractual requirements that mandate to undertake the alternative. Also, the baseline scenario only includes the spreading of chicken manure on agricultural fields after approximately one year and hand spreading of wood shavings on nurseries and/or landscapes. Therefore, aerobic treatment of the solid waste is not conducted and would require additional efforts and investment without additional revenues. The wood shavings will not be used in the ER calculations. Hence this alternative has not been considered as realistic and credible.
M6	Part of the organic fraction of the solid waste is incinerated and not disposed in the SWDS;	***No***	The baseline scenario in Alabama is dry lot, followed by solid storge and then spreading onto agricultural fields. The process prior to spreading takes a approximately one year for the manure to be spread on agricultural fields. The other waste wood shavings generated from lumber operators is used in

			nursery, landscapers. The wood shavings will not be used in the ER calculations. Hence the common practice does not involve any kind of incineration of the solid waste. The chicken manure and wood shavings used in the project activity are purchased from local companies. There are no facilities in the location utilizing the waste for this incineration purpose. It is because there are no mandatory regulatory or contractual requirements that mandate to undertake the alternative. Further the incineration of the solid waste would require additional efforts and investment without any mandatory requirement for the same and no revenues. Hence this alternative has not been considered as realistic and credible.
M7	Part of the organic fraction of the solid waste is gasified and not disposed in the SWDS;	***No***	The baseline scenario in Alabama is dry lot, followed by solid storge and then spreading onto agricultural fields. The process prior to spreading takes a approximately one year for the manure to be spread on agricultural fields. The other waste wood shavings generated from lumber operators is used in nursery, landscapers. The wood shavings will not be used in the ER calculations. Hence the common practice does not involve any kind of gasification of the solid waste. The chicken manure and wood shavings used in the project activity are purchased from local companies. There are no facilities in the location utilizing the waste for this gasification purpose. It is because there are no mandatory regulatory or contractual requirements that mandate to undertake the alternative. Further the gasification of the solid waste would require additional efforts and investment without any mandatory requirement for the same and no revenues. Hence this alternative has not been considered as realistic and credible alternative.

M8	Part of the organic fraction of the solid waste is treated in an anaerobic digester and not disposed in the SWDS	***No***	The baseline scenario in Alabama is dry lot, followed by solid storge and then spreading onto agricultural fields. The process prior to spreading takes a approximately one year for the manure to be spread on agricultural fields. The other waste wood shavings generated from lumber operators is used in nursery, landscapers. The wood shavings will not be used in the ER calculations. Hence the common practice does not involve any kind of anaerobic digestion of the solid waste. The chicken manure and wood shavings used in the project activity are purchased from local companies. There are no facilities in the location utilizing the waste for this anaerobic digestion purpose. It is because there are no mandatory regulatory or contractual requirements that mandate to undertake the alternative. Further the anaerobic digestion of the solid waste would require additional efforts and investment without any mandatory requirement for the same and no revenues. Hence this alternative has not been considered as realistic and credible alternative.
M9	Part of the organic fraction of the solid waste is mechanically or thermally treated to produce RDF and not disposed in the SWDS	***No***	The baseline scenario in Alabama is dry lot, followed by solid storge and then spreading onto agricultural fields. The process prior to spreading takes a approximately one year for the manure to be spread on agricultural fields. The other waste wood shavings generated from lumber operators is used in nursery, landscapers. The wood shavings will not be used in the ER calculations. Hence the common practice does not involve any kind of mechanically or thermally treatment of solid waste. The chicken manure and wood shavings used in the project activity are purchased from local companies. There are no facilities in the location utilizing the waste for this mechanical or thermal treatment of organic fraction of solid waste. It is because there are no mandatory regulatory or contractual requirements that mandate to undertake the alternative. Further mechanical or

			thermal treatment of solid waste would require additional efforts and investment without any mandatory requirement for the same and no revenues. Hence this alternative has not been considered as realistic and credible alternative.

Therefore, none of the above are credible and realistic alternatives considered for disposal/treatment of fresh waste.

Table B.2 For Electricity Generation, the realistic and credible alternative(s) may include, inter alia:

Representation	Parameter	Realistic and credible alternative	Reasons with Justification
E1	Electricity generation from biogas, undertaken without being registered as CDM project activity;	No	The proposed project activity is a composting facility by formation of windrows to aerobically degrade the solid waste (chicken manure + wood shavings) using windrow turner and also by addition of microbial inoculant to enhance the degradation process. The electricity generation is not an aspect of the project activity, hence no alternative scenarios related to the generation of the electricity has been identified. This is in line with the applied methodology to the project activity.
E2	Electricity generation in existing or new renewable based captive power plant(s);	No	
E3	Electricity generation in existing and/or new grid-connected power plant;	No	
E4	Electricity generation in an off-grid fossil fuel fired captive power plant;	No	
E5	Electricity generation in existing and/or new grid-connected power plant and fossil fuel fired captive power plant(s).	No	

Table B.3: For Heat generation, the realistic and credible alternative(s) may include, inter alia:

Representation	Parameter	Realistic and credible alternative	Reasons with Justification
H1	Heat generation from biogas undertaken without being registered as CDM project activity;	No	The proposed project activity is a composting facility by formation of windrows to aerobically degrade the solid waste (chicken manure + wood shavings) using windrow turner and also by addition of microbial inoculant to enhance the degradation process. The heat generation is not an aspect of the project activity,
H2	Heat generation in existing or new fossil fuel fired cogeneration plant(s);	No	
H3	Heat generation in existing or new renewable based cogeneration plant(s);	No	
H4	Heat generation in existing or new on-site or off-site fossil	No	

	fuel based boiler(s) or air heater(s);		hence no alternative scenarios related to the generation of the heat has been identified. This is in line with the applied methodology to the project activity.
H5	Heat generation in existing or new on-site or off-site renewable energy based boiler(s) or air heater(s);	No	
H6	Any other source, such as district heat;	No	
H7	Other heat generation technologies (e.g. heat pumps or solar energy).	No	

B.5. Demonstration of additionality

Carbon revenues are extremely critical for the implementation of the project activity. Project participants considered carbon revenues at the time when the initial project planning was done. This is evident from the following timeline of implementation.

I. Definitions

1. **Applicable Geographical Area**:

The area to a specific geographical area, Alabama within the host country. The justification for the limitation and distinction of the limited geographical area restricted to state of Alabama.

(i) Climate; Compost is more efficiently produced in warmer climates. The ideal temperature for composting is between 131-160ºF (55-70ºC)[3]. Temperature is an indication that the organisms are working well, releasing energy as they break apart organic compounds. Maintaining temperatures within this range is important because the composter must ensure that all pathogens are being killed. If temperature is too low, one or more of the above factors is out of whack. Alabama is one of the warm states of US. The climate of Alabama supports the composting process. Summers in Albama are one of the hottest in the United States, with high temperatures averaging over 90 °F (32 °C) throughout the summer in many parts of the state[4][5][6].

(ii) The North, Northeast, Northwest US states will not allow the necessary outdoor activity needed to remediate waste for more than 5 months per year

(iii) Access to Raw Material; The chicken operations are the main source of poultry litter/manure. The Alabama is one of the leading broiler-producing states in USA. The Alabama produces more than 1.7 million tons of poultry litter annually[7]. Hence the state has very good access to the Chicken manure.

[3] http://compostingcouncil.org/wp/wp-content/uploads/2014/05/FR2YW_BMP.pdf

[4] http://en.wikipedia.org/wiki/Climate_of_Alabama

[5] http://nsstc.uah.edu/alclimatereport/january2015/Hottest-Coldest122014.pdf

[6] https://www.sercc.com/climateinfo/historical/recordhigh.html#AL

[7] http://www.aces.edu/pubs/docs/A/ANR-0889/

(iv) Legal Regulations: The States in US have assumed the lead role in regulating the composting facilities, Composting facilities need approval from the State before operating. The permit requirements for composting facilities vary among states[8][9][10]. Examples of topics covered in the permitting process include: a detailed facility design, operating plans, a description of incoming materials, the amount and types of residue to be generated in the plant, monitoring plans, potential environmental releases, landfills to be used, and potential markets for the compost.

(v) Environmental Problems: The composting process is indirectly protection water bodies in Alabama against the problems of excess phosphorus and nitrogen and pathogens found in animal waste generated by large animal feeding operations, Alabama reported in 2012 it had nearly 83,000 acres of lakes, reservoirs and ponds impaired or threatened by phosphorus[11][12][13].

(vi) Regional & Statewise Composting Programs: The United States have varying priorities statewise and therefore a varying regional and statewise composting programs are promoted and implemented. The various states in US has been divided into various regions[14] (Region 1, Region 2, Region 3 till Region 10) based on the priorities, concerns and reguirements of the states.This shows a great diversity among the various states in the United States of America.

Hence considering all the above constraints and differences found in different states of USA, the Alabama has been considered as geographical area for demonstrating the first of its kind project activity.

Table 7: Chronology of Project Milestones

#	Milestone	Date
1	Consulting Agreement with Global Enviro Services (GES) was established to help GEC and its Subsidiaries with consulting services pertaining to development of the project along with issuance of carbon credits for the reduction of greenhouse gases. GES was also responsible for the site inspection and research of a similar project in Mexico.	1 Nov 2010
2	Board of Directors Resolution to proceed ahead with composting project implementation. The purpose of this meeting was to receive approval and funding from the Board of Directors of GECO. As a result of this meeting, the Board of Directors agreed to authorize Mr. Peter Ubaldi to arrange funding for the GECO operation in the amount of up to $1,000,000.	15 Aug 2011

[8] https://epd.georgia.gov/sites/epd.georgia.gov/files/related_files/site_page/CompostingRegsSummary2.pdf

[9] http://www.recycle.cc/compostregs.htm#Alabama

[10] http://compostingcouncil.org/state-compost-regulations-map/

[11] http://www.al.com/news/index.ssf/2015/03/alabama_farmers_have_to_deal_w.html

[12] http://www.aaes.auburn.edu/comm/pubs/highlightsonline/fall01/fall-adhik.html

[13] http://www.aaes.auburn.edu/comm/pubs/highlightsonline/summer96/litter.htm

[14] http://www.epa.gov/composting/live.htm

3	First meeting with Mayor, regulatory officials at Alabama. This meeting was held to discuss GECO's operations, obtain support from the Town of Castleberry, discuss hiring of local citizens and discuss the possibility of GHG emission reductions.	30 Aug 2011
4	Site Visit and discussions with Stakeholders about project and GHG reduction potential. During the site visit, the following items were addressed: project activities, types of wastes to be used, issues associated with odors, noise and traffic, etc.	31 Aug 2011
5	Purchase of Scarab Composter Machinery (Start date of Project as GS guidelines)	21 Sept 2011
6	Appreciation Letter from Mayor of Alabama for GEC efforts for composting project	22 Sept 2011
7	70 acre Land Lease valid till Sept 2012	1 Sept 2011
8	Hawk Associates news Release on behalf of GECO for start of construction on 70 acreage land	25 Oct 2011
9	First Purchase of Raw Material (Chicken manure)	12 Jan 2012
10	First Purchase of Raw Material (Wood Shavings)	24 Jan 2012
11	Visit of Mayor, Regulatory officials, NGOs and Local People to Project site and Town hall meetings with local people and NGOs (Roughly some date) *On this date we began to have different organizations visit the site. A few are Poarch Creek Indians, Alabama Extension System, Costal Gateway, Piedmont National, local farmers*	28 March 2012
12	Hawk Associates news release on behalf of GECO stating Alabama Govt. official praising the efforts of GECO	28 March 2012
13	Application submission to ADEM for permits and other approval	23 April 2012
14	Storm Water Permit Approval from ADEM	23 May 2012
15	First Meeting with Alabama Agriculture Commission	14 Aug 2012
16	Beta testing to meet the requirements of USDA	1 Nov 2012
17	Submission of USDA Application form to Amricert International	5 Nov 2012
18	Receipt of USDA certificate to GEC Organics Compost	22 Dec 2012
19	Carbon/Emission Credit forward purchase agreement between GEC Organics and Kronos International Investments Limited	8^{th} May 2013
20	CDM carbon credit project development consulting agreement between GEC Organics and Green Giant Venture Fund.	30^{th} July 2013
22	Letter to stockholders mentioning about carbon credit forward purchase agreement	7 August 2013
23	Board Resolution to open account in Climate Action Reserve (CAR) in registry	19 Sept 2013
24	Board Resolution to open account in VCS in registry	9 Oct 2013
25	Opening of account in VCS registry	15 Oct 2013
26	Opening of account in Climate Action Reserve (CAR) registry	4 Nov 2013
27	Appointment of Validation Agency PJR	13 Nov 2013
28	Appointment of PDD writer	14 Jan 2014
29	Renewed GECO_USDA_Certification	22 March 2014 valid till March 2015

From the very initial conceptualization stage PP was aware of carbon credit potential; however, due to financial liquidity crisis, PP was more focused toward arranging for funds, investors required for initial investment in the project. Thus it is evident from above mentioned timelines that carbon revenues are extremely critical for the construction of the project activity. Project construction could be started only after obtaining the funds from the GEC Board of Directors. In the absence of the carbon revenues and required funds, the project would not have been implemented.

Step 0: Demonstration whether the proposed project activity is the first-of-its-kind

Stepwise approach for assessment of first-of-its-kind

Other compost facilities, which produce a compost product, have been identified in the State of Alabama.Since these facilities produce a similar final product, although not organic and not from chicken manure, the project activity is not considered first of its kind. Furthermore, these alternative facilities that produce a compost product use horse or cow manure along with other green wastes. These compost facilities use anaerobic composting processes (e.g. static/passive composting). In general, these facilities use their compost for on-site agricultural fields, but do sell small quantities to the public. These facilities do not use CDM Carbon revenues because the farm operations are already established and additional equipment, land, employees, etc. for composting operations are not necessary.

Therefore, since other facilities exist in the state of Alabama that produce a compost product, the project activity is not the first-of-its-kind.

Step 1: Identification of alternative scenarios

Table B.5: Scenarios from the "Combined tool to identify the baseline scenario and demonstrate additionality"

Representation	***Parameters***	***Plausible Baseline Scenario***	***Reasons with Justification***
S1	The proposed project activity undertaken without being registered as a CDM project activity;	***No (same as M1)***	This alternative has already been discussed above as M1.
S2	Where applicable, no investment is undertaken by the project participants but third party(ies) undertake(s) investments or actions which provide the same output to users of the project activity, for example: (i) In the case of a Greenfield power project, an alternative scenario may be that the project participants would not invest in another power plant but that power would be generated in existing and/or	***No***	The PP has not invested in any other existing or new projects that would produce the same output as the project activity. The output is the production of compost from chicken manure and wood shavings. Similar output from an investment by another Party than the project participant would face the same investment barrier to implementation as encountered by the project participant (see STEP 2: barrier analysis). Hence Scenario S2 is eliminated.

	new power plants in the electricity grid.		
S3	Where applicable, the continuation of the current situation, not requiring any investment or expenses to maintain the current situation, such as, inter alia: (i) The continued venting of methane from a landfill; (ii) The continued release of N_2O from adipic or nitric acid production.	***No***	Without the project activity and further investment, the project could not continue. The chicken manure and would shavings would be handled in accordance with the baseline scenario. Also, the heating of the manure and aerobic treatment would not be possible.
S4	Where applicable, the continuation of the current situation, requiring an investment or expenses to maintain the current situation, such as, inter alia: (i) The continued use of an existing boiler involving expenses for operation and maintenance; (ii) The continued use of a specific fuel mix for power generation in an existing power plant.	***No***	The continuation of the current project activity would require a continued investment and/or expenses (e.g. lease of the land, maintainance of the equipment and operating the facility). However, based on the investement analysis conducted, the project is not feasible to continue operation without being registered as a CDM project activity.
S5	Other plausible and credible alternative scenarios to the project activity scenario, including the common practices in the relevant sector, which deliver the same output, taking into account, where relevant, examples of scenarios identified in the underlying methodology;	***No***	Other plausible and credible scenarios have already been discussed above under the baseline scenarios, including the commom practice in the region. However, for farms with grazing animals, manure is often collected and composted. This compost is eventually spread out on grazing lands / farm lands. Further, for farms with no grazing animals (e.g. broiler chicken farms) the manure is treated as indicated in the baseline scenario, since the effort to compost the material is not worth the cost and potential revenue to sell it.
S6	Where applicable, the "proposed project activity undertaken without being registered as a CDM project activity" to be implemented at a later point in time (e.g. due to existing regulations, end-of-life of existing equipment, financing aspects).	***No***	Without being registered as a CDM project activity, the project activity would not be implemented. No existing regulations or other factors exist that would require the project activity to be implemented now or in the future. Alternative scenario S6 is deemed not to alleviate implementation barriers faced by the project activity and therefore corresponds to scenario S1 (M1), which has been discussed.

Therefore, none of the above were found to be realistic or plausible baseline alternatives.

Sub-step 1b: Consistency with mandatory applicable laws and regulations

The Regulatory authority for the Composting facilities in the state of Alabama is "Alabama Department of Environmental Management" (ADEM) Land Division – Solid Waste Program. As per the rules under the para 335-13-14-.01 (Purpose) of Chapter 335-13-14 (Composting Facilites) of ADEM document[15], "*The regulation is to establish procedures to encourage and regulate the production and use of compost made from solid waste within the State of Alabama*". There is no rules or legislation in Alabama which puts any mandatory requirement for the chicken manure to get composted. Moreover the ADEM composting regulations came into effect during April 2012 and hence were not available at the time when the project was taken up.

Further the common practice in Alabama is to dump the Solid Waste (chicken manure) generated from broiler farms in agricultural fields as fertilizer after being treated by dry lot and solid storage for approximately one year. The other waste wood shavings generated from lumber operators are used in nurseries and landscapes. The wood shavings will not be used in the ER calculations. Further, the ADEM rules also do not put restrictions on the common practice of solid waste disposal followed in the region.

The United States Environmental Protection Agency (EPA) has released its first-ever standards to cut methane emissions from the oil and gas sectors only. These reductions do not apply to the agricultural sector. However, GECO will continue to monitor laws and regulations to identify if future laws and regulations are established for the agricultural sector that would affect the additionality of the project acitivity.

Outcome of step 1a and step 1b:

Therefore, none of the above are credible and realistic alternatives considered for disposal/treatment of fresh waste.

Step 2: Barrier analysis:

Step 2a: Identify barriers that would prevent the implementation of alternative scenario

The only alternative scenario that exists is related to compost projects, which are located at existing farms, that are developed as part of the farm operations with existing farm equipment. Leftover compost not used on the farm is sold to the public. Therefore, costs are already covered as part of the farming operations. Only under this situation is composting without being registered as a CDM project viable. In this scenario, the upfront costs for land, equipment, employees, purchase of raw materials (e.g. manure) is not applicable because this is included in the existing farm operations.

Barriers to this alternative scenario is that most agricultural fields do not have the manure, compost equipment, additional land, etc. to run a compost facility. Therefore, the financial costs to establish and operate a compost facilty are not financially viable.

[15] http://www.adem.state.al.us/alEnviroReglaws/files/Division13.pdf

Step 2b: Eliminate alternative scenarios which are prevented by the identified barriers

Upon review of existing compost facilities in the State of Alabama, it was verified that the only compost facilities occur at existing farms that supply the raw material and have the farm equipment already on-site to facilitate composting. These compost operations are not solely compost facilities, but farming facilities that compost on a small portion of the existing farm land. Further, compost operations are small scale in nature and only include the raw material produced on-site. Therefore, the costs of a new operation to purchase land and buildings, purchase compost equipment, employ personnel, purchase raw materials, etc. is not viable without the use of CERs and initial financial invenstement from investors.

Outcome of Step 2:
As per the sub-step 3 (b) under "Outcome of Step 2", "If the alternative scenarios do not include the proposed project activity undertaken without being registered as a CDM project activity" and and " If the proposed project activity is not the first-of-its-kind, *then it is additional and for the baseline scenario identification the project participants may choose either: Option 1 or Option 2*". The PP shall utilize Option 1, Investment Analysis, identified in Step 3 below.

Step 3: Investment analysis

As per the "combined tool to identify the baseline scenario and demonstrate additionality", version 5, the investment analysis has been conducted in accordance with the *"Guidelines on the assessment of investment analysis",* version 5, EB 62, annex 5.

The project proponent "GECO" has chosen Benchmark Analysis for demonstration of additionality since the baseline scenario is the continuation of the current scenario wherein, the chicken manure is disposed in designated and undesignated disposal sites such as agricultural farms, after being treated by dry lot and solid storage. The same is in line with section 19 of the Guidelines on the assessment of investment analysis" version 5, which states, *"The benchmark approach is therefore suited to circumstances where the baseline does not require investment or is outside the direct control of the project developer, i.e. cases where the choice of the developer is to invest or not to invest."*

The financial indicator used for carrying out the investment analysis is equity IRR that will determine the feasibility of the project activity. The Equity IRR of the project is calculated and compared with the expected return on equity (RoE) as the benchmark. The same is in line with the para 12 of *"Guidelines on the assessment of investment analysis"*, Annex 5, EB 62 *Required/expected returns on equity are appropriate benchmarks for equity IRR".*

As per point no. 15 of the "*Guidelines on the assessment of investment analysis"*, version 5, Annex 5, EB 62, *"If the benchmark is based on parameters that are standard in the market, the cost of equity should be determined either by: (a) selecting the values provided in Appendix A; or by (b) calculating the cost of equity using best financial practices, based on data sources which can be clearly validated by the DOE, while properly justifying all underlying factors. The values in the table in Appendix A may also be used, as a simple default option, if a company internal benchmark is used. Benchmark's should not include the subjective profitability expectations or risk profile of a particular project developer".* PP accordingly demonstrating the expected return/cost on equity as per the Appendix (Default values for the expected return on equity) as per para 15 of guidance EB 62 Annex 5. The expected return on equity is composed of four elements: (a) a risk free rate of return; (b) an equity risk premium; (c) a risk premium for the host country; and (d) an adjustment factor to reflect the risk of projects in different sectoral scopes. All values are expressed in real terms from (Page 7 of 12 of guidance EB 62 Annex 5).

1. The risk free rate of return is calculated based on the long-term average returns of US treasury bonds. The US stock market is used as a proxy because it has the longest well recorded data for government bonds as well as stocks. A default value of 3.0% is used.

2. The equity risk premium is derived from the long-term historical returns on equity in the US market relative to the return of bonds. Arithmetic means are used because they are more appropriate for estimating forward looking equity risk premiums than geometric means. A value of 6.5% is used.

The parameter ke is calculated equivalent to a risk free rate plus a country risk premium plus a general equity risk premium, as follows:

Ke = RF + CDS + PEg (4)

Where:
ke = Average cost of equity financing
RF = Risk free rate is 3%
GBi = Yield of a government bond issued by the host country
CDS = Country Default Spread is 0.00%
PEg = General equity risk premium is 6.50%

= 3% + 0.00% + 6.50% = 9.50%

Therefore the benchmark of the project is 9.50%.

Sub-step 3c: Calculation and comparison of financial indicators

The equity IRR for the proposed project activity without CDM revenue is computed for a period of 15 years. A detailed investment analysis has been carried out and presented in the supported excel sheets. The data and analysis is presented here. The techno-economical parameters available before investment decision are used for the equity IRR calculation for the project activity is provided in the **table 8** below:

#	Parameters	Value	Source
1.	Project Capital Investment	$ 940,500	The project capital costs is based on the publicly research report titled "*LCA comparison of windrow composting of yard wastes with use as alternative daily cover (ADC)*[16]". The report is submitted to DOE.
2.	Average Annual Operation and Maintenance cost	$ 404,518	The O&M cost is based on the publicly research report titled "*LCA comparison of windrow composting of yard wastes with use as alternative daily cover (ADC)*[17]". The report is submitted to DOE.

[16] http://www.seas.columbia.edu/earth/wtert/sofos/LCA_Haaren_Themelis_Barlaz.pdf

[17] http://www.seas.columbia.edu/earth/wtert/sofos/LCA_Haaren_Themelis_Barlaz.pdf

			This was identified as the cost for the first year of operations. However, a slight annual increase (2.6%) in annual O&M costs are expected due to inflation and typical cost of living increases. Therefore, the value provided is the average cost over the 15 year period. The source referenced in the investment analysis uses values based on the annual windrow composting of 40,000 Mg/year, which is equivalent to approximately 44,092 tons/year, which is conservative as the maximum compost capacity is 45,000 tons/year. Thus, GECO used the operational and maintenance costs associated with this volume as our own annual operational and maintenance costs. However, for the Labor costs used in the previous investment analysis, GECO factored the overhead costs in from the source referenced. When figuring the new labor costs, GECO took a conservative approach and only added $61,400 for the overhead instead of the $77,000 referenced in the source. In order to make the Annual Operation & Maintenance costs easier to understand as well easily traceable, GECO is now using the exact costs for the categories identified in the source referenced. However, annual operation & Maintenance costs will vary by year depending the amount composted in that year. Also, the annual building Operation & Maintenance costs were previously excluded. Based on the source used, the building costs will be included as they are appropriate to be included. With three structures on-site, the 2015 building maintenance, utiliites, insurance, etc were determined to be $15000 per year. As mentioned, the annual operation & maintenance costs will vary based on the amount of composting conducted. However, each piece of equipment will require regularly scheduled maintenance, regardless of the amount of compostinging conducted. Therefore, only the labor and overhead costs will vary based on the amount of composting conducted.
3.	Compost Production maximum Capacity per annum	45,000 tons	The current compost production is considered the maximum amount of compost that could be produced per month given the existing equipment. If additional compost, above the current maximum of 45,000 tons per month of raw material is composted, additional O&M costs, including additional labor, equipment and maintenance costs would be incurred. GECO anticipates a production of 45,000 tons/per year or raw material. Additional information provided by Report from Consultant. Submitted to DOE.
4.	Chicken manure Price	$30 per ton	Source-1: http://deltafarmpress.com/management/latest-scoop-chicken-litter. (As per this weblink, price range between USD 25 to USD 30) Source-2: http://www.moag.gov.il/NR/rdonlyres/635719CD-

			1706-4765-B663-1ABF8C1D0502/0/Mississippibroilerlitter.pdf (As per this weblink, price range between USD 30 to USD 40) Source-3: http://www.uaex.edu/publications/PDF/FSA-9529.pdf (As per this weblink, price is USD 28.5) USD 30 has been considered based on the PP's actual purchase price from supplier. Based on the stability of the market, the price of chicken manure is not expected to decrease. Based on the nutrients in chicken litter, any change in price would likely be a slight increase as indicated in Source 1 above. However, a variation of +/- 10% in the price of chicken manure provides a value that is still under the 9.5% for the Average cost of equity financing.
5.	Wood shavings price	$30.5 per ton	http://www.wri-ltd.com/PDFs/NAWFR_sample_report.pdf Page No:6, Average value has been taken based on 2Q of 2011. USD 30.5 has been considered based on the PP's actual purchase price from supplier. Based on the stability of the market, the price of wood shavings is not expected to decrease. Based on the high demand of wood shavings for nursery and landscape use, any change in price would likely be a slight increase as indicated in Source 1 above. However, a variation of +/- 10% in the price of chicken manure provides a value that is still under the 9.5% for the Average cost of equity financing.
6.	Waste to Compost conversion (%)	80%	http://www.seas.columbia.edu/earth/wtert/sofos/haaren_thesis.pdf (page no 16 & 17).
7.	Equity	100%	Letter from Global Ecology Corporation
8.	Compost Price	$ 50 per ton	Compost price of USD 50 is based on GECO's actual sale of compost. However, this original pricing of $50 per ton is an aggressive price and is considered to be at the top of the pricing structure of $40 to $50 per ton. Cornell University Management Program study from 2004 also revelieved the cost of fertilizer to be $50 per ton.Therefore, the price of compost is unlikely to change greater than +/- 10%.
9.	Depreciation Rates	http://www.costtech.com/articles/IRS_2010_Depreciation.pdf	

		http://ruraltax.org/files/uploads/Dep.%20Class%20Life%20Final.pdf

As evident from the summit financial excelsheet, the equity IRR comes as a negative % which is less than the benchmark rate (9.50%) computed as above. With carbon credits, the IRR crosses the benchmark and becomes 35% which is profitable. Hence, revenue from sale of GS VERs obtained through project is essential for implementation and operation of the project activity.

Sub-Step 2d: Sensitivity analysis:

The purpose of sensitivity analysis is to examine whether the conclusion regarding the financial viability of the proposed project is sound and tenable with those reasonable variations in the critical assumptions. As per the "Guidance on the Assessment of Investment Analysis, Version 5", Annex 5, EB 62, *"only variables, including the initial investment cost, that constitute more than 20% of either the total project costs or the total project revenues should be subjected to reasonable variation".* Thus, a sensitivity analysis is applied in accordance with the above guidelines to the following parameters considered critical to the operations of the project namely project cost, compost sale price, compost raw material, and operation and maintenance costs (which includes expenses due to salary, maintenance of equipment's and vehicles, chemical, lubricants, fuel and electricity). These parameters were subjected to 10% variation on either side, based on "Guidance on the Assessment of Investment Analysis, Version 5", Annex-5 of EB-62, to ascertain the impact on the profitability and hence the IRR of the project. **The results of the sensitivity analysis are as given below in table 9:**

Resulting Equity IRR			
Parameter	**Variation Without ER Revenues**		**Remarks**
Baseline IRR	Negative		**Benchmark is set at 9.5%**
	-10%	+10%	Within Benchmark
Project Cost	Negative	Negative	Within Benchmark
O&M cost	Negative	Negative	Within Benchmark
Chicken Manure Price	2.29%	Negative	Within Benchmark
Wood Shavings Price	Negative	Negative	Within Benchmark
Compost Production	Negative	9.08%	The current compost production is considered the maximum amount of compost that could be produced per month given the existing equipment. If additional compost, above the current maximum of 45,000 tons per month of raw material, is composted, additional O&M costs, including additional labor, equipment and maintenance costs would be incurred, which would keep the IRR below the existing benchmark.
Compost Sale Price	Negative	9.08%	Compost price of USD 50 is based on GECO's actual sale of compost. However, this original pricing of $50 per ton is an aggressive price and is considered to be at the top of the pricing structure of $40 to $50 per ton. Lower sales

			price of compost would only lower the IRR below the current benchmark. This price was established by meetings and interviews with farmers in the area who would be our customers. The target cost per acre for fertilizer for almost all crops and turf, is between \$40.00 and \$50.00. Our product coverage is 1 ton per acre; therefore our price was determined to be \$50.00 per ton after the carbon revenue is applied. This was confirmed with major end-users of fertilizer in the area: (1)Helton Bros. Farms, Atmore AL, (2) Sherrer Lawn Care, Brewton AL. (3) Auburn University , Auburn AL, (4) Rigby McMillian, Brewton AL, (5) Barber Berry Farms, Millbrook, AL, (6) The Farm Center, Castleberry AL Independent analysis for us to support these discussions came from the following web sites; www.fertilizerpricing.com. http://www.cityofpaloalto.org/civicax/filebank/documents/15113 Organic Compost: http://www.garden-ville.com/products/123/Invigorator.htm http://www.krantztopsoil.com/products.php http://www.sonomacompost.com/product.shtml#Sonoma_Compost http://www.pricefarms.org/expertise.html

Thus, the sensitivity analysis reveals that even with +/-10% changes in various parameters, the equity IRR doesn’t cross the benchmark rate. Therefore, from the above analysis it may be concluded that the project is additional and is not a business – as – usual scenario. Hence this proves that proposed activity is additional and is not a business – as – usual scenario.

Step 4: Common practice Analysis:

The proposed project activity is not the first-of-its-kind, hence as per para 35 of Methodological tool: Combined tool to identify the baseline scenario and demonstrate additionality Version 05.0.0 step 4, a credibility check shall be demonstrated. Further, per para 36 of Methodological tool: Combined tool to identify the baseline scenario and demonstrate additionality Version 05.0.0 step 4, the measures that are listed in the definitions section above are not applicable, therefore, Step 4a is not applicable.

Step 4a: The proposed CDM project activity(s) applies measure(s) that are listed in the definitions section above.

Since the project activity is not the first of its kind, the step is not applicable.

Step 4b: The proposed CDM project activity(s) does not apply any of the measures that are listed in the definitions section above

Based on a thorough analysis and search of compost facilities in the State of Alabama, only one other compost facility was identified. Composting is currently not regulated in the State of Alabama.

- **Faulkner Farms** – Based on "About Us" page on their website, Faulker farm produced compost for small quantity usage, gardens, lawns, etc. Faulkner Farms is located in the Southwest quadrant of the State of Alabama. Faulkner Farm has their own garden on-site, which uses a bulk of the compost produced. Remaining compost is sold to local stores and/or residents for small quantity (residential) usage.

The following sites were searched to verify this information:

- www.google.com
- http://www.agrilicious.org/
- http://www.adem.state.al.us/default.cnt
- USDA Organic Certified
- http://compostingcouncil.org/

Faulkner Farms is not a large scale compost facility, compared to GECO's project activity. Faullker Farms process consists of Static windrow processing in which the compost is not aerated / turned or sprayed with a microbial blend to decrease emissions and smell of manure. GECO's compost process consists of windrow turning and regular spary of our proprietary microbial blend, as discussed in Section A.3 of this PDD. GECO's compost process requires additional equipment (e.g. windrow turner) and therefore, incurs additional employee and maintenance expenses, which is not incurred at Faulker Farm. Further, GECO does not operate a farm and/or garden on-site, which would have already incurred the cost of the land, compost equipment and employees. Therefore, GECO's compost process requires additional financial investments while reducing the emissions released, compared to the process at Faulkner Farm.

Therefore, the project activity is not regarded as common practice as no other compost facilities in the State of Alabama operate the type of facility as the project activity. Further, as GECO is solely a compost facility and does not operate a farm and/or garden, the project activity incurred much greater start-up costs.

Outcome of Step 4:

B.6. Based on a thorough analysis and search of compost facilities in the State of Alabama, the project activity is not regarded as common practice. Emission reductions

B.6.1. Explanation of methodological choices

The Emission reductions obtained as per the Methodology from the project activity will be given as:

ERy = BEy – PEy – Ly

Where:

ERy	Is the emissions reductions in year y (t CO_2e)
BEy	Is the emissions in the baseline scenario in year y (tCO_2e)
PEy	Is the emissions in the project scenario in year y (tCO_2e)
Ly	Is the leakage in year y (tCO_2e)

<u>Baseline Emissions:</u>

A. Baseline Emissions from Animal Waste Treatment

The baseline is the AWMSs identified through the baseline selection procedure, as well as, when relevant, the baseline for the use of gas generated from the anaerobic digester.

Baseline emissions are:

$$BE_{Manure,y} = BE_{CH4,y} + BE_{N2O,y} + BE_{elec/heat,y} \qquad (2)$$

Where:

$BE_{manure,y}$ = Baseline emissions in year y (tCO_2/yr)

$BE_{CH4,y}$ = Baseline CH_4 emissions in year y (tCO_2/yr)

$BE_{N2O,y}$ = Baseline N_2O emissions in year y (tCO_2/yr)

$BE_{elec/heat,y}$ = Baseline CO_2 emissions from electricity and/or heat used in the baseline (tCO_2/yr)

i. Baseline CH4 emissions from manure treatment (BECH4,y)

The manure management system in the baseline could be based on different livestock, treatment systems and on one or more stages. Therefore:

$$BE_{CH4,y} = GWP_{CH4} \times D_{CH4} \times \sum_{j,LT} \left(MCF_j \times B_{0,LT} \times N_{LT} \times VS_{LT,y} \times MS\%_{Bl,j} \right) \quad \textbf{(3)}$$

Where:

$BE_{CH4,y}$	=	Baseline CH_4 emissions (tCO_2/yr)
GWP_{CH4}	=	Global Warming Potential (GWP) of CH_4 (tCO_2e/tCH_4)
D_{CH4}	=	Density of CH_4 (t/m^3)
MCF_j	=	Annual methane conversion factor (MCF) for the baseline $AWMS_j$
$B_{0,LT}$	=	Maximum methane producing potential of the volatile solid generated by animal type LT (m^3CH_4/kg -dm)
N_{LT}	=	Annual average number of animals of type LT for the year y (number)
$VS_{LT,y}$	=	Annual volatile solid excretions for livestock LT entering all AWMS on a dry matter weight basis (kg -dm/animal/yr)
$MS\%_{Bl,j}$	=	Fraction of manure handled in system j in the baseline
LT	=	Type of livestock
j	=	Type of treatment system

Estimation of various variables and parameters used in the above equation:

(A) ***$VS_{LT,y}$*** *shall be determined in one of the following ways, presented in the order of preference*

Option 3: (This option is utilized for the project activity)

Scaling default IPCC values *$VS_{default}$* to adjust for a site-specific average animal weight as shown in equation below:

$$VS_{LT,y} = \left(\frac{W_{site}}{W_{default}} \right) \times VS_{default} \times nd_y \quad \textbf{(5)}$$

Where:

$VS_{LT,y}$	=	Annual volatile solid excretions for livestock LT entering all AWMS on a dry matter weight basis (kg -dm/animal/yr)
W_{site}	=	Average animal weight of a defined livestock population at the project site (kg)
$W_{default\,t}$	=	Default average animal weight of a defined population (kg)
$VS_{default}$	=	Default value for the volatile solid excretion per day on a dry-matter basis for a defined livestock population (kg -dm/animal/day)
nd_y	=	Number of days treatment plant was operational in year y

(B) Annual average number of animals of type LT (N_{LT}) shall be determined in one of the following ways, presented in order of preference:

Option 1:

$$N_{LT} = N_{da,LT} \times \left(\frac{N_{p,LT}}{365} \right) \qquad \textbf{(6.a)}$$

Where:

N_{LT}	=	Annual average number of animals of type LT for the year y (number)
$N_{da,LT}$	=	Number of days animal of type LT is alive in the farm in the year y (number)
$N_{p,LT}$	=	Number of animals of type LT produced annually for the year y (number)

ii. *Baseline N_2O emissions ($BE_{N2O,y}$)*

$$BE_{N2O,y} = GWP_{N2O} \times CF_{N2O-N,N} \times \frac{1}{1000} \times (E_{N2O,D,y} + E_{N2O,ID,y}) \qquad \textbf{(7)}$$

Where:

$BE_{N2O,y}$	=	Annual baseline N_2O emissions in (tCO_2e/yr)
GWP_{N2O}	=	Global Warming Potential (GWP) for N_2O (tCO_2e/tN_2O)
$CF_{N2O-N,N}$	=	Conversion factor N_2O-N to N_2O (44/28)
$E_{N2O,D,y}$	=	Direct N_2O emission in year y (kg N_2O-N/year)
$E_{N2O,ID,y}$	=	Indirect N_2O emission in year y (kg N_2O-N/year)

$$E_{N2O,D,y} = \sum_{j,LT} EF_{N2O,D,j} \times NEX_{LT,y} \times N_{LT} \times MS\%_{Bl,j} \qquad \textbf{(8)}$$

Where:

$E_{N2O,D,y}$	=	Direct N_2O emission in year y (kg N_2O-N/yr)
$EF_{N2O,D,j}$	=	Direct N_2O emission factor for the treatment system j of the manure management system (kg N_2O-N/kg N)
$NEX_{LT,y}$	=	Annual average nitrogen excretion per head of a defined livestock population (kg N/animal/yr) estimated as described in appendix 2
$MS\%_{Bl,j}$	=	Fraction of manure handled in system j (fraction)
N_{LT}	=	Annual Average number of animals of type LT for the year y estimated as per equation (5.a) or (5.b) (number)

$$E_{N2O,ID,y} = \sum_{j,LT} EF_{N2O,ID} \times F_{gasMS,j,LT} \times NEX_{LT,y} \times N_{LT} \times MS\%_{Bl,j} \qquad \textbf{(9)}$$

Where:

$E_{N2O,ID,y}$	=	Indirect N_2O emission in year y (kg N_2O-N/year)
$EF_{N2O,ID}$	=	Indirect N_2O emission factor for N_2O emissions from atmospheric deposition of nitrogen on soils and water surfaces (kg N_2O-N/kg NH3-N and NO_X-N)
$NEX_{LT,y}$	=	Annual average nitrogen excretion per head of a defined livestock population (kg N/animal/year) estimated as described in appendix 2
$MS\%_{Bl,j}$	=	Fraction of manure handled in system j (fraction)
$F_{gasMS,j,LT}$	=	Default values for nitrogen loss due to volatilisation of NH_3 and NO_X from manure management (fraction)
N_{LT}	=	Annual average number of animals of type LT for the year y estimated as per equation (5.a) or (5.b) (number)

For subsequent treatment stages, the reduction of the nitrogen during a treatment stage is estimated based on referenced data for different treatment types. Emissions from the next treatment stage are then calculated following the approach outlined above, but with nitrogen adjusted for the reduction from the previous treatment stages by multiplying by (1 - R_N), where R_N is the relative reduction of nitrogen from the previous stage. The relative reduction (R_N) of nitrogen depends on the treatment technology and should be estimated in a ***conservative manner***. Default values for different treatment technologies can be found in appendix 1 (values for TN).

iii. *Baseline CO_2 emission from electricity and/or heat used in the baseline*

$$BE_{elec/heat,y} = BE_{EC,y} + BE_{HG,y} \tag{10}$$

Where:

$BE_{elec/heat,y}$	=	Baseline CO_2 emissions from electricity and/or heat used in the baseline (tCO_2/yr)
$BE_{EC,y}$	=	Baseline emissions associated with electricity generation in year y (tCO_2/yr)
$BE_{HG,y}$	=	Baseline emissions associated with heat generation in year y (tCO_2/yr)

B. ***Baseline emissions associated with electricity generation ($BE_{EC,y}$)***

There are no baseline emissions associated with electricity generation

C. ***Baseline emissions associated with heat generation (BEHG,y)***

There are no baseline emissions associated with heat generation

<u>Project Emissions:</u>

The project emissions in year *y* are calculated for each alternative waste treatment option implemented in the project activity as follows:

$$PE_y = PE_{AD,y} + PE_{Aer,y} + PE_{Comp,y} + PE_{N2O,y} + PE_{EC/FC,y} + PE_{Tran,y} + PE_{Storage,y} \tag{12}$$

Where:

PE_y	=	Project emissions in year y
$PE_{AD,y}$	=	Project emissions associated with the anaerobic digester/ co-digestion in year y (tCO_2e/yr)
$PE_{Aer,y}$	=	Project CH_4 emissions from aerobic AWMS treatment (tCO_2e/yr)
$PE_{Comp,y}$	=	Project CH_4emissions from composting/ co-composting (tCO_2e/yr)
$PE_{N2O,y}$	=	Project N_2O emissions in year y (t CO_2/yr)
$PE_{EC/FC,y}$	=	Project emissions from electricity consumption and fossil fuel combustion (tCO_2e/yr)
$PE_{Tran,y}$	=	Project emissions from manure transportation in the year y (tCO_2/yr)
$PE_{Storage,y}$	=	Project emissions from manure storage (tCO_2e,yr)

The parameters which are applicable for calculating the project emissions for the proposed project activity are summarized in the table below:

Table 10: Parameters applicable for calculating the Project Emissions

Symbols	Parameters	Applicable	Justifications
$PE_{COMP,y}$	Project emission from composting or co-composting in year y (tCo_2e)	Yes	Since, the project activity is involved in composting process, so during composting some amount of methane and N_2O emissions occur along with CO_2 emissions due to electricity and fossil fuel usage. So this parameter is applicable for calculating the project emission.
$PE_{AD,y}$	Project emission from anaerobic digestion and biogas combustion in year y (tCO_2e)	No	Project activity does not involve any process where anaerobic digestion occurs, so this parameter is not included.
$PE_{AER,y}$	Project CH_4 emissions from aerobic AWMS treatment (tCO_2e/yr)	No	Project activity does not involve any process where aerobic AWMS treatment occurs, so this parameter is not included.
$PE_{N2O,y}$	Project N_2O emissions in year *y* (t CO_2/yr)	Yes	The project activity involves process of RDF manufacturing. Therefore, emissions related to RDF processing are considered.
$PE_{EC/FC,y}$	Project emissions from electricity consumption and fossil fuel combustion (tCO_2e/yr)	No	The project activity does not involve any electricity consumption or fossil fuel combustion during the entire process; so this parameter is not included.
$PE_{Tran,y}$	Project emissions from manure transportation in the year *y* (tCO_2/yr)	Yes	Since the project activity involves the transportation of manure from the chicken farms to the project site, this parameter is applicable for calculating the project emissions.
$PE_{Storage,y}$	Project emissions from manure storage (tCO_2e,yr)	No	The project activity does not involve any manure storage during the entire process; so this parameter is not included.

Based on the parameters applicable for the proposed project activity, the Project Emissions are calculated based on the following basis:

$PEy = PE_{COMP,y} + PE_{N2O,y} + PE_{Tran,y}$…………………………………………………………………….**(11)**

Project emissions associated with the composting in the year y ($PE_{Comp,y}$)

The project CH_4 emission from composting shall be estimated as follows.

a. The project CH_4 emission from MSW and or digestate treatment through composting are calculated as per the latest version of "Project and leakage emissions from composting".

b. The project CH_4 emission from composting are equivalent to the methane conversion factor as suggested in IPCC guidelines for various type of composting technology. The relevant MCF value shall be are sourced form table 10.17 provided in Appendix 1 of the revised approved consolidated methodology ACM0010, Version 7.0.0. The eq 13. is applied to estimate project emissions by replacing the 0.1% factor with appropriate MCF value from Table 10.17. The relative reduction (R_{VS}) of volatile solids depends on the treatment technology and should be estimated in a conservative manner. The reduction of the volatile solid during the treatment stage is estimated based on referenced data/ literature for different treatment types and substrate used for composting. The parameter ($PE_{st,y}$) *Project CH_4 emissions from sludge disposed of in storage pit* *prior to disposal during the year* y *(tCO_2e/yr)* because the emissions due to anaerobic storage has been accounted under leakage sections.

Project N_2O emissions in year y ($PE_{N2O,y}$)

a. The project N_2O emission from MSW and or digestate treatment through composting shall be calculated as per the latest version of Project and leakage emissions from composting.

b. The Project N_2O emission from animal manure shall be estimated as follows;

$$PE_{N2O,y} = GWP_{N2O} \times CF_{N2O-N,N} \times \frac{1}{1000} \times (E_{N2O,D,y} + E_{N2O,ID,y}) \quad \textbf{(15)}$$

Where:

$PE_{N2O,y}$	=	Project N_2O emissions in year y (tCO_2/yr)
GWP_{N2O}	=	Global Warming Potential (GWP) for N_2O (tCO_2e/tN_2O)
$CF_{N2O-N,N}$	=	Conversion factor N_2O-N to N_2O (44/28)
$E_{N2O,D,y}$	=	Direct N_2O emission in year y (kg N_2O-N/year)
$E_{N2O,ID,y}$	=	Indirect N_2O emission in year y (kg N_2O-N/year)

Option 1:

$$E_{N2O,D,y} = \sum_{j,LT} EF_{N2O,D,j} \times NEX_{LT,y} \times N_{LT} \times MS\%_j \quad \textbf{(16)}$$

Where:

$E_{N2O,D,y}$	=	Direct N_2O emission in year y (kg N_2O-N/yr)
$EF_{N2O,D,j}$	=	Direct N_2O emission factor for the treatment system j of the manure management system (kg N_2O-N/kg N)
$NEX_{LT,y}$	=	Annual average nitrogen excretion per head of a defined livestock population (kg N/animal/yr) estimated as described in appendix 2
$MS\%_j$	=	Fraction of manure handled in system j in the project activity (fraction)
N_{LT}	=	Annual average number of animals of type LT for the year y estimated as per equation (5.a) or (5.b) (number)

$$E_{N2O,ID,y} = \sum_{j,LT} EF_{N2O,ID} \times F_{gasMS,j,LT} \times NEX_{LT,y} \times N_{LT} \times MS\%_j \quad \textbf{(17)}$$

Where:

$E_{N2O,ID,y}$	=	Indirect N_2O emission in year y (kg N_2O-N/year)
$EF_{N2O,ID}$	=	Indirect N_2O emission factor for N_2O emissions from atmospheric deposition of nitrogen on soils and water surfaces(kg N_2O-N/kg NH_3-N and NO_X-N)
$NEX_{LT,y}$	=	Annual average nitrogen excretion per head of a defined livestock population (kg N/animal/yr) estimated as described in appendix 2
$MS\%_j$	=	Fraction of manure handled in system j in the project activity (fraction)
$F_{gasMS,j,LT}$	=	Default values for nitrogen loss due to volatilisation of NH_3 and NO_X from manure management (fraction)
N_{LT}	=	Annual average number of animals of type LT for the year y estimated as per equation (5.a) or (5.b) (number)

Project emissions from manure transportation (PE_{Tran})

The project emissions from manure transportation from collection points to the central treatment plant shall be calculated according to the Methodological tool “Project and leakage emissions from transportation of freight”.

Determination of the Quantity of waste composted (Qy)

As per the methodological tool “Project and Leakage Emissions from Composting” Version 01.0.0, Annex 09, EB 65, the quantity of waste composted can be determined using a weighing device or without using a weighing device. Project participant wishes to determine the quantity using a weighing device. The details of monitoring of the weighing device have been provided in section B.7.1.

Leakage emissions are determined as follows:

Leakage covers the emissions from land application of treated manure as well as the emissions related
to anaerobic digestion in a digester, occurring outside the project boundary. These emissions are estimated as net of those released under project activity and those released in the baseline scenario. Net
leakage are only considered if they are positive.

$$LE_y = (LE_{PJ,N2O,y} - LE_{BL,N2O,y}) + (LE_{PJ,CH4,y} - LE_{BL,CH4,y}) + LE_{Comp,y} + LE_{AD,y} + LE_{Trans,y} \qquad \textbf{(22)}$$

Where:

$LE_{PJ,N2O,y}$	=	Leakage N_2O emissions released during project activity from land application of the treated manure in year y (tCO_2e/yr)
$LE_{BL,N2O,y}$	=	Leakage N_2O emissions released during baseline scenario from land application of the treated manure in year y (tCO_2e/yr)
$LE_{PJ,CH4,y}$	=	Leakage CH_4 emissions released during project activity from land application of the treated manure in year y (tCO_2e/yr)
$LE_{BL,CH4,y}$	=	Leakage CH_4 emissions released during baseline scenario from land application of the treated manure in year y (tCO_2e/yr)
$LE_{comp,y}$	=	Leakage emissions associated with the storage and disposal of compost in year y (tCO_2e)
$LE_{AD,y}$	=	Leakage emissions associated with the anaerobic digester in year y (tCO_2e)
$LE_{Trans,y}$	=	Emissions from incremental distance travelled for waste/final compost/ residue transportation in tCO_2e/yr

The parameters which are applicable for the project activity for calculation of Leakage are provided in the table below:

Table 11: Parameters for calculating Leakage Emissions (LEy):

Symbols	Parameters	Applicable	Justification
$LE_{COMP,y}$	Leakage emissions from composting or co-composting in year y (tCO_2e)	No	Since the compost is not subjected to anaerobic storage or disposed of in a SWDS rather it will be sold to the market to earn revenue so leakage emission associated with composting shall be zero.
$LE_{AD,y}$	Leakage emissions from anaerobic digester in year (tCO_2e)	No	The project activity doesn’t involve an anaerobic digestion of chicken manure + wood shavings, hence

			leakage emissions from these sources is not applicable for the project activity.

Data and parameters not monitored

Data / Parameter	$R_{VS,n}$
Data unit	Data unit: Fraction
Description	Description: Fraction of volatile solid degraded in AWMS treatment method *n* of the *N* treatment steps prior to waste being treated
Source of data	N/A
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of Data	N/A
Comments	

Data / Parameter	$R_{VS,n}$
Data unit	Data unit: Fraction
Description	Description: Fraction of volatile solid degraded in AWMS treatment method *n* of the *N* treatment steps prior to waste being treated
Source of data	N/A
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of Data	N/A
Comments	

Data / Parameter	**MCF**
Data unit	Unitless

Description	Methane correction factor
Source of data	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value applied:	1.5% = dry lot, 4.0% = solid storage, 0.5% = spreading, 0.005 = composting
Justification of choice of data or description of measurement methods and procedures applied	The conservative value among all the values has been chosen for the calculations.
Purpose of Data	For calculating the Baseline emission
Comments	As per the methodology ACM0022, version1, "MCF accounts for the fact that unmanaged SWDS produce less methane from a given amount of waste than managed SWDS, because a larger fraction of waste decomposes aerobically in the top layers of unmanaged SWDS." The SWDS in case of project activity is a managed one with compacting levelling of waste. The data will archived for the entire crediting period and 2 years post crediting period.

Data / Parameter	**$GWPCH_4$**
Data unit	tCO_2e/tCH_4
Description	Global Warming Potential of CH4
Source of data	Fourth assessment period of IPCC 2007. http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html
Value applied:	25
Justification of choice of data or description of measurement methods and procedures applied	The value for second commitment period is considered for the project as per the Point No7 of the Guidelines, "STANDARD FOR APPLICATION OF THE GLOBAL WARMING POTENTIALS TO CLEAN DEVELOPMENT MECHANISM PROJECT ACTIVITIES AND PROGRAMMES OF ACTIVITIES FOR THE SECOND COMMITMENT PERIOD OF THE KYOTO PROTOCOL" EB 69, Annex 3[18]
Purpose of Data	For calculating the Baseline emission
Comments	The data will archived for the entire crediting period and 2 years post crediting period.

Data / Parameter	**$EFCH_4$,default**
Data unit	tCH4/t

[18] http://cdm.unfccc.int/Reference/Standards/meth/reg_stan02.pdf

Description	Default emission factor of methane per tonne of waste composted (wet basis).
Source of data	Based on the methodological tool "Project and leakage emission from composting ", Version 01.0.0 , Annex 09, EB 65
Value applied:	0.02
Justification of choice of data or description of measurement methods and procedures applied	The emission factor was selected based on studying published results of emission measurements from composting facilities, literature reviews on the subject and published emission factors. Data from recent, high quality source and analysed and a value conservatively selected from the higher end of the range in result.
Purpose of Data	For calculating the Project emission
Comments	Applicable to Option 2 in the step "Determination of methane and nitrous oxide emission from the composting process".

Data / Parameter	**EFN_2O,default**
Data unit	tN_20/t
Description	Default emission factor of methane per tonne of waste composted (wet basis)
Source of data	The emission factor was selected based on studying published results of emission measurements from composting facilities, literature reviews on the subject and published emission factors. Data from recent, high quality source and analyzed and a value conservatively selected from the higher end of the range in result.
Value applied:	0.01
Justification of choice of data or description of measurement methods and procedures applied	Justify the choice of data source, providing references where applicable. Where values are based on measurement, include a description of the measurement methods and procedures applied (e.g., what standards or protocols have been followed), indicate the responsible person/entity that undertook the measurement, the date of the measurement and the measurement results. More detailed information may be provided in an appendix.
Purpose of Data	For calculating the Project emission
Comments	Applicable to Option 2 in the step "Determination of methane and nitrous oxide emission from the composting process".

Data / Parameter	**$GWPN_2O$**
Data unit	tCO_2e/tN_2O
Description	Global Warming Potential of N_2O
Source of data	Forth assessment period of IPCC 2007 for second commitment period of Kyoto protocol. http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html
Value applied:	298

Justification of choice of data or description of measurement methods and procedures applied	The value for second commitment period is considered for the project as per the Point No 7 of the Guidelines "STANDARD FOR APPLICATION OF THE GLOBAL WARMING POTENTIALS TO CLEAN DEVELOPMENT MECHANISM PROJECT ACTIVITIES AND PROGRAMMES OF ACTIVITIES FOR THE SECOND COMMITMENT PERIOD OF THE KYOTO PROTOCOL" EB 69, Annex 3[19]
Purpose of Data	For calculating the Project emission
Comments	The data will archived for the entire crediting period and 2 years post crediting period.

Data / Parameter	$EF_{N2O, D,j}$
Data unit	kg N_2O-N/kg N
Description	Direct N_2O emission factor for the treatment system *j* of the manure management system
Source of data	Estimated with site-specific, regional or national data if such data is available, otherwise use default EF_3 from table 10.21, chapter 10, volume 4, in the IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value applied:	.04 = dry lot, .001 = solid storage, 0.02 = spreading, 0.01 = composting
Justification of choice of data or description of measurement methods and procedures applied	*Based on common management system practices in the state of Alabama.*
Purpose of Data	For calculating the Project emission
Comments	The data will be archived for the entire crediting period and 2 years post crediting period.

Data / Parameter	$EF_{N2O,ID}$
Data unit	kg N_2O-N/kg NH3-N and NO_X-N
Description	Indirect N_2O emission factor for N_2O emissions from atmospheric deposition of nitrogen on soils and water surfaces
Source of data	Estimated with site-specific, regional or national data if such data is available. Otherwise, default values for EF_4 from table 11.3, chapter 11, volume 4 of IPCC 2006 Guidelines for National Greenhouse Gas Inventories can be used
Value applied:	0.01
Justification of choice of data or description of measurement methods and procedures applied	*Based on IPPC values*
Purpose of Data	For calculating the Project emission

[19]http://cdm.unfccc.int/Reference/Standards/meth/reg_stan02.pdf

Comments	The data will be archived for the entire crediting period and 2 years post crediting period.

Data / Parameter	$F_{gasMS,j,LT}$
Data unit	Fraction
Description	Default values for nitrogen loss due to volatilisation of NH_3 and NO_X from manure management
Source of data	IPCC 2006 Guidelines. Volume 4, Chapter 10 - Table 10.22
Value applied:	0.4
Justification of choice of data or description of measurement methods and procedures applied	*Based on IPPC values*
Purpose of Data	For calculating the baseline emission
Comments	The data will be archived for the entire crediting period and 2 years post crediting period.

Data / Parameter	F_{gasm}
Data unit	Fraction
Description	Fraction of N lost due to volatilization
Source of data	Estimated with site-specific, regional or national data if such data is available. Otherwise, default values from table 11.3, chapter 11, volume 4 of IPCC 2006 guidelines can be used
Value applied:	0.05
Justification of choice of data or description of measurement methods and procedures applied	*Based on IPPC values*
Purpose of Data	For calculating the baseline emission
Comments	The data will be archived for the entire crediting period and 2 years post crediting period.

Data / Parameter	EF_1, EF_4, EF_5
Data unit	kg N_2O-N/kg N for EF_1, EF_5 and [kg N_2O-N/ (kg NH_3-N and NO_X-N) for EF_4
Description	Emission factor for N_2O emissions from N inputs; from N leaching and runoff; from atmospheric deposition of N on soils and water surfaces
Source of data	Estimated with site-specific, regional or national data if such data is available
Value applied:	0.01 = EF1, 0.01 = EF4, 0.0075 = EF5
Justification of choice of data or description of measurement methods and procedures applied	*Based on IPPC values*

Purpose of Data	Calculating baseline and project emissions
Comments	IPCC 2006 Guidelines default values may be used, if country specific or region specific data are not available. EF_1 from table 11.1, chapter 11, volume 4. EF_4 and EF_5 from table 11.3, chapter 11, volume 4

Data / Parameter	$MS\%_{Bl,j}$
Data unit	Fraction
Description	Fraction of manure handled in system *j* in the baseline
Source of data	Project proponents
Value applied:	100
Justification of choice of data or description of measurement methods and procedures applied	*All manure baseline scenearios and project scenario are the same.*
Purpose of Data	Calculating baseline and project emissions
Comments	IPCC 2006 Guidelines default values may be used, if country specific or region specific data are not available. EF_1 from table 11.1, chapter 11, volume 4. EF_4 and EF_5 from table 11.3, chapter 11, volume 4

Data / Parameter	D_{CH4}
Data unit	t/m_3
Description	Density of CH_4
Source of data	Technical literature
Value applied:	0.00067 t/m_3
Justification of choice of data or description of measurement methods and procedures applied	*Based on IPPC values*
Purpose of Data	Calculating baseline and project emissions
Comments	0.00067 t/m_3 at room temperature 20_oC and 1 atm pressure

Data / Parameter	MCF_d
Data unit	---
Description	Methane conversion factor for leakage calculation assumed to be equal 1
Source of data	IPCC values
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied	
Purpose of Data	
Comments	

Data / Parameter	MCF_j
Data unit	---
Description	Methane conversion factor for the baseline $AWMS_j$
Source of data	IPCC 2006 table 10.17, chapter 10, volume 4 (see appendix 3)
Value applied:	1.5% = dry lot, 4.0% = solid storage, 0.5% = spreading, 0.005 = composting
Justification of choice of data or description of measurement methods and procedures applied	The conservative value among all the values has been chosen for the calculations.
Purpose of Data	For baseline and project emission calculations
Comments	MCF values depend on the annual average temperature where the anaerobic manure treatment facility in the baseline existed. For average annual temperatures below 10 $_o$C and above 5 $_o$C, a linear interpolation should be used to estimate the MCF value at the specific temperature assuming an MCF value of 0 at an annual average of 5 $_o$C. Future revisions to the IPCC Guidelines for National Greenhouse Gas Inventories should be taken into account; A conservativeness factor should be applied by multiplying MCF values (estimated as per above bullet) with a value of 0.94, to account for the 20% uncertainty in the MCF values as reported by IPCC 2006

Data / Parameter	$W_{default}$
Data unit	Kg
Description	Default average animal weight of a defined population
Source of data	IPCC 2006 or US-EPA, whichever is lower
Value applied:	Broilers = 0.9 kg
Justification of choice of data or description of measurement methods and procedures applied	*Based on IPCC values*
Purpose of Data	For calculating the baseline emission
Comments	

Data / Parameter	$VS_{default}$
Data unit	kg –kg VS/ day/1000 kg animal mass
Description	Default value for the volatile solid excretion per day on a dry-matter basis for a defined livestock population
Source of data	IPCC 2006 or US-EPA, whichever is lower
Value applied:	Broilers = 15

Justification of choice of data or description of measurement methods and procedures applied	*Based on IPCC values*
Purpose of Data	For calculating the baseline emission
Comments	---

Data / Parameter	$NEX_{IPCCdefault}$
Data unit	kg N/animal/year
Description	Default value for the nitrogen excretion per head of a defined livestock population
Source of data	IPCC 2006 or US-EPA
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied	
Purpose of Data	For calculating the baseline emission
Comments	This parameter is used to estimate $NEX_{LT,y}$ in appendix 2

B.6.2. Ex ante calculation of emission reductions

>>

Calculation of baseline emissions:

The amount of methane that is generated each year ($BECH_4$, SWDS,y tCO_2e) is calculated for each year with the recommended multi-phase model, the First Order Decay (FOD) model.

As per equation

$$BE_y = BE_{manureCH4,\ y} + BE_{manureN2O,\ y} + BE_{Transport,y} + BE_{syn,y}$$

Where,

$BE_{manure\ y}$, Where applicable, baseline emissions from the manure co-digested by the project activities, calculated as per the relevant procedures provided below.

Baseline CH_4 Emission Calculations for Manure Treatment

$$BE_{CH4,y} = GWP_{CH4} \times D_{CH4} \times \sum_{j,LT} \left(MCF_j \times B_{0,LT} \times N_{LT} \times VS_{LT,y} \times MS\%_{Bl,j} \right) \quad (3)$$

Where:

$BE_{CH4,y}$	=	Baseline CH_4 emissions (tCO_2/yr)
GWP_{CH4}	=	Global Warming Potential (GWP) of CH_4 (tCO_2e/tCH_4)
D_{CH4}	=	Density of CH_4 (t/m^3)
MCF_j	=	Annual methane conversion factor (MCF) for the baseline $AWMS_j$
$B_{0,LT}$	=	Maximum methane producing potential of the volatile solid generated by animal type LT (m^3CH_4/kg -dm)
N_{LT}	=	Annual average number of animals of type LT for the year *y* (number)
$VS_{LT,y}$	=	Annual volatile solid excretions for livestock LT entering all AWMS on a dry matter weight basis (kg -dm/animal/yr)
$MS\%_{Bl,j}$	=	Fraction of manure handled in system *j* in the baseline
LT	=	Type of livestock
j	=	Type of treatment system

Baseline N_2O Emission Calculations for Manure Treatment

$$BE_{N2O,y} = GWP_{N2O} \times CF_{N2O-N,N} \times \frac{1}{1000} \times \left(E_{N2O,D,y} + E_{N2O,ID,y} \right) \quad (7)$$

Where:

$BE_{N2O,y}$	=	Annual baseline N_2O emissions in (tCO_2e/yr)
GWP_{N2O}	=	Global Warming Potential (GWP) for N_2O (tCO_2e/tN_2O)
$CF_{N2O-N,N}$	=	Conversion factor N_2O-N to N_2O (44/28)
$E_{N2O,D,y}$	=	Direct N_2O emission in year *y* (kg N_2O-N/year)
$E_{N2O,ID,y}$	=	Indirect N_2O emission in year *y* (kg N_2O-N/year)

Baseline emissions from manure transportation (BE_{Tran})

The project emissions from manure transportation from collection points to the central treatment plant
shall be calculated according to the Methodological tool “Project and leakage emissions from transportation of freight”.

$$BE_{Tran} = \sum_{f} D_{f,m} \times FR_{f,m} \times EF_{CO2,f} \times 10^{-6}$$

Table 12: below depicts the baseline emission calculations:

Parameters	Unit	Value	References
Compost Production	Tonnes/day	85.17	Based on raw material purchase invoices of chicken manure and wood chips per month

Annual Operating Days	Days	365	As per General working days practice of United States
Total amount of solid waste disposed or prevented from disposal at SWDS (Wj,x)	TPA	3,886	Based on raw material purchase invoices of wood waste per month
Total amount of organic waste to be treated	TPA	34,975	Based on raw material purchase invoices of chicken manure per month
Total percentage of organic waste treated for composting	Percent	100	90% Chicken manure + 10% Wood Shavings
Total amount of waste to be treated for composting	TPA	38,861	Based on raw material purchase invoices of chicken manure and wood chips per month
Conversion rate	Percent	80	DPR
Total amount of compost generated	TPA	31,089	Calculated based on the conversion factor of degradable organic waste & the total amount of waste to be composted
Average Baseline Emission per year	tCO_2e	186,230	Calculated

Table 13: Baseline emissions calculated with FOD model:

Description		**Total**
Avoided waste deposition, processed for composting	**TPA**	**38,861**
Emissions from (A): Broilers CH4	**tCO_2e**	**8,564**
Emissions from (B): Broilers N2O	**tCO_2e**	**185,998**
Transportation of manure to fields (D)	**tCO_2e**	**667**
Total baseline methane emissions (MBy)	**tCO_2e**	**194,563**
Total Baseline Emissions in ten years	**tCO2e**	**1,945,628**

<u>Project Emissions:</u>

For the project activity, project emissions are as follows:

$$PE_y = PE_{AD,y} + PE_{Aer,y} + PE_{Comp,y} + PE_{N2O,y} + PE_{EC/FC,y} + PE_{Tran,y} + PE_{Storage,y} \quad \textbf{(12)}$$

Where:

PE_y	=	Project emissions in year y
$PE_{AD,y}$	=	Project emissions associated with the anaerobic digester/ co-digestion in year y (tCO_2e/yr)
$PE_{Aer,y}$	=	Project CH_4 emissions from aerobic AWMS treatment (tCO_2e/yr)
$PE_{Comp,y}$	=	Project CH_4emissions from composting/ co-composting (tCO_2e/yr)
$PE_{N2O,y}$	=	Project N_2O emissions in year y (t CO_2/yr)
$PE_{EC/FC,y}$	=	Project emissions from electricity consumption and fossil fuel combustion (tCO_2e/yr)
$PE_{Tran,y}$	=	Project emissions from manure transportation in the year y (tCO_2/yr)
$PE_{Storage,y}$	=	Project emissions from manure storage (tCO_2e,yr)

Project emissions associated with the anaerobic digester in year y ($PE_{AD,y}$)

The project activity does not involve an anaerobic digester.

Project CH_4 emissions from aerobic AWMS treatment ($PE_{Aer,y}$)

The project activity does not involve aerobic AWMS treatment.

Project emissions associated with the composting in the year y ($PE_{Comp,y}$)

$$PE_{Aer,y} = GWP_{CH4} \times D_{CH4} \times 0.001 \times F_{Aer} \times \left[\prod_{n=1}^{N}\left(1 - R_{VS,n}\right)\right] \times \sum_{j,LT}(B_{0,LT} \times N_{LT} \times VS_{LT,y} \times MS\%_j) + PE_{Sl,y} \quad \textbf{(13)}$$

Where:

GWP_{CH4}	=	Global Warming Potential (GWP) of CH_4 (tCO_2e/tCH_4)
$R_{VS,n}$	=	Fraction of volatile solid degraded in AWMS treatment method n of the N treatment steps prior to waste being treated (fraction)
D_{CH4}	=	Density of CH_4 (t/m^3).
F_{Aer}	=	Fraction of volatile solid directed to aerobic system (fraction)
LT	=	Type of livestock
$B_{0,LT}$	=	Maximum methane producing potential of the volatile solid generated by animal type LT (m^3CH_4/kg dm)
$VS_{LT,y}$	=	Annual volatile solid excretion livestock type LT entering all AWMS on a dry matter weight basis in (kg -dm/animal/yr)
N_{LT}	=	Annual average number of animals of type LT for the year y (number) as estimated in equation (5.a) or (5.b).
$PE_{Sl,y}$	=	Project CH_4 emissions from sludge disposed of in storage pit prior to disposal during the year y (tCO_2e/yr)
$MS\%_j$	=	Fraction of manure handled in system j in the project activity (fraction)

Project N_2O emissions in year y ($PE_{N2O,y}$)

$$PE_{N2O,y} = GWP_{N2O} \times CF_{N2O-N,N} \times \frac{1}{1000} \times (E_{N2O,D,y} + E_{N2O,ID,y}) \quad (15)$$

Where:

$PE_{N2O,y}$	=	Project N_2O emissions in year y (tCO_2/yr)
GWP_{N2O}	=	Global Warming Potential (GWP) for N_2O (tCO_2e/tN_2O)
$CF_{N2O-N,N}$	=	Conversion factor N_2O-N to N_2O (44/28)
$E_{N2O,D,y}$	=	Direct N_2O emission in year y (kg N_2O-N/year)
$E_{N2O,ID,y}$	=	Indirect N_2O emission in year y (kg N_2O-N/year)

Project emissions from use of heat and/or electricity (PE_{elec/heat})

The project activity doesn't consume electricity for composting activity hence ***PE_{elec}*** *is zero.*

The project activity consists of fossil fuel consumption for preparation of compost. The diesel and gasoline are consumed in the project. Hence, the fossil fuel consumption for the entire project site is measured together using fossil fuel purchase invoices.

Project emissions from manure transportation (PE_{Tran})

The project emissions from manure transportation from collection points to the central treatment plant
shall be calculated according to the Methodological tool "Project and leakage emissions from transportation of freight".

$$PE_{Tran} = \sum_f D_{f,m} \times FR_{f,m} \times EF_{CO2,f} \times 10^{-6}$$

Project emissions from manure storage ($PE_{Storage,y}$)

$$PE_{storage,y} = GWP_{CH_4} * D_{CH_4,n} * \sum_{LT,l}\left[\frac{365}{AI_l}\sum_{d=1}^{AI}(N_{LT} * VS_{LT,d} * MS\%_l * (1-e^{-k\ (AI_l-d)}) * MCF_l * B_{0_{LT}})\right] \quad (21)$$

Where:

$PE_{storage,y}$	=	Annual project emission in manure storage tanks in tCO_{2e}/yr
GWP_{CH4}	=	Global warming potential of methane
$D_{CH4,n}$	=	Density of methane (6.7×10^{-4} t/m^3 at room temperature (20°C and 1 atm pressure)
AI_l	=	Annual average interval between manure collection procedures at a given storage tank l (days)
N_{LT}	=	Number of animals of type LT during a year y, expressed in numbers
$VS_{LT,d}$	=	Amount of volatile solid production by type of animal LT in a day (kg VS/head/d)
$MS\%_l$	=	Fraction of volatile solids (%) handled by storage tank *l*
k	=	Degradation rate constant (0.069)
d	=	Days for which cumulative methane emissions are calculated; d can vary from 1 to 45 and to be run from 1 up to AI (average interval between manure collection procedure)
MCF_l	=	Annual methane conversion factor for the project manure storage tank *l* from Table 10.17, Chapter 10, Volume 4
$B_{o,LT}$	=	Maximum methane yield from manure for livestock type LT, in m^3CH_4/kgVS from IPCC 2006, Table 10A-4 to 10A-9, Chapter 10, Volume 4

Project emissions from fossil fuel use ($PE_{FC,t,y}$):

From equation no. 19 and 20

$$PE_{y\ FC\ PJ} = \sum_i FC_{i,j,y} \times COEF_{i,y}$$

$$COEF_{i,y} = NCV_{i,y} \times EF_{CO_2,i,y}$$

Table 15: Project emissions from fossil fuel (Diesel) consumption associated with composting ($PE_{FC,y}$)

Parameter	Description	Unit	Value applied	Source
$PE_{CO2,\ diesel,\ onsite,\ y}$	**Emissions from on-site fuel consumption per year**	**tCO_2e**	**131**	**Calculated**

Table 14: Summary of Project emissions (PE_y)

Description		Total
Emissions from (A): Fuel	**tCO_2e**	131
Emissions from (B): Broilers CH4	**tCO2e**	181
Emissions from (C): Broilers N2O	**tCO2e**	7,353
Transportation of manure (D)	**tCO2e**	667
Baseline emissions (BEy)	**tCO2e**	8,332
Total Project Emissions in ten years	**tCO2e**	**83,317**

Leakage emission:

As there is no production of RDF in the project activity hence ex-ante estimation of leakage emission is considered as zero for 10 years.

Hence, $LE_{ENDUSE,RDF\_SB,y} = 0$

B.6.3. Summary of ex ante estimates of emission reductions

Baseline emission calculations for elimination of synthetic fertilizer:

BEsyn = 0.53 tCO2e / acre

The project activity compost is applied at a rate of 5.99 tCo2e / acre.

Additional amount saved for not using synthetic fertilizer is 8% per tCO2e for the project acitivity compost.

Year	Baseline emissions (t CO_2e)	Project emissions (t CO_2e)	Leakage (t CO_2e)	Emission reductions (t CO_2e)	Total Emission Reductions with Synthetic Fertilizer (t CO_2e)
2015	8,065	471	-	7,594	8,212
2016	195,258	8,361	-	186,897	202,116
2017	210,278	8,994	-	201,284	217,674
2018	225,298	9,627	-	215,671	233,232
2019	225,298	9,627	-	215,671	233,232
2020	225,298	9,627	-	215,671	233,232
2021	225,298	9,627	-	215,671	233,232
2022	210,278	8,994	-	201,284	217,674
2023	210,278	8,994	-	201,284	217,674
2024	210,278	8,994	-	201,284	217,674
Total	**1,945,627**	**83,317**	**-**	**1,862,310**	**2,013,952**
Total number of crediting years	10				
Annual average over the crediting period	**201,395**				

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

Data / Parameter	Wx or Wi
Unit	Tonne
Description	Total amount of waste disposed or prevented from disposal in a SWDS in year x or month i
Source of data	Measurement is done by project participants and record will be maintained in log books
Value(s) Applied	Max of 60000 Tonnes/Year
Measurement methods and procedures	Measurement is done on wet basis for every incoming waste carrying vehicle by an electronic weigh-bridge and recorded electronically and manually
Monitoring frequency	Continuously, aggregated at least annually for year x or monthly for month i
QA/QC procedures	Calibration frequency: In accordance with stipulation of the weighing device supplier. Accuracy Class: As per manufacturer's specification
Purpose of data	For calculating the baseline emission
Additional Comment	All data will be archived for two years post the end of the crediting period

Data / Parameter	**Qy**
Data unit	Tonne/yr
Description	Quantity of waste composted in composting in year y (wet basis).
Source of data	Plant records
Value(s) applied:	Max of 60,000 tons of raw material * 0.8 (conversion rate)
Measurement methods and procedures	Measurement is done by an electronic weigh-bridge and recorded electronically and manually
Monitoring Frequency	Continuously, aggregated at least annually for year x or monthly for month i
QA/QC procedures	Calibration frequency: As per manufacturer's specification Accuracy Class: As per manufacturer's specification
Purpose of data	For calculating the project emission
Additional Comment	Applicable to Option 1 in the step "Determination of the quantity of waste composted". The parameter corresponds to the quantity of solid waste delivered to the composting installation,

	weighed on a wet basis. All data will be archived for two years post the end of the crediting period.

Data / Parameter	T
Unit	°C
Description	Annual Average ambient temperature at project site
Source of data	Project proponents
Value(s) applied:	18
Measurement methods and procedures	Monitor temperature for site location on a monthly basis using NOAA.org
Monitoring frequency	Monthly
QA/QC Procedures	---
Purpose of Data	Calculation of baseline and project emissions
Additional Comment	Used to select the annual MCF from IPCC 2006 guidelines

Data / Parameter	F_{Aer}
Unit	Fraction
Description	Fraction of volatile solids directed to aerobic treatment
Source of data	Only project activity is passive windrow
Value(s) applied:	100%
Measurement methods and procedures	On-site verification
Monitoring frequency	Annually
QA/QC Procedures	N/A
Purpose of Data	Calculation of project emissions
Additional Comment	N/A

Data / Parameter	**MS%j**
Unit	Fraction
Description	Fraction of manure handled in system j in the project activity
Source of data	Project proponents
Value(s) applied:	100%
Measurement methods and procedures	N/A
Monitoring frequency	Annually
QA/QC Procedures	N/A
Purpose of Data	N/A

Additional Comment	N/A

Data / Parameter	**$NEX_{LT,y}$**
Unit	kg N/animal/year
Description	Annual average nitrogen excretion per head of a defined livestock population estimated as described in appendix 2
Source of data	Refer to appendix 2; Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories
Value(s) applied:	0.6
Measurement methods and procedures	N/A
Monitoring frequency	Annually
QA/QC Procedures	N/A
Purpose of Data	Calculation of baseline emissions
Additional Comment	When using equation 2 in appendix 2, please refer to above guidance for estimating W_{site}

Data / Parameter	nd_y
Unit	Number
Description	Number of days treatment plant was operational in year *y*
Source of data	Project proponents
Value(s) applied:	365
Measurement methods and procedures	Days per annum
Monitoring frequency	Daily
QA/QC Procedures	N/A
Purpose of Data	Calculation of baseline and project emissions
Additional Comment	N/A

Data / Parameter	**$FC_{i,j,y}$**
Unit	Mass or volume units of fuel
Description	Fuel consumption on-site during year y of the crediting period
Source of data	Onsite measurements
Value(s) applied:	36,000 litres of diesel 0 litres of gasoline
Measurement methods and procedures	Ruler gauge shall be used to determine mass or volume of the fuel consumed, with the following conditions: The ruler gauge must be part of the daily tank and calibrated at least once a year and have a book of control for recording the

	measurements. Data is cross-checked based on invoices and archived electronically and manually.
Monitoring frequency	Continuously
QA/QC Procedures	The ruler gauge shall be calibrated atleast once a year and the data shall be cross-checked with the purchased invoices. Accuracy Class: As per manufacturer's specification
Purpose of Data	Calculation of project emissions
Additional Comment	This parameter includes diesel + gasoline used waste treatment process in preparation of compost. All data will be archived for two years post the end of the crediting period.

<table>
<tr><td>Data / Parameter</td><td>pn,i,y or pn,j,i</td></tr>
<tr><td>Unit</td><td>Weight Fraction</td></tr>
<tr><td>Description</td><td>Weight fraction of the waste type j in the sample n collected during the year y or month i</td></tr>
<tr><td>Source of data</td><td>Sample measurements by project participants</td></tr>
<tr><td>Value(s) applied:</td><td><table>
<tr><td>Different components of organic part of the Waste</td><td>% composition by wt</td></tr>
<tr><td>Wood shavings</td><td>10%</td></tr>
<tr><td>chicken manure</td><td>90%</td></tr>
<tr><td>Total</td><td>100%</td></tr>
</table></td></tr>
<tr><td>Measurement methods and procedures</td><td>Sample the waste composition, using the waste categories j, as provided in the table for DOCj and kj, and each waste fraction shall be weighed. A minimum of three samples shall be undertaken every three months with the mean value valid for year y. The size and frequency of sampling should be statistically significant with a maximum uncertainty range of 10% at a 95% confidence level.</td></tr>
<tr><td>Monitoring Frequency</td><td>A minimum of three samples shall be undertaken every three months with the mean value valid for year y</td></tr>
<tr><td>QA/QC procedures</td><td>The size and frequency of sampling should be statistically significant with a maximum uncertainty range of 10% at a 95% confidence level.</td></tr>
<tr><td>Purpose of Data</td><td>Calculation of baseline emissions</td></tr>
<tr><td>Comments</td><td>All data will be archived for two years post the end of the crediting period</td></tr>
</table>

Data / Parameter	**$RATE_{Compliance,y}$**

Unit	Fraction
Description	Rate of Compliance with a regulatory requirement to implement the alternative waste treatment t implemented in the project activity.
Source of data	Ex post based on the information (annual report) to be provided by the local environment management authority + email communication if any from ADEM
Value(s) applied:	0%
Measurement methods and procedures	Fraction is calculated as the number of instances of compliance divided by the number of instances of compliance plus non-compliance. The compliance rate is based on the annual reports of Alabama Environment Management Authority.
Monitoring Frequency	Annual
QA/QC procedures	NA
Purpose of Data	For calculation of Baseline Emissions
Comments	Provide any additional comments

Data / Parameter	**NCVi,y**
Unit	TJ/Gg
Description	Net calorific value of diesel consumed for compost processing unit.
Source of data	Table 1.2 of IPCC 2006 of Guidelines of national Greenhouse gas Inventories.
Value(s) applied:	43
Measurement methods and procedures	Default value as per IPCC 2006. Link is given below: http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf
Monitoring Frequency	Any future revision of the IPCC Guidelines shall be taken into account
QA/QC Procedures	Measurement will be taken in line with national/international standards
Purpose of Data	For calculation of Project Emissions
Additional Comment	The data will archived for the entire crediting period and 2 years post crediting period

Data / Parameter	**EF**co_2,i,y
Unit	$kgCO_2$/TJ
Description	CO_2 emission factor for diesel consumed at the MSW processing unit
Source of data	Table 1.4 of IPCC 2006 of guidelines of Greenhouse gas inventories
Value(s) applied:	74800
Measurement methods and procedures	Default value as per IPCC 2006. http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf
Monitoring Frequency	Any future revision of the IPCC Guidelines shall be taken into account
QA/QC Procedures	Measurement will be taken in line with national/international standards
Purpose of Data	For calculation of Project Emissions
Additional Comment	The data will archived for the entire crediting period and 2 years post crediting period

B.7.2. Sampling plan

As per the Revised approved consolidated baseline and monitoring methodology *ACM0010 – "*Revised Consolidated baseline methodology for GHG emission reductions from manure management systems and municipal solid waste*", Version 7.0.0*, the sampling should be undertaken during verification period in line with exact requirements mentioned in EB 65 Annex 2 "Standard For Sampling And Surveys For CDM Project Activities And Programme of Activities".

B.7.3. Other elements of monitoring plan

The monitoring plan defines the standards and rules according to which the emission reductions of the project activity are monitored and verified in conformance with all relevant equipment of the project. GECO is the co-ordinating and managing entity, which supervises the monitoring plan.

To ensure compliance to relevant local and federal laws and all other site requirements, GECO has established a monthly compliance checklist to be completed by the Site Manager. Any non-compliances identified will be evaluated and put through a corrective action process, if deemed necessary.

Use of the monitoring plan by the operators:

The Monitoring Plan identifies key performance indicators of the project and sets out the procedures for metering, monitoring, calculating and verifying the emission reductions generated by the GECO compost plant, annually. Adherence to the instructions in the monitoring plan will be issued to the operator to measure and track the impact of the project on the environment. The operator will prepare all data required for the periodic audit and verification process that must be undertaken to confirm the achievement of the corresponding Verified Emission Reductions. The monitoring plan is thus the basis for the production of verified emission reductions and issuance of the verified emission reductions within the framework. If the monitoring plan is updated and adjusted to meet operational requirements, it will be done so with DOE approval. Any shifts in the baseline scenario may lead to such amendments, which may be mandated by the DOE. Amendments may also be necessary as a consequence of new circumstances that affect the ability to monitor emission reductions as described here or to accommodate new or modified GS rules. All the results of monitoring shall be preserved by the project proponent for two years beyond the end of crediting period or the last issuance of verified emission reductions for the project activity whichever occurs later.

Organizational, Operational and Monitoring Obligations:

Obligations of the Operator:

Monitoring the project's performance in terms of emission reduction achievement requires the fulfilment of operational data collection and processing obligations from the operator. The operator of the compost plant has the primary obligation to collect data that would facilitate the calculation of the project emission reduction. The data shall be collected by the operator based on the most recent available information as per the procedures presented in this PDD. In addition, roles and responsibilities of monitoring personnel would be well defined. Examples of roles and responsibilities for monitoring of data and parameters are provided with this monitoring plan; however these need to be updated on a regular basis. The documentation for the sales or delivery of the compost final product is also monitored.

It is believed that the monitoring plan approach presented here will result in an accurate, yet conservative calculation of emission reductions. However some uncertainties may lead to a deviation between monitored and verified emission reductions especially errors in the data monitoring and processing system. The operator is expected to prevent such errors and the verification audits are expected to uncover any possible errors. The operation of the composting facilities will be documented in a quality control program, monitoring the conditions and procedures that ensure the aerobic condition of the waste during the composting process.

GECO VER Project Team	Responsibilities
Senior Management of GECO (CEO)	• Reviewing the monthly and annual generation statistics. • Evaluating the GHG performance of the project activity. • Identify opportunities for further improvement.
Site Manager	• Implementation of appropriate corrective measures in case any discrepancies are identified in the reported parameters. • Review of monthly reports. • Ensuring calibration of the monitoring equipment's as and when required • Conduct monthly compliance inspections
Support Staff	• Monitoring and reporting the GHG performance related parameters following the guidance provided in the Project Design Document • Preparation of the monthly and annual generation statistics. • Reporting of any discrepancies identified in the reporting parameters • Ensuring calibration of the monitoring equipment's as and when required.

B.7.4. Date of completion of application of methodology and standardized baseline and contact information of responsible persons/ entities

>>
03/05/2015
Mr. Peter Ubaldi
GEC Organics
96 Park Street, Montclair New Jersey 07042
Montclair New Jersey
New York (United States of America)
Post Code: 07042

SECTION C. Duration and crediting period

C.1. Duration of project activity

C.1.1. Start date of project activity

21/09/2011

The GEC Organics purchased the Scarab International made Composting Machinery from M/s DT Equipment Sales Inc Florida. This was the first and earliest major expenditure from PP related to project composting machinery. This is in line with project start date definition mention in Glossary.

C.1.2. Expected operational lifetime of project activity

15 years and 00 months

C.2. Crediting period of project activity

C.2.1. Type of crediting period

Fixed

C.2.2. Start date of crediting period

04 January 2015

C.2.3. Length of crediting period

10 years and 00 months

SECTION D. Environmental impacts

D.1. Analysis of environmental impacts

The compost production facility in Alabama is not mandatory and does not require any Environment Impact Studies and its approval[20]. The only approval required for project site was a “Storm Water Permit”. The ADEM (Alabama Department of Environmental Management) approved the requirement. The Approval is valid till 31st May 2017.

D.2. Environmental impact assessment

The compost production facility in Alabama is not mandatory and does not require any Environment impact studies and its approval[21]. The only approval required for project site was a “Storm Water Permit”. The ADEM (Alabama Department of Environmental Management) approved the requirement. The Approval is valid till 31st May 2017.

SECTION E. Local stakeholder consultation

E.1. Solicitation of comments from local stakeholders

<u>Consultations with local stakeholders about GHG reduction potential and project plan in Aug 2011:</u>

In Aug of 2011, PP went to identify and select site area. During this trip, PP meet local stakeholders, prospective farmers nearby neighbours, etc. PP has appraised about the GEC Business mission and prospective venture in the composting project in Conecuh County. PP also briefed during discussions that apart from composting process, project also has potential in environment protection such as reduction in soil pollution, dependence of synthetic fertilizers and reduction of GHG emissions while manufacturing of compost. PP also mentionedthat this project is first of its kind initiative and there is significant risk. The GHG reduction potential provides opportunity for company to monetize the achieved GHG reductions and mitigate the investment risk. The project also requires significant testing and experimenting to confirm the quality, robustness in results and financial viability of the product in large scale as compared to synthetic fertilizers.

<u>Consultation and Site Visit for composting product testing Conducted in 28- March 2012:</u>

PP invited local stakeholders, NGOs to visit the site. The local people was appraised that the project is not a solid waste disposal site. PP distributed the compost product free cost to test at their agricultural land. The compost product was appreciated by local farmers and PP received positive feedback from local stakeholders. Moreover PP also invited four local leaders, Castleberry Mayor J.B. Jackson, County Commissioner Leonard Millender, State Representative Harry Shiver and the Executive Director of the Costal Gateway Regional Economic Development Alliance, James Searcy, to inspect and visit facility. The local govt. officials appraised the PP effort to implement the project in Castleberry and largest of its kind in Alabama. The Mayor appraised the project stating “This is a great opportunity for our community and the region as a whole. New jobs are being created for our citizens and the economy of the surrounding area has already experienced a positive impact.”

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[20] http://www.recycle.cc/compostregs.htm#Alabama

[21] http://www.recycle.cc/compostregs.htm#Alabama

Mr. Ubaldi greeted all present and thanked them for attending. He acknowledged the presence of State and County officials as well as the representatives of the Poarch Band of Creek Indians. He began his opening remarks with a description of the corporate structure of the Company as follows:

- Subsidiary of a publically traded Company; Global Ecology Corporation ("Global") which was formed in 1993 and is in the business of environmental remediation.
- GECO was formed in September of 2011 for the purpose of developing the site in Castleberry for the production of soil amendments.
- The final product is known as OSA1000™ and is made from a combination of chicken manure and green waste. GECO has its own all natural microbe formula.

J.B. Jackson, Mayor Town of Castleberry

Mayor Jackson discussed the merits of the GECO project and the benefit for the town and local community in general. Mayor Jackson is well known to the State and County officials that are in attendance and offered his personal greeting to them:

- As he has done in previous presentations, Mayor Jackson assured the attendees that this would create revenue for the town without any additional infrastructure needed as support.
- The Mayor pointed out the hiring of local citizens for the GECO operation and the potential tax revenue related to the sale of the products. He also stated that there will be substantial benefits for the County and State through this additional revenue.
- Further support for the Project was voiced by Mayor Jackson indicating that additional traffic from the location would be minimal.
- He pointed out the amount of capital to be invested by GECO and discussed the opportunity available for local financial institutions to add additional funding for the operation.

Thea B. Kelly, Director of Corporate Development, GEC Organics Corp.

Ms. Kelly indicated she was a lifelong resident of Alabama from Daphne, a town south of Castleberry near the Gulf. She discussed her experience with the GECO parent Company Global Ecology and its work in water purification and environmental causes worldwide.

- She spoke about the health benefits for individuals as the agricultural community embraces the organic movement.
- Ms. Kelly quoted well-known individuals and organizations dedicated to sustainability in agricultural and the elimination of GMOs in our food supply.
- She explained the science of feeding the soil and not the plant for the long term health of the US farmland.

James Jackson, Chief Operating Officer, GEC Organics Corp.

Mr. Jackson introduced himself and explained how he joined the Company in January of 2012. He has been employed by the Town of Castleberry for monitoring many of their water issues and the oversight of general activities for the Town's maintenance:

- Mr. Jackson described the use of windrows to blend the raw material and create the compost by turning and injection of the GECO microbe formula.
- He offered more details about the GECO process and explained the gestation period for the final product and its conversion from raw material to an organic soil amendment.
- Mr. Jackson went into detail on the temperature monitoring and curing of the finished compost as well as the screening and bagging operation.

- He assured the attendees that there would be no odor from the accumulation of chicken waste and that there would be no appreciable noise generated from the machinery used in the production of OSA1000™.
- After this discussion, Mr. Jackson and the entire group took a tour of the facility and learned more about the operation.
- Mr. Jackson then climbed on the Scarab which is the GECO windrow turner and the major piece of equipment used in the operation. He ran the Scarab over one of the windrows and demonstrated how the material is heated to 160°F and becomes compost.
- He then performed a quick demonstration of the GECO screening machine to show how the final product looks and is ready for sale.

Peter D. Ubaldi, President & CEO

Mr. Ubaldi addressed the group for the second time describing the opportunity for GECO to receive Carbon Credits for its work in creating the soil amendments at the Castleberry location:

- The reduction of Greenhouse Gas ("GHG") emissions is a natural occurrence from the GECO composting process.
- He went on to explain the need for further testing at the site to determine the volume of compost production which is attainable each month to generate Carbon Credits.
- Mr. Ubaldi discussed the various carbon registries and their requirements. He described the Gold Standard Foundation and the quality of the projects that are able to qualify for this registry.

Question and Answer Segment

The floor was opened to all the attendees so that they would be able to ask questions about the Company and any of the comments made by the speakers. The process was conducted informally and the answers were given by Peter Ubaldi, Thea Kelly and James Jackson from GECO. The State and County officials asked a number of questions related to the eventual expansion of the operation and the benefits for The State of Alabama. The Creek Indian representatives were interested in a possible investment opportunity and the use of the OSA1000™ in their Tribal farmland.

Closing Remarks

Peter Ubaldi delivered the closing remarks and summarized the basic presentation provided by the speakers. All of the attendees were encouraged to spread the word about the Project and were invited to visit the facility during business hours any day. A GECO employee handed out sample bags of the OSA1000™ to all those in attendance. Refreshments were offered and the meeting adjourned.

Gold Standard Local Stakeholder Consultations Conducted in May 2014:

Speaker: Peter D. Ubaldi, President & CEO
GEC Organics Corp. ("GECO")

Moderator: James Jackson
Observer: Scott Jones, Perry Johnson Registrars CES

Opening Remarks and Introduction:

Mr. Ubaldi greeted all present and thanked them for attending. He acknowledged the presence of Town officials as well as the representatives from government agencies that provide capital for Alabama businesses. Special thanks were expressed to the NGOs and Financial Consultants who travel from out of state to attend the meeting. Mr. Ubaldi began his opening remarks with a description of the corporate structure of the Company / Project Proponent ("PP") as follows:

- Subsidiary of a publically traded Company; Global Ecology Corporation ("Global") which was incorporated in 1993 and is in the business of environmental remediation.
- GECO was formed in September of 2011 for the purpose of developing the site in Castleberry for the production of soil amendments.
- The final product is known as OSA1000™ and is made from a combination of chicken manure and green waste. GECO has its own all natural microbe formula.
- GECO began researching the opportunity to reduce GHG emissions several years ago.

Design of Stakeholder Consultation Process:

The Agenda was prepared and explained by Peter Ubaldi. A general non-technical summary was discussed at the start of the meeting. The text of the individual invitations and the public announcement were made available for any Stakeholders in attendance for review. Mr. Ubaldi discussed the methods used for the selection and invitation for the stakeholders. This consisted of an explanation of having a combination of local individuals, local NGOs and out of state corporations.

Consultation Process:

A list of the participants was recorded and each attendee was given a sign-in form with a section for their comments. All comments were addressed and all questions from Stakeholders were answered to the satisfaction of each participant. The sustainable development assessment and changes to the design were discussed and all Stakeholder feedback was positive.

Sustainable Development Assessment:

Mr. Ubaldi referred the stakeholders to the documents passed out at beginning of the meeting. The Sustainability Development Matrix was discussed and the attendees were given instructions as to the information to be considered with each question.

- The topics were open for discussion and the stakeholders were encouraged to offer their comments.
- Mr. Ubaldi raised issues which could impact the individual responses and the stake holders were given the chance to address the group with their ideas.
- Mr. Ubaldi indicated that after this evaluation of the Sustainable Development Matrix was complete the Stakeholder feedback was positive and consistent.

Sustainability Monitoring Plan:

Peter Ubaldi discussed the sustainability monitoring plan directly with the Stakeholders and provided an explanation of the continuous input and grievance mechanism which will allow any Stakeholder the opportunity submit all comments, now and in the future.

Description of Stakeholder Feedback Round:

This was done immediately after the presentation by Peter Ubaldi and he re-introduced Scott Jones of PJRCES, who had been monitoring the meeting from a video feed in the meeting room. Before continuing to the final segment, Mr. Ubaldi addressed the group again describing the opportunity for

GECO to develop Carbon Credits through the Gold Standard Foundation while it creates its soil amendments at the Castleberry location.

- The reduction of Greenhouse Gas ("GHG") emissions is a natural occurrence from the GECO composting process.
- Mr. Ubaldi described the Gold Standard Foundation and the quality of the projects that are able to qualify for this registry.

E.2. Summary of comments received

<u>Consultations with local stakeholders about GHG reduction potential and project plan in Aug 2011:</u>

<u>Question and Answer Segment:</u>

The floor was opened to all the attendees so that they would be able to ask questions about the Company and any of the comments made by the speakers. The process was conducted informally and the answers were given by Peter Ubaldi and Thea Kelly from GECO. There were some questions taken by Mayor Jackson that related to the Town of Castleberry participation.

Comments and Question by Local Stakeholder	Response from Mr. Ubaldi
1. What will be the expected price of your product	It is very difficult to mention at this stage since we have not yet studied in detail the local market price and demand supply ratio. Roughly the price would be less than $50 per tonne of finished product
2. Is the project area will be solid waste disposal site	Although we are using the litter as waste material but we will converting the waste into useful material i.e. compost. We will comply with all the essential regulatory requirements of ADEM.
3. Does the Project will create bad odour and nuisance in local surrounding	Due to composting process i.e. aerobic degradation of litter some bad odour may occur however this will not create nuisance since we will be processing and controlling the aerobic reactions using our microbial inoculant and windrow turner machineries.
4. How much time company will take for commercial operations	The company will take atleast 6-8 months since at present we don't know what would be the best results and initially we will be conducting the beta testing to optimize the ratio of raw material intake and microbial inoculant.

5. Are there any side effects on crops using your product	We will be studying the product during beta testing in coming months and will eventually understand about the side effects on crops by developed compost.
6. Who will gain GHG reduction monetization benefits, Private Company or US Govt.	As on date we have some preliminary information i.e. project has some potential to develop as GHG reduction project and subject to approval from registry. The carbon revenue benefits will be gained by us and this will help us to overcome to barriers associated with this project.

Q1. Will there be additional locations in the region for GECO?

A1. At the present time GECO will focus on this location in Castleberry

Q2. Will the tax payers of Castleberry be responsible for additional services such as new roads, security, schools etc.?

A2. There will be no additional expense for the citizens of Castleberry. The existing roads are more than adequate to support the operation and security will be provided at the expense of GECO. We will employ people from the area and their need for personal services is already in place.

Q3. Will the Project have a positive economic effect for the town and the region in general?

A3. Yes. The additional jobs for local citizens and in general the new activity will increase business in the area.

Q4. Why will there be no odour from the use of chicken waste in the GECO process?

A.4 Our proprietary blend of all natural microbes eliminates the odor as soon as the waste is delivered to the site.

Q5. What does the elimination of GHG emissions really mean as it relates to this Project?

A5. Untreated chicken waste emits GHGs (Greenhouse Gas) as it is removed from the chicken houses. When allowed to exist untreated, it is a toxic for the atmosphere. The GECO process converts this raw material and removes the toxins that emit the unwanted gases.

Q6. Please tell us a little more about the Emission Reduction Project

A6. As on date we have some preliminary information i.e. project has some potential to develop as GHG reduction project and subject to approval from registry. The carbon revenue benefits will be gained by us and this will help us to overcome to barriers associated with this project

Q7. Are there other organizations engaged in the Emission Reduction Project

A7. Yes. TheClimate Action Reserve (CAR) is the most known organization of this kind in United States and there are few others in European Union.

Consultation and Site Visit for composting product testing Conducted in March 2012:

- Barbara Wolfe, retail customer and gardening expert. "I used the Compost from GEC on tomato plants by mixing it in with the soil. My plants were green and healthier and bloomed earlier while producing more tomatoes than all other years."
- Debra Burch, consumer and avid gardener. "I tilled the GEC Compost into the ground and planted squash and okra. The okra grew taller, had an increased yield and had a growing longer than the previous year. The squash plants were also bigger and healthier while producing more squash than last year."
- Josh Coleman, farmer. "I tilled the OSA1000 into the ground and planted winter greens. They are growing faster and doing better than I have ever seen"
- Johnny Andrews, farmer. I used the Compost on winter greens by first tilling it in the soil. My winter plants are doing better than all past years. I can't wait to see how the OSA1000 will perform in the summer."
- Josh Reeves, consumer. "I spread the Compost by hand on my lawn when I planted grass seed. In a short time the new grass was thicker than what was already growing for years in my backyard."
- Lavon Boutwell, owner of The Farm Center in Brewton Alabama, a representative for John Deere and formerly a fertilizer distributor throughout Alabama and Florida for 30 years. "I have experimented with the GEC OSA1000 and the results were very impressive. As an example, I grew pineapple plants side by side using synthetic fertilizer and OSA1000. The OSA plants had greener leaves, grew faster and much bigger. A pineapple in Southern Alabama.
- Jeremy Padgett, farmer and builder. "For the last home I built, I laid sod for the lawn and it turned completely brown. I contacted GEC and purchased their Compost Tea, OSA-CT1000. I drenched the sod and in 3 days it was green and began to knit together. The results were hard to believe."

Gold Standard Local Stakeholder Consultations Conducted in May 2014:

Question and Answer Segment:

The floor was opened to all the attendees so that they would be able to ask questions about all the points discussed and the documents that were completed.Refreshments were offered and Peter Ubaldi thanked the attendees and adjourned the meeting.

Q1. Is there any binding agreement with any company to assure the sales of expected VER?

A1. In any carbon project there is an ERPA or Emission Reduction Purchasing Agreement which will arrange how the credit will be sold and also at what price it will be sold. ERPA depends on the agreement between project developer and buyer. As in our case, Agreement with Green Giant Venture Fund, for the carbon credit business that support Gold Standard signed an ERPA and they also have been helping us so far with the carbon financing concept as our project has a high value of sustainability.

Q.2 How long does it takes to register the project?

A.2 1 to 2 years

Q3. The special treatment of composting process, and monitoring will take extra time from the operator also will make additional cost. Who will be responsible for these?

A3. GECO will cover the costs that arise from the application of aerobic composting and monitoring

E.3. Report on consideration of comments received

GECO has received positive comments from the local stakeholders on the project activity. All the necessary clearance, permission and agreement have been obtained for the project activity. As per Gold Standard requirement this Project Design Document (PDD) will be published at the Gold Standard Registry website for comments if any.

SECTION F. Approval and authorization

Storm Water Permit Approval from ADEM (Alabama Department of Environmental Management) dated May 23 2012.

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Appendix 1. Contact information of project participants and responsible persons/ entities

Project participant and/or responsible person/ entity	☒ Project participant ☐ Responsible person/ entity for application of the selected methodology (ies) and, where applicable, the selected standardized baselines to the project activity
Organization name	GEC Organics Corp.
Street/P.O. Box	96 Park Street, Montclair New Jersey 07042
Building	Montclair New Jersey
City	New York
State/Region	
Postcode	07402
Country	United States of America
Telephone	+1-973-610-6048
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E-mail	peterubaldi@comcast.net
Website	www.geco.us
Contact person	Peter D. Ubaldi
Title	President & CEO
Salutation	Mr.
Last name	Ubaldi
Middle name	Dennis
First name	Peter
Department	
Mobile	+1-973-610-6048
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Direct tel.	+1-973-610-6048
Personal e-mail	peterubaldi@comcast.net

Appendix 2. Affirmation regarding public funding

Appendix 3. Applicability of methodology and standardized baseline

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

Appendix 5. Further background information on monitoring plan

Appendix 6. Summary of post registration changes

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Document information

Version	*Date*	*Description*
05.0	25 June 2014	Revisions to: • Include the Attachment: Instructions for filling out the project design document form for CDM project activities (these instructions supersede the "Guidelines for completing the project design document form" (Version 01.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for the application of the methodology (ies) to the project activity in B.7.4 and Appendix 1; • Change the reference number from *F-CDM-PDD* to *CDM-PDD-FORM;* • Editorial improvement.
04.1	11 April 2012	Editorial revision to change version 02 line in history box from Annex 06 to Annex 06b
04.0	13 March 2012	Revision required to ensure consistency with the “Guidelines for completing the project design document form for CDM project activities” (EB 66, Annex 8).
03.0	26 July 2006	EB 25, Annex 15
02.0	14 June 2004	EB 14, Annex 06b
01.0	03 August 2002	EB 05, Paragraph 12 Initial adoption.

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