



Public Consultation Document

VCS Methodology

Title	Date of Issue
VCS Methodology for ICT Enabled 'Sustainable Community Service Promoters'	November 10 2010
Version	Sectoral Scope(s)
Version 1.1	4 - Energy demand, 7 - Transport, and 13 – Waste handling and disposal.
Element Type	Prepared By
Methodology	Gedden Inc. & ICF International

Relationship to Approved or Pending Methodologies

No approved or pending methodology under the VCS Program or an approved GHG program can reasonably be revised to meet the objective of this proposed methodology. All existing and pending VCS, CDM and CAR methodologies under sectoral scopes 4, 7 and 13 have been reviewed. All corresponding methodologies have been grouped and listed below. None of the seven similar methodologies listed below could be revised without the addition of new procedures or scenarios to more than half of its sections.

Program	Sectoral Scope	Title	Similarity
CDM	4	AM0025 - Avoided emissions from organic waste through alternative waste treatment processes	Similar
CDM	4	AM0041 - Mitigation of Methane Emissions in the Wood Carbonization Activity for Charcoal Production	Not Similar
CDM	4	AM0049 - Methodology for gas based energy generation in an industrial facility	Not Similar
CDM	4	AM0055 - Baseline and Monitoring Methodology for the recovery and utilization of waste gas in refinery facilities	Not Similar
CDM	4	AM065 - Replacement of SF6 with alternate cover gas in the magnesium industry	Not Similar
CDM	4	AM0070 - Manufacturing of energy efficient domestic refrigerators	Not Similar
CDM	4	ACM003 - Emissions reduction through partial substitution of fossil fuels with alternative fuels or less carbon intensive fuels in cement manufacture	Not Similar
CDM	4	AM0007 - Analysis of the least-cost fuel option for seasonally-operating biomass cogeneration plants	Not Similar
CDM	4	AM0014 - Natural gas-based package cogeneration	Not Similar
CDM	4	ACM0012 - Consolidated baseline methodology for GHG emission reductions from waste energy recovery projects	Not Similar
CDM	4	AM0024 - Methodology for greenhouse gas reductions through waste heat recovery and utilization for power generation at cement plants	Not Similar
CDM	4	ACM0015 - Consolidated baseline and monitoring methodology for project activities using alternative raw materials that do not contain carbonates for clinker production in cement kilns	Not Similar
CDM	4	ACM003 - Emissions reduction through partial substitution of fossil fuels with alternative fuels or less carbon intensive fuels in cement manufacture	Not Similar
CDM	4	ACM0005 - Consolidated Methodology for Increasing the Blend in Cement Production	Not Similar
CDM	7	AM0031 - Baseline Methodology for Bus Rapid Transit Projects	Similar
CDM	7	AM0090 - Modal shift in transportation of cargo from road transportation to water or rail transportation	Similar

Program	Sectoral Scope	Title	Similarity
CDM	7	ACM0016 - Baseline Methodology for Mass Rapid Transit Projects	Similar
VCS	7	VCSUD - Methodology for complete substitution of gasoline and its blends by ethanol in commercial fleets of flex-fuel vehicles	Not Similar
VCS	7	VCSUD - Methodology for Fuel Switch to Renewable Biomass for Thermal Applications	Not Similar
CDM	13	AM0039 - Methane emissions reduction from organic waste water and bioorganic solid waste using co-composting	Similar
CDM	13	AM0057 - Avoided emissions from biomass wastes through use as feed stock in pulp and paper production or in bio-oil production	Similar
CAR	13	CAR - Organic Waste Composting Project Protocol	Similar
CDM	13	AM0073 - GHG emission reductions through multi-site manure collection and treatment in a central plant	Not Similar
CDM	13	AM0083 - Avoidance of landfill gas emissions by in-situ aeration of landfills	Not Similar
CDM	13	ACM0014 - Mitigation of greenhouse gas emissions from treatment of industrial wastewater	Not Similar
CAR	13	CAR - Landfill Project Protocol	Not Similar

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1 Sources

This methodology aims to comply with the principles of ISO 41064:2

- ISO 14064: Part 2, “Specification with guidance at the project level for the quantification, monitoring and reporting of greenhouse gas emission reductions and removal enhancements”.

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

- CDM, “Tool for the Demonstration and Assessment of Additionality”;
- CDM, “Tool to Calculate the Emissions Factor of an Electricity System”; and
- CDM, “Combined Tool to Identify the Baseline Scenario and Demonstrate Additionality”.

The energy efficiency approach within has been based on elements of the following methodologies:

- Direct Energy’s, “GHG Quantification Protocol for Energy Efficiency in Commercial and Institutional Buildings”;
- Alberta Offset System, Draft Protocol, “GHG Quantification Protocol For Energy Efficiency in Commercial and Institutional Buildings”;
- Alberta Offset System, Protocol, “Quantification Protocol For Energy Efficiency Projects”;
- IPMVP - Efficiency Valuation Organization in its International Performance Measurement and Verification Protocol (IPMVP) (www.evo-world.org) for guidance on methods determining energy savings.¹

This waste diversion and transportation approach within has been based on elements of the following methodologies:

- CDM, AM0039, “Methane emissions reduction from organic waste water and bioorganic solid waste using co-composting”.
- CCX “Avoided Emissions from Organic Waste Disposal Offset Project Protocol”;
- Alberta Offset System, Protocol, “Quantification Protocol for Freight Modal Shifting”;
- Alberta Offset System, Protocol, “Quantification Protocol for Anaerobic Treatment of Wastewater Projects”;

¹ IPMVP is a recognized international standard for measuring, monitoring, and verifying energy savings.

2 Summary Description of the Methodology/Revision

Just as the aggregated GHG emissions from small emitters (warehouses, supermarkets, restaurants, shops, governmental and municipal buildings and offices, etc.) make up a significant component of any country's GHG inventory, they also pose a significant opportunity to reduce real GHG emissions. Many of the incentives created by emission reduction offset programs do not, however, provide incentives nor produce a framework in which these small emitters ("SE") can work efficiently – there is a problem of scale.

By grouping several small businesses or organizations together using a "Sustainable Community" approach, lasting behavior change can be stimulated. It does so by providing a framework to stimulate and generate small GHG reductions. The following should be considered in regards to SEs:

- They represent 80% of enterprises and organizations world-wide;
- There is an opportunity to catalyze their desire to take GHG reducing actions;
- They can involve their employees, supply chain contractors, and their customers;
- SEs can be grouped into Sustainable Community projects;

This methodology element has potential to be applied in wide diversity of clusters in many regions of the world.

At the same time, quantifying and verifying emissions reductions from aggregated projects poses real challenges, especially in the field of data capture, data management, and data monitoring. The emergence and application of new Information and Communication Technology ("ICT") such as the Internet, wireless communications, and Web 2.0, however is presenting new ways of collecting, and monitoring emissions data from aggregated collections of SEs thereby enabling greater participation of SEs in carbon offset origination.

Towards the objective of enabling SEs to participate in offset origination activities, this VCS methodology element proposes a "Grouped Project"² approach enabled through ICT. This methodology element has been designed to be simple yet rigorous to apply, measure, and monitor. Even though the activities of SEs vary, energy consumption and waste disposal are similar across many business and organizations. This methodology is meant to work with and support the provision of single window reporting and measurement provided by a third party to capture the information required to quantify emissions reductions.

In this first version of the methodology element, provisions have been provided to quantify emission reductions associated with energy efficiency and improved waste handling and disposal systems. In future iterations however, it is possible that other activities, such as transportation, water treatment, and ODS reduction, could be written into, or appended to an updated version of the methodology.

This methodology has been prepared by Gedden Inc., to allow Gedden and similar players to quantify and originate emission reductions registered on the VCS for the emission reduction activities. Gedden's Sustainable Community solution is an innovative, flexible and efficient solution/service to stimulate greenhouse gas (GHG) reduction. It targets a large range of "Client Facilities" which are small to medium sized companies located in regional or state clusters. It provides to each Client Facility inside their cluster, the less carbon intensive way to achieve the delivery of their goods and services on their major key inputs: energy building consumptions,

² Voluntary Carbon Standard, 2011, Section 3.10

transportation activities and waste management.

To overcome the inherent monitoring and measurement challenges of aggregating small energy efficiency and waste diversion activities, this methodology relies on advanced data gathering technology. Gedden has constructed this protocol to utilize their increased ability, through its electronic tracking platform, to collect data from client facilities, but it is applicable to any other project developer who can provide the same rigor and efficiency in collecting reliable activity data. Gedden's system involves collecting ground data, activities per activities or events per events, in real time to calculate carbon emissions from many of GHG Small Emitters. To achieve this Gedden uses an amalgam of ICT technologies to provide automated ground data collection with minimum human intervention: Radio Frequency Identification (RFID), Wi-Fi or cellular network and web portals. The technology is scalable to support automated and manual data gathering along with off line data entry transaction. This will simplify third party verification of controls and activity data paramount to the emission reduction quantification.

3 Definitions

This sub-section introduces important terminology to ensure project developers and verifiers share common understandings of the various roles, parties and grouping systems involved in this methodology element.

Client Facility	A large range of small companies or business units that contract the Sustainable Community Service Promoter ("SCSP") to manage their GHG emitting services. Client facilities may include commercial, institutional, and industrial buildings/facilities including but not limited to warehouses, apartment buildings, hotels, restaurants, educational buildings, shopping malls, food manufacturing plants, chemical manufacturing facilities, and light industrial plants. Client Facilities are typically located in regional or state clusters.
Grouped Projects	A number of projects and their related methodologies included in a single VCS Project Description (VCS PD) at the time of the validation. (Voluntary Carbon Standard 2007.1) The "Territory" concept defined below refers to a sub-grouping of client facilities facing in similar clusters. Multiple Territories may be included under one grouped project.
Sustainable Community Service Promoter	An independent entity which provide essential services such as energy, waste handling, and transportation to client facilities to stimulate greenhouse gas (GHG) reduction activities. SCSPs add value to client facilities by implementing ICT enabled electronic tracking platform, monitoring technologies, and emission reduction activities. In providing services to client facilities, SCSPs contractually maintain ownership of the environmental attributes associated with actions that reduce the client facilities overall GHG emissions.
Territory	Client Facilities are grouped into Territories. Territories are a grouping of client facilities which belong to a common industrial or geographic cluster, where the production factors and regulations are similar for the different facilities; where homogeneous emission factors for fossil combustibles and identifiable emission factor for the electricity grid can be applied; and where common EE activities and waste processing alternatives are possible. The Territory concept has been applied to facilitate sampling during verification procedures, sampling resolutions though are to ultimately determined by the verifier based on a risk assessment of the project and project controls.

This sub-section introduces data, sampling, and conceptual terminologies that are important to how emission reductions are quantified and verified under this methodology element.

Baseline Adjustments	The non-routine adjustments arising during the reporting period from changes in: - any energy governing characteristic of the facility within the measurement boundary, except the named independent variables used for routine adjustments. (IPMVP Volume I, 2007); or - any waste characteristic of the facility within the measurement boundary.
Baseline Period	The period of time chosen to represent operation of the facility or system before implementation of an ECM or waste reduction / diversion activities. This period may be as short as the time required for an instantaneous measurement of a constant quantity, or long enough to reflect one full operating cycle of a system or facility with variable operations.
Confidence Level	The probability that any measured value will fall within a stated range of precision. (ISO 2602, 1980)
Estimate	A process of determining a parameter used in a savings calculation through methods other than measuring it in the baseline and reporting periods. These methods may range from arbitrary assumptions to engineering estimates derived from manufacturer's rating of equipment performance. Equipment performance tests that are not made in the place where they are used during the reporting period are estimates, shall be considered as estimates.
Facility	The facility is defined as the collection of units, excluding the Project Unit. As such, the greenhouse emissions from the facility are defined to remain constant as only the project unit is impacted by the project. Where the Project Unit encompasses the entire site, there may be no components defined as the Facility at the site.
Functional Equivalence	The Project and the Baseline should provide the same function and quality of products or services. This type of comparison requires a common metric or unit of measurement (such as the mass of cardboard diverted from landfill for mass of finished furniture, energy use/per unit of product) for comparison between the Project and Baseline activity (refer to the Project Guidance Document for the Alberta Offset System for more information).

ICT	Information and Communication Technology that is applied through an electronic tracking platform for each client facility. An electronic account and the effective electronic link between all Client Facilities inside a Territory to stimulate, to support and measure their GHG related activities. SCSPs employ and ICT enable GHG monitoring system.
Measurement Boundary	A notional boundary drawn around equipment and/or systems to segregate those which are relevant to savings determination from those which are not (IPMVP Volume I, 2007)
Non-Routine Adjustments	The individually engineered calculations to account for changes in static factors within the measurement boundary since the baseline period. When non-routine adjustments are applied to the baseline energy they are sometimes called just “baseline adjustments” (IPMVP Volume I, 2007). For this quantification protocol non-routine adjustments also account for changes in the “surplus” characteristics of the project.
Primary Data	Observed data from specific facilities linked to the SCSP tracking system.
Project Unit	The project unit is defined as the equipment, processes and facilities that are being serviced and impacted by the energy efficiency, waste diversion processing and transport reduction project. The project unit must be clearly defined and justified by the project proponent. All non-project unit items are covered under the heading of facility operation.
Routine Adjustments	The calculations...made by a formula shown in the : • M&V Plan to account for changes in selected independent variables within the measurement boundary since the baseline period. (IPMVP Volume I, 2007); • Or in the waste surveillance plan.
Secondary Data	Generic or industry average data from published sources that are representative of a project unit activities, and Client Facility products.
Static Factors	Those characteristics of a Client Facility which affect energy use and waste volume produced, within the chosen measurement boundary, but which are not used as the basis for any routine adjustments. These characteristics include fixed, environmental, operational and maintenance characteristics. They may be constant or varying. (IPMVP Volume I, 2007)

Suggested Sample Size	While the ultimate level of sampling must be determined by the third party verifier, project developers may provide a suggested number of SC Project Units to be physically verified.
Unit of Productivity	The unit of productivity is to be defined by the project developer as a basis for incorporating functional equivalence within the calculation methodology. Examples of units of productivity could be: energy requirements for residential buildings, per square foot of front of house commercial space, per kg/L/m2/m3 of output from manufacturing facilities, etc. The unit of productivity should be defined to account for any non-production sensitive components. In all cases the project developer must thoroughly justify their assessment of the appropriate unit of productivity.
Verified Data Feedback Loop	After each verification cycle, verified SCSP Client Facility data may be used to increase the confidence interval on any estimated values included in the baseline or project scenarios. Examples of such situations could include replacing regional factors for a specific facility with a more accurate waste or energy profile of the specific Client Facility based on measured data, providing it can still be related to the baseline period. This verified data feedback loop could ultimately result in adjustments that both increase or decrease emission reduction assertions in future years. The adjustments however, would not be retroactive to previously serialized offsets.
These definitions apply to the Energy Efficiency components of the quantification methodologies described herein.	
Adjusted-baseline energy	The energy use of the baseline period, adjusted to a different set of operating conditions (IPMVP Volume I, 2007)
Baseline Energy	The energy use occurring during the baseline period without adjustments. (IPMVP Volume I, 2007)
Cycle	The period of time between the start of successive similar operating modes of a facility or piece of equipment whose energy use varies in response to operating procedures or independent variables. For example the cycle of most buildings is 12 months, since their energy use responds to outdoor weather which varies on an annual basis. Another example is the weekly cycle of an industrial process which operates differently on Sundays than during the rest of the week. (IPMVP Volume I, 2007)

Energy Conservation Measure (ECM)*	An activity or set of activities designed to increase the energy efficiency of a facility, system or piece of equipment. ECMs may also conserve energy without changing efficiency. Several ECM's may be carried out in a facility at one time, each with a different thrust. An ECM may involve one or more of: physical changes to facility equipment, revisions to operating and maintenance procedures, software changes, or new means of training or managing users of the space or operations and maintenance staff. An ECM may be applied as a retrofit to an existing system or facility, or as a modification to a design before construction of a new system or facility.
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These definitions Waste Diversion and Transportation components of the quantification methodology described herein.

Alternative Processing	Refers to recycling, reusing, reduction and re-processing activities which are applied as part of the project to divert waste from reaching a landfill.
Destinations	The ultimate destination for waste being shipped by the project. This is the location where the waste would be unloaded from a truck after having been shipped from project Origins.
Landfill Gas (LFG)	Gas generated by biological decomposition of waste material in a landfill. The gas is typically comprised of methane, carbon dioxide, other trace gases and water vapor.
Origins	Starting points for waste being shipped by the project. This is the location where the waste would be loaded onto a truck or train for ultimate delivery to Destinations.
Producer	Refers to the Client Facility that produces the waste to be disposed of.
Waste Transportation	Refers to the physical transportation of waste from the facility to a disposal facility. This transportation is separate from other transportation means employed by the Client Facility such as shipping of inventory and final goods.

4 Applicability Conditions

This methodology is to be applied to grouped projects, where energy efficiency and solid waste diversion activities have been initiated by a Sustainable Community Service Provider (“SCSP”) for an assortment of dispersed “Client Facilities”. This methodology requires that the SCSP use a consolidated and ICT enabled data monitoring and collection system to track project activity data.

This methodology is applicable to the quantification of direct and indirect reductions of GHG emissions arising from energy-efficiency and waste diversion projects at Client Facilities which may include commercial, institutional, and industrial buildings/facilities including but not limited to:

- Warehouses,
- Hotels,
- Restaurants,
- Educational buildings,
- Shopping malls,
- manufacturing plants,
- Chemical manufacturing facilities,
- Light industrial plants and
- Apartment buildings.

While this list of facilities may seem disconnected, three groups of sustainable communities are frequently targeted, including:

- Manufacturing companies involved the secondary and tertiary manufacturing,
- Shops, malls, and business-to-business companies, and
- Companies offering services to both the types of businesses listed above.

The following GHG(s) will be reduced:

- Carbon dioxide (CO₂).
- Methane (CH₄).
- Nitrous oxide (N₂O).

Two distinct project activities are eligible:

- a. Energy Efficiency – where the project activity is the construction of new facilities, the retrofit of existing facilities, or process/management changes of existing facilities that result in a reduction of energy use per unit of productivity. This methodology can be applied to a wide range of ECM’s including but not limited to:

- Behavior change,
- Building envelope modifications.
- Heating, ventilation and air conditioning (HVAC).
- Heat generation (including industrial steam systems).
- Chilling/cooling systems.
- Lighting and lighting control.

- Building mechanical infrastructure
 - Appliances and industrial processes (including heating and cooling requirements and process modification).
 - Electric motors.
 - Equipment optimization.
 - Maintenance.
- b. Waste Diversion – where the project activity is the diversion of municipal solid waste for other productive uses and alternative disposal options, as well as reduced transportation of this waste. Specific activities include but are not limited to:
- Card Board Recycling,
 - Organic Composting,
 - Hybrid Truck Fleets,
 - Bulk Shipping,
 - Biomethanation,
 - Using more proximate waste handling facilities.

When selecting the baseline period for Waste Diversion and Energy Efficiency activities, the appropriateness of baseline period should be analyzed for the two activities separately. While one baseline period for both may be deemed appropriate, it is also possible that different baseline periods and approaches are required for the two different activities. As one example, the best unit of productivity for the Waste Diversion baseline period, may be different from that for the Energy Efficiency baseline period depending on the selected unit of productivity and the quality of data available for each.

The following guidance provides further clarification on Energy Efficiency activities, approach and applicability:

- a. By reducing energy consumption, eligible projects will reduce GHG emissions associated with the conversion of primary energy sources to secondary forms of energy (e.g., electricity, heat, mechanical energy, etc.).
- b. This methodology is also open to quantify GHG emission reductions related to fuel switching.
- c. Real reductions will be achieved through the implementation of new ECMs in existing facilities beyond those that would have occurred in the absence of the project, or through the construction of new facilities that incorporate energy-efficiency measures above and beyond those required by relevant legislation or normal business practice. In all cases, implemented ECMs will reduce energy consumption at project sites to levels below the baseline case per unit of productivity.
- d. A net emission reduction would be achieved by such activities so long as a net reduction in overall energy consumption per unit of productivity is achieved, since production of energy, particularly from fossil energy sources, has significant associated GHG emissions (typically combustion-related), including both direct and indirect sources.
- e. Additionally the following requirements must be met by the project:
 - The new facility, process/management change or facility retrofit must rely on functionally equivalent inputs and outputs from the modified process as indicated by an affirmation from the project developer and the project description.

- A suitable unit of production, or other applicable unit that effectively describes any non-production sensitive components, can be defined for incorporating equivalence within the calculation methodology as indicated by reasoned qualitative and quantitative analysis.
 - Biological or chemical components of the operation must not yield any increase in non-biogenic greenhouse gas emissions compared to the baseline condition, unless these are accounted for under the applicable flexibility mechanisms as indicated by an affirmation from the project developer.
 - The quantification of reductions achieved by the project is based on actual measurement and monitoring (except where indicated in this methodology element).
- f. The intent of this methodology element is to rely on measurement to the greatest extent possible. To this effect, two general approaches have deemed acceptable to be used by project developers:
- Option A – Isolation Parameter Measurement; Savings are determined by measuring the energy use of the ECM affected system.
 - Option B – Whole Facility Measurement; Energy use for the entire facility is measured and any savings are calculated accordingly.
- g. In determining an energy efficiency baseline for new facilities, the baseline will be determined by the lowest energy usage level reflected by current regulation and legal obligations.
- h. In the case of construction of additions or expansions to existing facilities, the new floor space will be treated as a “new facility.” If retrofits are applied to the existing facility, emission reductions for the retrofit will be added to those from the expansion. Both sections however will have different baselines.
- i. Project developers may apply the following flexibility mechanisms when applying this methodology element:
- Sources and sinks that can be shown to be equivalent or not applicable for the project can be excluded from the analysis.
 - External ambient temperature data may be used as a means for adjusting energy usage for equivalence.
 - Territory specific emission factors may be substituted for the generic emissions factors indicated within the methodology element providing the methodology for the generation of such factors ensure accuracy.
- j. The concept of Unit of Productivity (as defined in Section **Error! Reference source not found.**) is central to this methodology element. Project proponent's must select and defend an appropriate unit of productivity (e.g. occupied square foot, liters of produced chemical, etc.). Alternative unit's of productivity must be identified and rejected. The inclusion of a unit of productivity does not presuppose functional equivalence. Function equivalence must be shown to be met under separate test and justification by the project proponent.

The following guidance provides further clarification on Waste Diversion activities, approach and applicability:

- a. By diverting waste including but not-limited to organic waste from landfills or final disposal sites, and by transporting waste more energy and carbon efficiently, eligible projects will reduce GHG emissions associated with both the methane released from the anaerobic decomposition of organic matter in landfills as well as the GHG emissions from internal combustion engines of waste handling trucks.

- b. Real reductions will be achieved through the implementation of new waste management and handling systems in existing facilities and will be quantified against a historic baseline. In the case of new facilities, the reductions will be quantified by emission reductions measures above and beyond those required by relevant legislation or normal business practice.

The crediting period for a CDM project activity is selected by the project developer, and may be either:

- A 7-year crediting period, renewable twice; or
- A single 10-year crediting period.

At each renewal of the Project Crediting Period a VCS Program approved validator shall determine that the original project baseline scenario(s) and additionality is still valid or has been updated taking account of new data and changed VCS Program.

4.1 Ownership:

The SCSP must have on hand legal contracts in which the Client Facility explicitly transfers all rights to the environmental attributes associated with the emission streams involved in the project activities.

The SCSP should utilize a standard contract covering the entire crediting period.

A sample contract should be included as an Appendix of the Project Description, and copies of all contracts should be available to the verifier.

4.2 Grouped Project Requirements:

This methodology has been designed under the “grouped project” provision of the VCS. As such, there are several basic requirements that must be met.

c. Central GHG Information System

- The Project Description must include a detailed description of the particular central GHG information system which has been installed at each Territory or grouping of client facilities. This description must detail the solution employed as well as the controls that have been put in place by the SCSP to ensure accurate and sufficient data collection.

d. Verification

- The Verification Report shall explain and document in details the data sampling that was employed by the verifier. The verification report shall also set out any changes to the sampling due to findings during the verification. The sampling of a grouped project shall take account of any sub groups and associated activities within each sub group.

e. Additional Requirements

- Projects that intend to apply this methodology shall also comply with the VCS Program requirements for grouped projects, detailed in the most recent version of the Program Guidelines 2007.1 on www.v-c-s.org.

5 Project Boundary

5.1 Project

Project proponents shall identify all SS's relevant to the project, including on-site, upstream and downstream SS's.

- a. For energy efficiency activities, some common SS's include, but are not limited to:
 - Delivery and onsite combustion of fuel,
 - Transportation of materials and equipment,
 - Offsite production of electricity, and
 - Maintenance, construction and decommissioning.
- b. For waste diversion activities, some common SS's include, but are not limited to:
 - Transportation of solid waste to a disposal site, and
 - Decomposition of solid waste in landfills.

The following process flow diagram (Figure 5.1) indentifies, illustrates and organizes SS's for a typical project eligible under this methodology element.

For Energy Efficiency activities, it is important to note that whether project developers elect to quantify using "Option A – Isolation Parameter Measurement" or "Option B – Whole Facility Measurement" will determine the site boundaries.

- c. If Option A, Isolation Parameter Measurement, is selected savings are determined by measuring the energy use of the ECM affected system, rather than the entire building. As such the boundary chosen is the ECM affected system.
 - In this case, clear justification must be provided by the project developer that the ECM affected system would have no material impact on the operation and emissions of the whole or remaining facility. Functional equivalence and unit of productivity adjustments for the ECM affected system must be made to the baseline of the system.
- d. If Option B, Whole Facility Measurement, is selected energy use for the entire facility is measured and any savings are calculated accordingly and therefore the boundary chosen is the entire building.
 - In this case, clear justification must be provided by the project developer that the entire building's baseline meets functional equivalence and has been adjusted by units of productivity.

For Waste Diversion activities, project developers must use "Whole Facility Measurement" to determine the site boundaries.

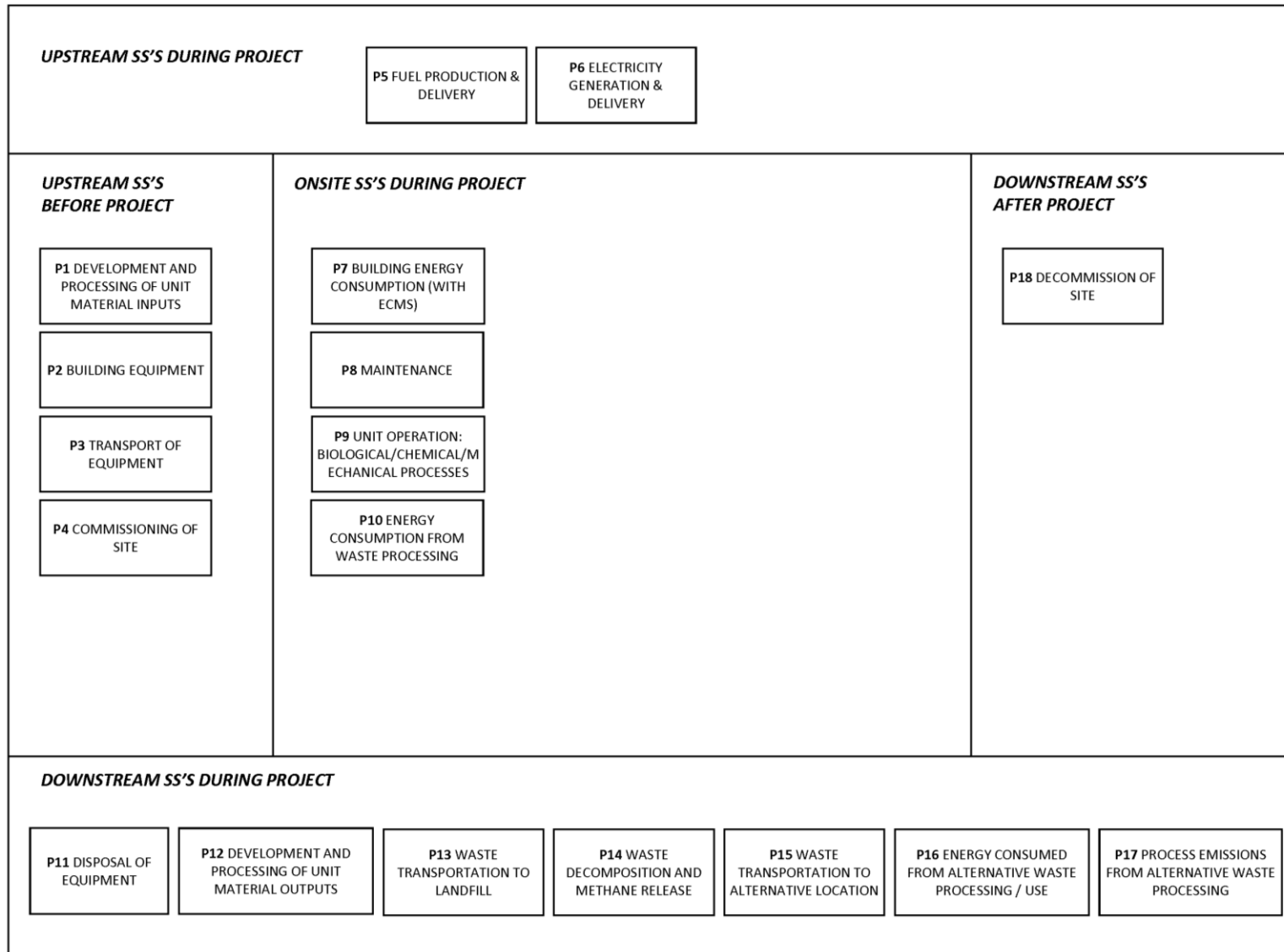
FIGURE 5.1: PROJECT ELEMENT LIFE CYCLE CHART

TABLE 5.1: PROJECT SS'S

SS	Description	Controlled, Related or Affected
Upstream Before Project		
P1 Development and Processing of Unit Material Inputs	The material inputs to the unit process need to be transported, developed and/or processed prior to the unit process. This may require any number of mechanical, chemical or biological processes. All relevant characteristics of the material inputs would need to be tracked to prove functional equivalence with the baseline scenario.	Related
P2 Building Equipment	GHG emissions will arise from the manufacturing process of the equipment to implement the ECMs and conventional building/facility operation in the project. Such emissions will likely be associated with the fossil fuels and electricity consumed during the manufacturing process.	Related
P3 Transport of Equipment	Equipment used in the implementation of the ECMs and conventional building operation must be transported to the project site. GHG emissions will primarily be attributed to the combustion of fossil fuels during the transportation process.	Related
P4 Commissioning of Site	The development of the site (technically onsite before project) and installation of equipment will result in GHG emissions, primarily from the use of fossil fuels and electricity during this process.	Related
Upstream During Project		
P5 Fuel Production & Delivery	The production and distribution of fuel used during building/facility operations will result in GHG emissions. The volume and type of fuel will be required for GHG emission calculations, as will be the distribution distance.	Related
P6 Electricity Generation & Delivery	Building/facility operations could require significant amount of electricity. The generation and distribution of electricity will result in GHG emissions. The quantity of electricity generated.	Related
Onsite During Project		
P7 Building/System Energy Consumption (with ECMs)	Energy (including fossil fuel and electricity) is likely required on-site to operate the building/facility. Equipment utilizing this energy could include boilers, lighting systems, HVAC Systems, ventilation systems, equipment, etc...	Controlled
P8 Maintenance	The facility and systems within the facility likely requires maintenance. GHG emissions will arise from the use of fuels and electricity in maintenance procedures.	Controlled
P9 Unit Operation: Biological/Chemical/Mechanical Processes	Greenhouse gas emissions may occur that are associated with the operation and maintenance of the biological processes (biological, chemical, and mechanical) within the unit at the project site. All relevant characteristics of the biological processes would need to be tracked.	Controlled
P10 Energy Consumption from Waste Processing	Energy may be required to power waste processing or handling equipment (i.e. compacters, etc.)	Controlled

Downstream During Project		
P11 Disposal of Equipment	The disposal of some materials/equipment which compose all or a component of the ECM or waste diversion systems may result in GHG emissions.	Related
P12 Development and Processing of Unit Material Outputs	The material outputs from the unit process need to be transported, developed, and/or processed subsequent to the unit process. This may require any number of mechanical, chemical or biological processes. All relevant characteristics of the material outputs would need to be tracked to prove functional equivalence with the baseline scenario.	Related
P13 Waste Transportation to Landfill	Waste may be transported to the project site by truck, barge or train to the conventional waste disposal facility (typically landfill). The related energy inputs for fuelling this equipment are captured under this SS, for the purpose of calculating the resulting GHG emissions.	Related
P14 Waste Decomposition and Methane Release	Waste may decompose in the disposal facility (typically a landfill site) resulting in the production of methane. A methane collection and destruction system may be in place at the disposal site. If such a system is active in the area of the landfill where this material is being disposed, then this methane collection must be accounted for in a reasonable manner. Disposal site characteristics and mass disposed of at each site may need to be tracked as well as the characteristics of the methane collection and destruction system.	Related
P15 Waste Transportation to Alternative Location	Waste may be transported to the project site by truck, barge or train to an alternative location which either allows the waste to be put to productive use, recycled, regenerated into energy, or any other processes which reduce the GHG emissions traditionally associated with the disposal of such waste. The related energy inputs for fuelling this equipment are captured under this SS, for the purpose of calculating the resulting GHG emissions.	Related
P16 Energy Consumed from alternative waste processing / use	Energy may be consumed in processing waste in a new, more productive or GHG reducing method. The related energy inputs for fuelling this equipment are captured under this SS, for the purpose of calculating the resulting GHG emissions.	Related
P17 Process Emissions from Alternative Waste Processing	This SS encompasses any process emissions associated with the new method of handling waste. Any new combustion and process emissions related to the alternative use or disposal of the solid waste must be measured or estimated. All relevant characteristics of these processes would need to be tracked.	Related
Downstream After Project		
P12 Decommission of Site	Once the facility is no longer operational, the site may need to be decommissioned. This may involve the disassembly of the equipment, demolition of on-site structures, disposal of some materials, environmental restoration, re-grading, planting or seeding, and transportation of materials off-site. Greenhouse gas emissions would be primarily attributed to the use of fossil fuels and electricity used to power equipment required to decommission the site.	Related

5.2 Baseline

SCPS shall identify all SS's relevant to the baseline, including on-site, upstream and downstream SS's.

The following process flow diagram (Figure 5.2) identifies, illustrates and organizes SS's for a typical baseline eligible under this methodology element.

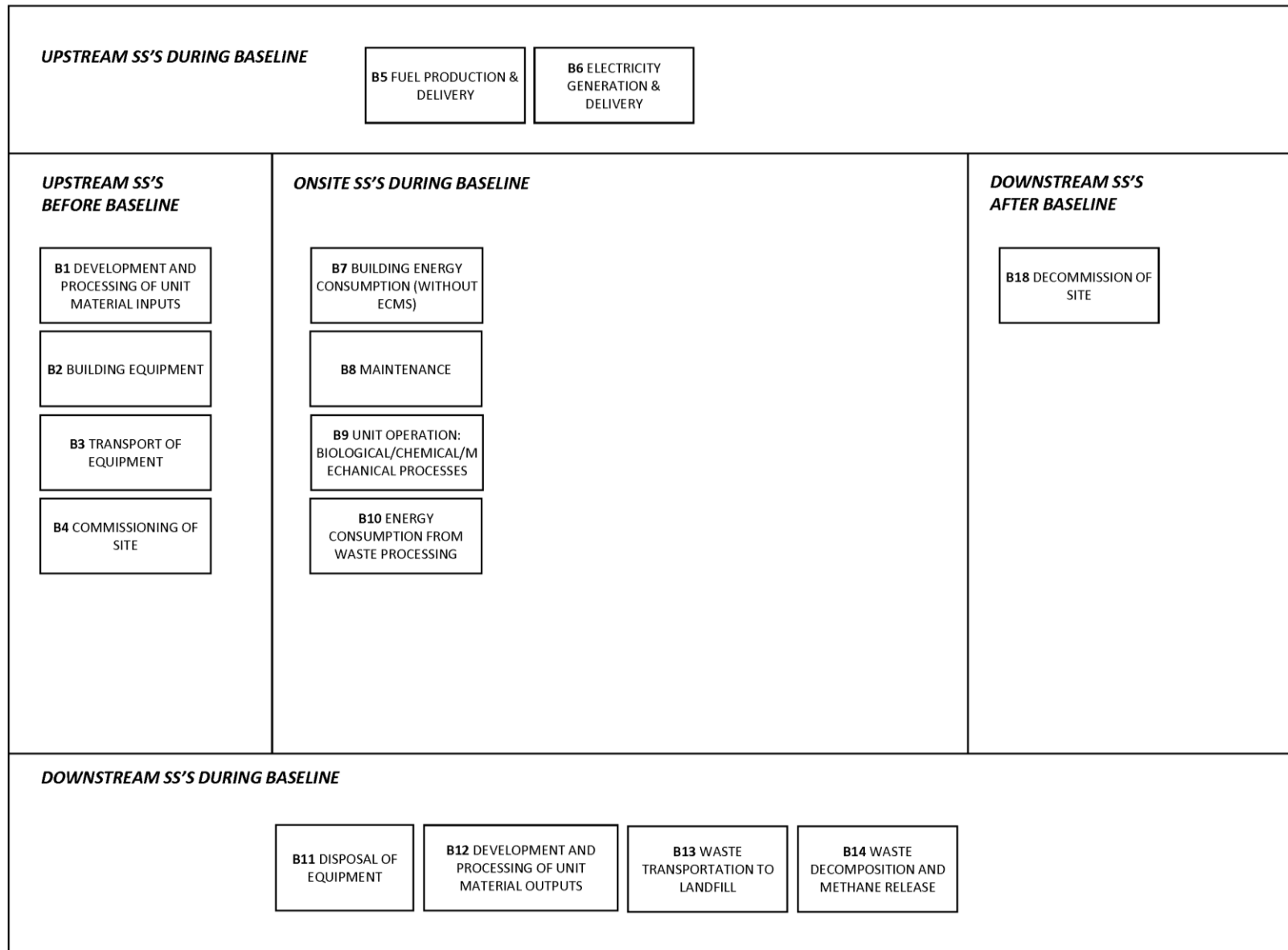
FIGURE 5.2: BASELINE ELEMENT LIFE CYCLE CHART

TABLE 5.2: BASELINE SS'S

SS	Description	Controlled, Related or Affected
Upstream During Baseline		
B1 Development and Processing of Unit Material Inputs	The material inputs to the unit process need to be transported, developed and/or processed prior to the unit process. This may require any number of mechanical, chemical or biological processes. All relevant characteristics of the material inputs would need to be tracked to prove functional equivalence with the baseline scenario.	Related
B2 Building Equipment	GHG emissions will arise from the manufacturing process of the equipment to implement the ECMs and conventional building/facility operation in the project. Such emissions will likely be associated with the fossil fuels and electricity consumed during the manufacturing process.	Related
B3 Transport of Equipment	Equipment used in the implementation of the ECMs and conventional building operation must be transported to the project site. GHG emissions will primarily be attributed to the combustion of fossil fuels during the transportation process.	Related
B4 Commissioning of Site	The development of the site (technically onsite before project) and installation of equipment will result in GHG emissions, primarily from the use of fossil fuels and electricity during this process.	Related
Upstream Before Baseline		
B5 Fuel Production & Delivery	The production and distribution of fuel used during building/facility operations will result in GHG emissions. The volume and type of fuel will be required for GHG emission calculations, as will be the distribution distance.	Related
B6 Electricity Generation & Delivery	Building/facility operations could require significant amount of electricity. The generation and distribution of electricity will result in GHG emissions. The quantity of electricity generated.	Related
Onsite During Baseline		
B7 Building/System Energy Consumption (without ECMs)	Energy (including fossil fuel and electricity) is likely required on-site to operate the building/facility. Equipment utilizing this energy could include boilers, lighting systems, HVAC Systems, ventilation systems, equipment, etc...	Controlled
B8 Maintenance	The facility and systems within the facility likely requires maintenance. GHG emissions will arise from the use of fuels and electricity in maintenance procedures.	Controlled
B9 Unit Operation: Biological/Chemical/Mechanical Processes	Greenhouse gas emissions may occur that are associated with the operation and maintenance of the biological processes (biological, chemical, and mechanical) within the unit at the project site. All relevant characteristics of the biological processes would need to be tracked.	Controlled
B10 Energy Consumption from Waste Processing	Energy may be required to power waste processing or handling equipment (i.e. compacters, etc.)	Controlled

Downstream During Baseline		
B11 Disposal of Equipment	The disposal of some materials/equipment which compose all or a component of the ECM or waste diversion systems may result in GHG emissions.	Related
B12 Development and Processing of Unit Material Outputs	The material outputs from the unit process need to be transported, developed, and/or processed subsequent to the unit process. This may require any number of mechanical, chemical or biological processes. All relevant characteristics of the material outputs would need to be tracked to prove functional equivalence with the baseline scenario.	Related
B13 Waste Transportation to Landfill	Waste may be transported to the project site by truck, barge or train to the conventional waste disposal facility (typically landfill). The related energy inputs for fuelling this equipment are captured under this SS, for the purpose of calculating the resulting GHG emissions.	Related
B14 Waste Decomposition and Methane Release	Waste may decompose in the disposal facility (typically a landfill site) resulting in the production of methane. A methane collection and destruction system may be in place at the disposal site. If such a system is active in the area of the landfill where this material is being disposed, then this methane collection must be accounted for in a reasonable manner. Disposal site characteristics and mass disposed of at each site may need to be tracked as well as the characteristics of the methane collection and destruction system.	Related
Downstream After Baseline		
B15 Decommission of Site	Once the facility is no longer operational, the site may need to be decommissioned. This may involve the disassembly of the equipment, demolition of on-site structures, disposal of some materials, environmental restoration, re-grading, planting or seeding, and transportation of materials off-site. Greenhouse gas emissions would be primarily attributed to the use of fossil fuels and electricity used to power equipment required to decommission the site.	Related

5.3 SS Selection

Each of the SS's from the project and baseline condition were be compared and evaluated as to their relevancy. The justification for the exclusion or conditions upon which SS's may be excluded is provided in **Error! Reference source not found.** below. All other SS's listed previously are included.

TABLE 5.3: SELECTION OF SS'S

Source		Gas	Included?	Justification/Explanation
Baseline	B1 Development and Processing of Unit Material Inputs	CO ₂	Excluded	Excluded as they must be functionally equivalent to allow for the application of the methodology element.
		CH ₄	Excluded	
		N ₂ O	Excluded	
		Other	N/A	
	B2 Building Equipment	CO ₂	Excluded	Excluded since emissions from building of the equipment are expected to be negligible over the lifetime of the project.
		CH ₄	Excluded	
		N ₂ O	Excluded	
		Other	N/A	
	B3 Transport of Equipment	CO ₂	Excluded	Excluded since emissions from transporting equipment are expected to be negligible considering the long life of the project.
		CH ₄	Excluded	
		N ₂ O	Excluded	
		Other	N/A	
	B4 Commissioning of Site	CO ₂	Excluded	Excluded since emissions from site development are expected to be negligible given the minimal site development typically required.
		CH ₄	Excluded	
		N ₂ O	Excluded	
		Other	N/A	
	B5 Fuel Production & Delivery	CO ₂	Excluded	Excluded since emissions from fuel production and delivery are expected to be greater under the baseline condition.
		CH ₄	Excluded	
		N ₂ O	Excluded	
		Other	N/A	
	B6 Electricity Generation & Delivery	CO ₂	Excluded	Excluded since emissions from fuel production and delivery are expected to be greater under the baseline condition.
		CH ₄	Excluded	
		N ₂ O	Excluded	
		Other	N/A	
	B7 Building/System Energy Consumption (without ECMs)	CO ₂	Included	Must be included
		CH ₄	Included	
		N ₂ O	Included	
		Other	N/A	
	B8 Maintenance	CO ₂	Included	Can be excluded if pre and project operations would involve immaterial difference in energy consumed for maintenance activities.
		CH ₄	Included	
		N ₂ O	Included	
		Other	N/A	

Source		Gas	Included?	Justification/Explanation
	B9 Unit Operation: Biological/Chemical/Mechanical Processes	CO ₂	Included	Can only be excluded if prescribed to be functionally equivalent.
		CH ₄	Included	
		N ₂ O	Included	
		Other		
	B10 Energy Consumption from Waste Processing	CO ₂	Included	Can only be excluded if the facility or group of facilities is not quantifying emission reductions associated with waste diversion activities and if the ECM activities would not affect the energy consumed for waste processing.
		CH ₄	Included	
		N ₂ O	Included	
		Other	N/A	
	B11 Disposal of Equipment	CO ₂	Excluded	Excluded since emissions from disposal of equipment are expected to be negligible
		CH ₄	Excluded	
		N ₂ O	Excluded	
		Other	N/A	
	B12 Development and Processing of Unit Material Outputs	CO ₂	Excluded	Excluded as they must be functionally equivalent to allow for the application of the methodology element.
		CH ₄	Excluded	
		N ₂ O	Excluded	
		Other	N/A	
	B13 Waste Transportation to Landfill	CO ₂	Included	Can only be excluded if the facility or group of facilities is not quantifying emission reductions associated with waste diversion activities and if the ECM activities would not affect the amount and nature of waste transportation.
		CH ₄	Included	
		N ₂ O	Included	
		Other	N/A	
	B14 Waste Decomposition and Methane Release	CO ₂	Included	Can only be excluded if the facility or group of facilities is not quantifying emission reductions associated with waste diversion activities and if the ECM activities would not affect the amount methane emitted from decomposition.
		CH ₄	Included	
		N ₂ O	Included	
		Other	N/A	
	B15 Decommission of Site	CO ₂	Excluded	Excluded since emissions from equipment disposal are expected to be negligible.
		CH ₄	Excluded	
		N ₂ O	Excluded	
		Other	N/A	
Project	P1 Development and Processing of Unit Material Inputs	CO ₂	Excluded	Excluded as they must be functionally equivalent to allow for the application of the methodology element.
		CH ₄	Excluded	
		N ₂ O	Excluded	
		Other	N/A	
	P2 Building	CO ₂	Excluded	Excluded since emissions from building of

Source		Gas	Included?	Justification/Explanation
	Equipment	CH ₄	Excluded	the equipment are expected to be negligible over the lifetime of the project.
		N ₂ O	Excluded	
		Other	N/A	
	P3 Transport of Equipment	CO ₂	Excluded	Excluded since emissions from transporting equipment are expected to be negligible considering the long life of the project.
		CH ₄	Excluded	
		N ₂ O	Excluded	
		Other	N/A	
	P4 Commissioning of Site	CO ₂	Excluded	Excluded since emissions from site development are expected to be negligible given the minimal site development typically required.
		CH ₄	Excluded	
		N ₂ O	Excluded	
		Other	N/A	
	P5 Fuel Production & Delivery	CO ₂	Excluded	Excluded since emissions from fuel production and delivery are expected to be greater under the baseline condition.
		CH ₄	Excluded	
		N ₂ O	Excluded	
		Other	N/A	
	P6 Electricity Generation & Delivery	CO ₂	Excluded	Excluded since emissions from fuel production and delivery are expected to be greater under the baseline condition.
		CH ₄	Excluded	
		N ₂ O	Excluded	
		Other	N/A	
	P7 Building/System Energy Consumption (with ECMs)	CO ₂	Included	Must be included
		CH ₄	Included	
		N ₂ O	Included	
		Other	N/A	
	P8 Maintenance	CO ₂	Included	Can be excluded if pre and project operations would involve immaterial difference in energy consumed for maintenance activities.
		CH ₄	Included	
		N ₂ O	Included	
		Other	N/A	
	P9 Unit Operation: Biological/Chemical/Mechanical Processes	CO ₂	Included	Can only be excluded if prescribed to be functionally equivalent.
		CH ₄	Included	
		N ₂ O	Included	
		Other	N/A	
	P10 Energy Consumption from Waste Processing	CO ₂	Included	Can only be excluded if the facility or group of facilities is not quantifying emission reductions associated with waste diversion activities and if the ECM activities would not affect the energy consumed for waste processing.
		CH ₄	Included	
		N ₂ O	Included	
		Other	N/A	
	P11 Disposal of Equipment	CO ₂	Excluded	Excluded since emissions from disposal of equipment are expected to be negligible
		CH ₄	Excluded	

Source		Gas	Included?	Justification/Explanation
		N ₂ O	Excluded	
		Other	N/A	
	P12 Development and Processing of Unit Material Outputs	CO ₂	Excluded	Excluded as they must be functionally equivalent to allow for the application of the methodology element.
		CH ₄	Excluded	
		N ₂ O	Excluded	
		Other	N/A	
	P13 Waste Transportation to Landfill	CO ₂	Included	Can only be excluded if the facility or group of facilities is not quantifying emission reductions associated with waste diversion activities and if the ECM activities would not affect the amount and nature of waste transportation.
		CH ₄	Included	
		N ₂ O	Included	
		Other	N/A	
	P14 Waste Decomposition and Methane Release	CO ₂	Included	Can only be excluded if the facility or group of facilities is not quantifying emission reductions associated with waste diversion activities and if the ECM activities would not affect the amount methane emitted from decomposition.
		CH ₄	Included	
		N ₂ O	Included	
		Other	N/A	
	P15 Waste Transportation to Alternative Location	CO ₂	Included	Can only be excluded if the facility or group of facilities is not quantifying emission reductions associated with waste diversion and transportation activities.
		CH ₄	Included	
		N ₂ O	Included	
		Other	N/A	
	P16 Energy Consumed from alternative waste processing / use	CO ₂	Included	Can only be excluded if the facility or group of facilities is not quantifying emission reductions associated with alternative waste processing / use in the project scenario.
		CH ₄	Included	
		N ₂ O	Included	
		Other	N/A	
	P17 Process Emissions from Alternative Waste Processing	CO ₂	Included	Can only be excluded if the facility or group of facilities is not quantifying emission reductions associated with the alternative processing of waste.
		CH ₄	Included	
		N ₂ O	Included	
		Other	N/A	
	P18 Decommission of Site	CO ₂	Excluded	Excluded since emissions from equipment disposal are expected to be negligible.
		CH ₄	Excluded	
		N ₂ O	Excluded	
		Other	N/A	

6 Procedure for Determining the Baseline Scenario

The baseline condition should be an appropriate and accurate estimate of the GHG emissions that would have occurred in the absence of the project activities.

When available, historic baseline scenarios are preferred. This entails having an accurate and auditable record of a representative period prior to implementation of the project. The project proponent must provide compelling evidence of the accuracy of the baseline scenario, as well as evidence that with the initiation of the project, the baseline condition would have continued as was.

For Energy Efficiency activities, retrofits and management changes in existing facilities require a slightly different methodology than do new facilities. As such they are handled separately in the sub-sections below.

While helpful guidance has been provided in the remainder of this section, the fundamental responsibility of determining an appropriate baseline scenario is that of the project proponent.

6.1 Energy Efficiency – Baselines for Existing Facilities

- a. The baseline condition is defined as the process configuration prior to the process changes or facility retrofits. The energy and emissions footprint, per unit of production, of the baseline configuration should be established as part of an energy project assessment or similar method.
- b. The unit of production must be thoroughly justified in its application of incorporating functional equivalence across the calculations of emissions under the baseline and project conditions.
- c. IMPVP provides guidance for determine baseline scenarios for existing facilities as being typically determined based on historical data collected during the baseline period. The baseline period has been described as:
 - “Representing all operating modes of the facility. This period should span a full operating cycle from maximum energy use to minimum. For example, building energy use is normally significantly affected by weather conditions, so a whole year’s baseline data is needed to define a full operating cycle. Likewise the energy use of a ...system (fan) may only be governed by a fixed occupancy pattern..., which varies on a weekly cycle. So one week’s data would be all that is needed to define baseline performance. ECM planning may require study of a longer time period than is chosen for the baseline period. Longer study periods assist the planner in understanding facility performance and determining what the normal cycle length actually is.”
 - “Fairly represent all operating conditions of a normal operating cycle. For example, though a year may be chosen as the baseline period, if data is missing during the selected year for one month, comparable data for the same month in a different year should be used to ensure the baseline record does not under represent operating conditions of the missing month.”
 - “Include only time periods for which all fixed and variable energy-governing facts are known about the facility. Extension of baseline periods backwards in time to include multiple cycles of operation requires equal knowledge of all energy-governing factors throughout the longer baseline period in order to properly derive routine and non-routine adjustments...after ECM installation.”
 - “Coincide with the period immediately before commitment to undertake the retrofit. Periods further back in time would not reflect the conditions existing before retrofit and may therefore not provide a proper baseline for measuring the effect of just the ECM”

6.2 Energy Efficiency – Baselines for New Facilities

- a. For energy efficiency projects added to the design and construction of a new system or facility, the baseline is the lowest energy usage level reflected by the then prevalent laws, regulations and performance standards. It is the responsibility of the project proponent to provide evidence that the particular regional performance standard does not fall within the least demanding third of all state/provincial level performance standards.
- b. Only Performance Standard based baseline scenarios are acceptable under this methodology element. Local building codes may provide minimum requirements for the energy efficient design of buildings which can be used as the baseline scenario.
- c. The code or standard selected must be the version current at the time of building design. If the time of design is unclear (may be difficult to clearly identify), it will be deemed to be no more than 3 years before the commissioning of the building. The code/standard selected for the purpose of determining the baseline of new facilities must be identified and justified. Publication date and version number must also be clearly identified.
- d. ASHRAE Standard 90 and Canada's MNECB are examples of relevant building code referenced standards that could be used to determine the minimum requirement for building energy efficiency.

6.3 Energy Efficiency - Baseline Scenario Adjustments

- a. The baseline scenario identified may require adjustments to ensure functional equivalence with the project. These adjustments are typically performed when the energy savings are quantified however, the methods should be clearly defined in the original project document. Typical adjustments include:
- b. Routine Adjustments of the Baseline
 - IMPVP provides the following guidance on performing routine adjustments. "for any energy governing factors, expected to change routinely during the reporting period, such as weather... A variety of techniques can be used to perform the adjustments. Techniques may be as simple as a constant value (no adjustment) or as complex as a several multiple parameter non-linear equations each correlating energy with one or more independent variables. Valid mathematical techniques must be used to derive the adjustment method." Users of the protocol are strongly encouraged to review IMPVP volume for examples of routine adjustments.
- c. Non-Routine Adjustments of the Baseline
 - IMPVP provides the following guidance on performing non-routine adjustments "for those energy-governing factors which are not usually expected to change, such as: the facility size, the design and operation of installed equipment, or the type of occupants. These static factors must be monitored for change throughout the reporting period."
- d. Non-Surplus Adjustments of the Baseline
 - Non-routine adjustments are defined to also include any necessary adjustments to the baseline arising from changes in the 'surplus' status of the project or parts thereof. During the reporting period, baseline data must be adjusted for any parts of the project which become non-surplus.
 - Surplus projects are defined as ECMs that were not required by law, regulation or legal obligation. However, if any change occurs to such requirements after the project was installed, project eligibility (or surplus) may change. Therefore any necessary non-surplus adjustment must be made to the baseline.

- A common situation warranting a non-surplus baseline adjustment arises when a project replaces equipment with more efficient equipment, but ahead of its normal end of life date. Up to its normal end of life date, the savings would be surplus and therefore determined relative to the historical baseline. However after this date, the baseline becomes the efficiency standard prevailing at the time of the retrofit.
- To enable non-surplus baseline adjustments, the project design document must report the
 - original installation date and normal lifetime of all equipment that is replaced under the project. Normal lifetime data should come from referenced independent sources.
 - energy standards inherent in any relevant laws, regulations, legal obligations and common products or practices used in the industry, as of the date of the retrofit.
- Ongoing reporting of savings must make non-surplus adjustment beginning with the date of change in surplus status, such as the date of a relevant new regulation or the notional end of life dates of relevant Sections of the retrofit. These adjustments must bring the baseline level to that of the standard that was in place at the time of project design. (If the project only installed equipment meeting those standards, the baseline equals the project energy use, and there are no further eligible savings.)

6.4 Waste Diversion – Selection of Baselines Scenario

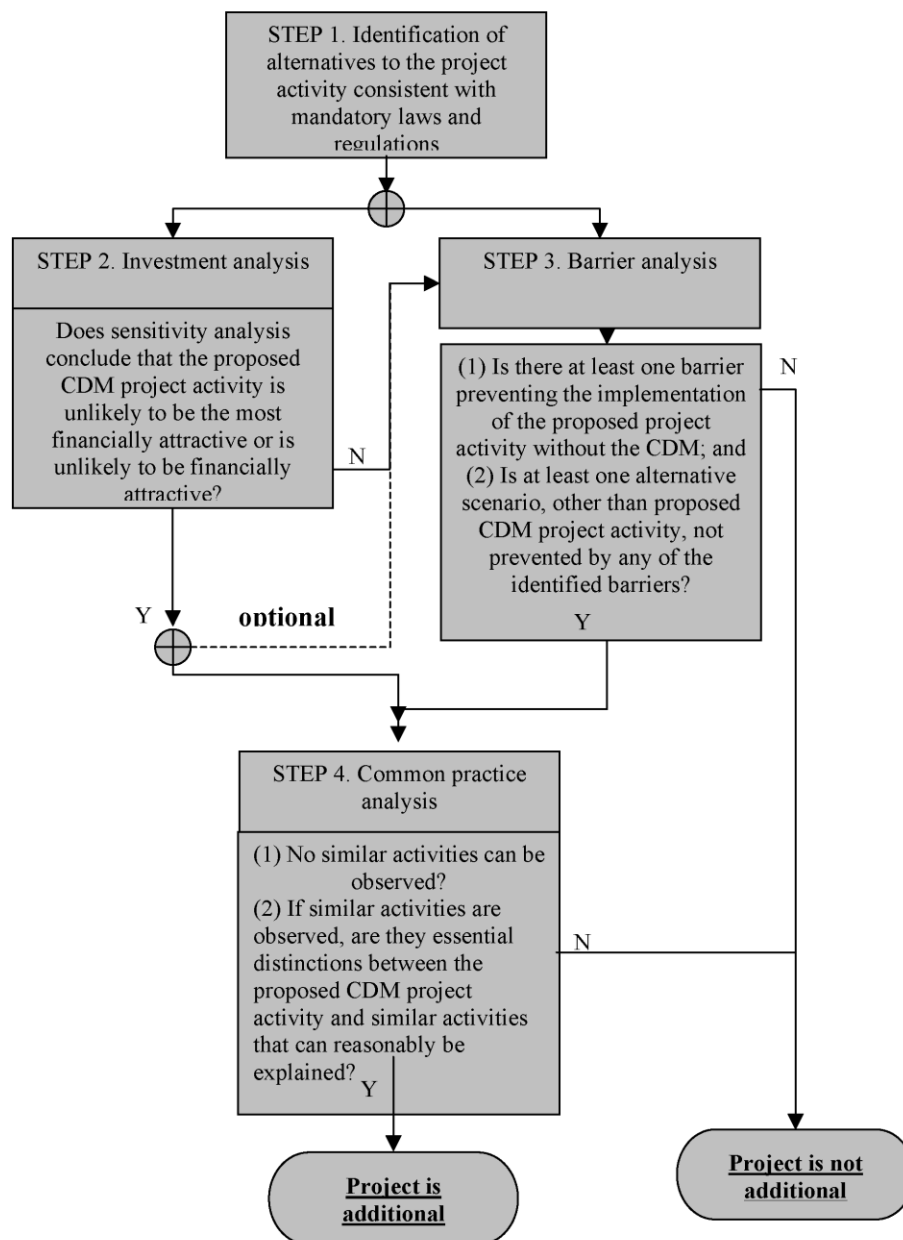
- a. For waste diversion projects, historic baselines are preferred since they would be backed by activity data taken before the project activity was implemented.
- b. Where similar waste handling practices were being implemented prior to the project activity at several client facilities, the SCSP could choose one baseline scenario and apply it to several client facilities. In such cases, a convincing argument or selection criteria should be in place to ensure only facilities with truly comparable historic scenarios are included in groups. That said, even for facilities deemed sufficiently similar, the actual baseline emissions should be quantified with site specific historic activity data.

7 Procedure for Demonstrating Additionality

The SCPS shall demonstrate that the proposed project activity is not an attractive option for the project developer to undertake unless the project activity can be registered under the VCS.

To do so, SCPS' must use the CDM's "Tool for the Demonstration and Assessment of Additionality Version 05.2" (See Appendix A). The general process is captured in the diagram below.

FIGURE 7.1 – PROCESS FOR IDENTIFYING ADDITIONALITY



Source: Tool for the Demonstration and Assessment of Additionality Version 05.2

8 Quantification of GHG Emission Reductions and Removals

Quantification of the reductions, removals and reversals of relevant SS's for each of the greenhouses gases will be completed using the methodologies outlined below.

If a project developer chooses to exclude any of the terms above, detailed justification must be provided.

8.1 Baseline Emissions

Describe the criteria and procedures, including relevant equations, for the quantification of GHG emissions and/or removals for the selected GHG sources, sinks and/or reservoirs for the baseline scenario.

Emissions _{Adjusted Baseline EE}	= the energy efficiency related baseline emissions plus any adjustments needed to adjust it to the conditions of the reporting period
Emissions _{Adjusted Baseline EE}	= Emissions _{Adjusted Building/System Energy Consumption with ECM} + Emissions _{Adjusted Maintenance} + Emissions _{Adjusted Unit Operation}

Emissions_{Building Energy Consumption w/o ECM} = Emissions under SS **B7** Adjusted Building/System Energy Consumption (w/o ECMs)

Emissions_{Maintenance} = Emissions under SS **B8** Adjusted Maintenance

Emissions_{Unit Operation} = Emissions under SS **B9** Adjusted Unit Operation: Biological/Chemical/Mechanical Processes

Emissions _{Adjusted Baseline WASTE}	= the waste related baseline emissions plus any adjustments needed to adjust it to the conditions of the reporting period
Emissions _{Adjusted Baseline WASTE}	= Emissions _{Energy Consumption from Waste Processing} + Emissions _{Waste Transportation to Landfill} + Emissions _{Waste Decomposition and Methane Release}

Emissions_{Energy Consumption from Waste Processing} = Emissions under SS **B10** Energy Consumption from Waste Processing

Emissions_{Waste Transportation to Landfill} = Emissions under SS **B13** Energy Consumption from Waste Processing

Emissions_{Waste Decomposition and Methane Release} = Emissions under SS **B14** Waste Decomposition and Methane Release

8.2 Project Emissions

Describe the criteria and procedures, including relevant equations, for the quantification of GHG emissions and/or removals for the selected GHG sources, sinks and/or reservoirs for the project.

Emissions _{Project EE}	= sum of the energy efficiency related emissions under the project condition
Emissions _{Project EE}	= Emissions _{Building/System Energy Consumption with ECM} + Emissions _{Maintenance} + Emissions _{Unit Operation}

Emissions_{Building Energy Consumption with ECM} = Emissions under SS **P7** Building/System Energy Consumption (with ECMs)

Emissions_{Maintenance} = Emissions under SS **P8** Maintenance

Emissions_{Unit Operation} = Emissions under SS **P9** Unit Operation: Biological/Chemical/Mechanical Processes

Emissions _{Project WASTE}	= sum of the waste related emissions under the project condition
Emissions _{Project WASTE}	= Emissions _{Energy Consumption from Waste Processing} + Emissions _{Waste Decomposition and Methane Release} + Emissions _{Waste Transportation to Alternative Location} + Emissions _{Energy Consumed from alternative waste processing use} + Emissions _{Process Emissions from Alternative Waste Processing}

Emissions_{Energy Consumption from Waste Processing} = Emissions under SS **P10** Energy Consumption from Waste Processing

Emissions_{Waste Transportation to Landfill} = Emissions under SS **P13** Waste Transportation to Landfill

Emissions_{Waste Decomposition and Methane Release} = Emissions under SS **P14** Waste Decomposition and Methane Release

Emissions_{Waste Transportation to Alternative Location} = Emissions under SS **P15** Waste Transportation to Alternative Location

Emissions_{Energy Consumed from alternative waste processing / use} = Emissions under SS **P16** Energy Consumed from alternative waste processing / use

Emissions_{Process Emissions from Alternative Waste Processing} = Emissions under SS **P17** Process Emissions from Alternative Waste Processing

8.3 Leakage

The IPCC Special Report on Land Use, Land-Use Change, and Forestry (2000) defines leakage as "the unanticipated decrease or increase in greenhouse gas (GHG) benefits outside of the project's accounting boundary as a result of project activities."

The potential for leakage has been assessed for this project type. Neither the activities associated with the anticipated energy efficiency improvement, nor the alternative handling of waste would conceivably result in leakage.

Of the two different activity types, the alternative waste handling activities pose a higher risk of leakage than energy efficiency. The project sources P10 to P17 capture the most plausible sources of leakage.

In the project plan, the project proponent must confirm that no plausible material leakage would occur based on the specific project activities.

8.4 Summary of GHG Emission Reduction and/or Removals

Emission Reductions	$= [\text{Emission}_{\text{Adjusted}^3 \text{ Baseline EE}} - \text{Emissions}_{\text{Project EE}}]$ $+ [\text{Emission}_{\text{Adjusted Baseline WASTE}} - \text{Emissions}_{\text{Project WASTE}}]$
Where:	
$\text{Emissions}_{\text{Adjusted Baseline EE}}$	= the energy efficiency related baseline emissions plus any adjustments needed to adjust it to the conditions of the reporting period
$\text{Emissions}_{\text{Adjusted Baseline WASTE}}$	= the waste related baseline emissions plus any adjustments needed to adjust it to the conditions of the reporting period
$\text{Emissions}_{\text{Project EE}}$	= sum of the energy efficiency related emissions under the project condition
$\text{Emissions}_{\text{Project WASTE}}$	= sum of the waste related emissions under the project condition

³ Adjusted refers to both the functional equivalence adjustments as well as unit of productivity adjustments.

9 Monitoring

Below the specific data and parameter associated with each SS are identified. Within the tables the Data Unit / Parameter is identified, and the Data unit, Description, Source of data and a Justification of choice of data or description of measurement methods and procedures have be specified.

TABLE 9.1: QUANTIFICATION PROCEDURES

SS	Parameter	Unit	Measured / Estimated	Method	Frequency	Justify measurement or estimation and frequency
B7 Building/System Energy Consumption (without ECMs)	Emissions $\text{Building/System Energy Consumption w/o ECM} = \sum [(\text{Vol. Fuel}_i * \text{EF Fuel}_{i\text{CO}_2}) ; (\text{Vol. Fuel}_i * \text{EF Fuel}_{i\text{CH}_4}) ; (\text{Vol. Fuel}_i * \text{EF Fuel}_{i\text{N}_2\text{O}})] + [\text{Electricity} * \text{EF Grid}_{\text{CO}_2\text{e}}] + [\text{Steam} * \text{EF Steam}_{\text{CO}_2\text{e}}]$					
	Emissions $\text{Building/System Energy Consumption w/o ECM}$	Kg of CO ₂ ; CH ₄ ; N ₂ O; CO ₂ e	N/A	N/A	N/A	The Quantity being calculated in aggregate form.
	Volume of each type of fuel combusted. This volume of fuel should be adjusted for both functional equivalence and units of productivity.	L, m ³ , or other	Measured	Direct metering or reconciliation of volume in storage (including volumes received)	Continuous Metering or invoice reconciliation	Frequency of metering and reconciliation is most frequent as possible.
	CO ₂ Emissions Factor for combustion of each type of fuel (EF Fuel _{iCO₂})	Kg CO ₂ per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory.
	CH ₄ Emissions Factor for combustion of each type of fuel (EF Fuel _{iCH₄})	Kg CH ₄ per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory.
	N ₂ O Emissions Factor for combustion of each type of fuel (EF Fuel _{iN₂O})	Kg N ₂ O per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory.
	Electricity consumed from grid. This amount should be adjusted for both functional equivalence and units of productivity.	kWh	Measured	Direct metering or reconciliation of invoices	Continuous Metering or invoice reconciliation	Frequency of metering and reconciliation is most frequent as possible.

	CO ₂ e Emissions Factor for electricity from the grid.	Kg CO ₂ e per kWh	Estimated	Official electricity generation and transmission company statistics should be used to determine the value.	Annual	These emission factors are adjusted annually in each countries emission's inventory
	Steamed consumed at the facility. This amount should be adjusted for both functional equivalence and units of productivity.	tonnes	Measured	Direct metering or reconciliation of invoices	Continuous Metering or invoice reconciliation	Frequency of metering and reconciliation is most frequent as possible.
	CO ₂ e Emissions Factor for local generation of steam	Kg CO ₂ e per tonne	Estimated	Using IPCC guidelines, an appropriate emissions factor should be specified in accordance with the facilities steam source	Annual	Steam generation characteristics are likely to remain relatively stable over a year's time.

SS	Parameter	Unit	Measured / Estimated	Method	Frequency	Justify measurement or estimation and frequency
B8 Maintenance	$\text{Emissions}_{\text{Maintenance}} = \sum [(Vol. Fuel_i * EF_{Fuel_i CO_2}) ; (Vol. Fuel_i * EF_{Fuel_i CH_4}) ; (Vol. Fuel_i * EF_{Fuel_i N_2O})] + [Electricity * EF_{Grid CO_2e}] + [Steam * EF_{Steam CO_2e}]$					
	Emissions _{Maintenance}	Kg of CO ₂ ; CH ₄ ; N ₂ O; CO ₂ e	N/A	N/A	N/A	The Quantity being calculated in aggregate form.
	Volume of each type of fuel combusted. This volume of fuel should be adjusted for both functional equivalence and units of productivity.	L, m ³ , or other	Measured	Direct metering or reconciliation of volume in storage (including volumes received)	Continuous Metering or invoice reconciliation	Frequency of metering and reconciliation is most frequent as possible.
	CO ₂ Emissions Factor for combustion of each type of fuel (EF _{Fuel_i CO₂})	Kg CO ₂ per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory.
	CH ₄ Emissions Factor for combustion of each type of fuel (EF _{Fuel_i CH₄})	Kg CH ₄ per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory.
	N ₂ O Emissions Factor for combustion of each type of fuel (EF _{Fuel_i N₂O})	Kg N ₂ O per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory.
	Electricity consumed from grid. This amount should be adjusted for both functional equivalence and units of productivity.	kWh	Measured	Direct metering or reconciliation of invoices	Continuous Metering or invoice reconciliation	Frequency of metering and reconciliation is most frequent as possible.

	CO ₂ e Emissions Factor for electricity from the grid.	Kg CO ₂ e per kWh	Estimated	Official electricity generation and transmission company statistics should be used to determine the value.	Annual	These emission factors are adjusted annually in each countries emission's inventory
	Steamed consumed at the facility. This amount should be adjusted for both functional equivalence and units of productivity.	tonnes	Measured	Direct metering or reconciliation of invoices	Continuous Metering or invoice reconciliation	Frequency of metering and reconciliation is most frequent as possible.
	CO ₂ e Emissions Factor for local generation of steam	Kg CO ₂ e per tonne	Estimated	Using IPCC guidelines, an appropriate emissions factor should be specified in accordance with the facilities steam source	Annual	Steam generation characteristics are likely to remain relatively stable over a year's time.

SS	Parameter	Unit	Measured / Estimated	Method	Frequency	Justify measurement or estimation and frequency
B9 Unit Operation: Biological / Chemical / Mechanical Processes	$\text{Emissions}_{\text{Unit Operation}} = \sum [(Vol. Fuel_i * EF_{Fuel_i CO_2}) ; (Vol. Fuel_i * EF_{Fuel_i CH_4}) ; (Vol. Fuel_i * EF_{Fuel_i N_2O})] + [Electricity * EF_{Grid CO_2e}] + [Steam * EF_{Steam CO_2e}]$					
	Emissions _{Unit Operation}	Kg of CO ₂ ; CH ₄ ; N ₂ O; CO ₂ e	N/A	N/A	N/A	The Quantity being calculated in aggregate form.
	Volume of each type of fuel combusted. This volume of fuel should be adjusted for both functional equivalence and units of productivity.	L, m ³ , or other	Measured	Direct metering or reconciliation of volume in storage (including volumes received)	Continuous Metering or invoice reconciliation	Frequency of metering and reconciliation is most frequent as possible.
	CO ₂ Emissions Factor for combustion of each type of fuel (EF _{Fuel_i CO₂})	Kg CO ₂ per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory.
	CH ₄ Emissions Factor for combustion of each type of fuel (EF _{Fuel_i CH₄})	Kg CH ₄ per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory.
	N ₂ O Emissions Factor for combustion of each type of fuel (EF _{Fuel_i N₂O})	Kg N ₂ O per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory.
	Electricity consumed from grid. This amount should be adjusted for both functional equivalence and units of productivity.	kWh	Measured	Direct metering or reconciliation of invoices	Continuous Metering or invoice reconciliation	Frequency of metering and reconciliation is most frequent as possible.

	CO ₂ e Emissions Factor for electricity from the grid.	Kg CO ₂ e per kWh	Estimated	Official electricity generation and transmission company statistics should be used to determine the value.	Annual	These emission factors are adjusted annually in each countries emission's inventory
	Steamed consumed at the facility. This amount should be adjusted for both functional equivalence and units of productivity.	tonnes	Measured	Direct metering or reconciliation of invoices	Continuous Metering or invoice reconciliation	Frequency of metering and reconciliation is most frequent as possible.
	CO ₂ e Emissions Factor for local generation of steam	Kg CO ₂ e per tonne	Estimated	Using IPCC guidelines, an appropriate emissions factor should be specified in accordance with the facilities steam source	Annual	Steam generation characteristics are likely to remain relatively stable over a year's time.

SS	Parameter	Unit	Measured / Estimated	Method	Frequency	Justify measurement or estimation and frequency
P7 Building/System Energy Consumption (with ECMs)	Emissions $\text{Building/System Energy Consumption with ECM} = \sum [(\text{Vol. Fuel}_i * \text{EF Fuel}_{i\text{CO}_2}) ; (\text{Vol. Fuel}_i * \text{EF Fuel}_{i\text{CH}_4}) ; (\text{Vol. Fuel}_i * \text{EF Fuel}_{i\text{N}_2\text{O}})]$					
	Emissions $\text{Building/System Energy Consumption with ECM}$	Kg of CO ₂ ; CH ₄ ; N ₂ O ; CO ₂ e	N/A	N/A	N/A	The Quantity being calculated in aggregate form.
	Volume of each type of fuel combusted. This volume of fuel should be adjusted for both functional equivalence and units of productivity.	L, m ³ , or other	Measured	Direct metering or reconciliation of volume in storage (including volumes received)	Continuous Metering or invoice reconciliation	Frequency of metering and reconciliation is most frequent as possible.
	CO ₂ Emissions Factor for combustion of each type of fuel (EF Fuel _{iCO₂})	Kg CO ₂ per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory.
	CH ₄ Emissions Factor for combustion of each type of fuel (EF Fuel _{iCH₄})	Kg CH ₄ per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory.
	N ₂ O Emissions Factor for combustion of each type of fuel (EF Fuel _{iN₂O})	Kg N ₂ O per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory.
	Electricity consumed from grid. This amount should be adjusted for both functional equivalence and units of productivity.	kWh	Measured	Direct metering or reconciliation of invoices	Continuous Metering or invoice reconciliation	Frequency of metering and reconciliation is most frequent as possible.

	CO ₂ e Emissions Factor for electricity from the grid.	Kg CO ₂ e per kWh	Estimated	Official electricity generation and transmission company statistics should be used to determine the value.	Annual	These emission factors are adjusted annually in each countries emission's inventory
	Steam consumed at the facility. This amount should be adjusted for both functional equivalence and units of productivity.	tonnes	Measured	Direct metering or reconciliation of invoices	Continuous Metering or invoice reconciliation	Frequency of metering and reconciliation is most frequent as possible.
	CO ₂ e Emissions Factor for local generation of steam	Kg CO ₂ e per tonne	Estimated	Using IPCC guidelines, an appropriate emissions factor should be specified in accordance with the facilities steam source	Annual	Steam generation characteristics are likely to remain relatively stable over a year's time.

SS	Parameter	Unit	Measured / Estimated	Method	Frequency	Justify measurement or estimation and frequency
P8 Maintenance	$\text{Emissions}_{\text{Maintenance}} = \sum [(Vol. Fuel_i * EF_{Fuel_i CO_2}) ; (Vol. Fuel_i * EF_{Fuel_i CH_4}) ; (Vol. Fuel_i * EF_{Fuel_i N_2O})] + [Electricity * EF_{Grid CO_2e}] + [Steam * EF_{Steam CO_2e}]$					
	Emissions _{Maintenance}	Kg of CO ₂ ; CH ₄ ; N ₂ O; CO _{2e}	N/A	N/A	N/A	The Quantity being calculated in aggregate form.
	Volume of each type of fuel combusted. This volume of fuel should be adjusted for both functional equivalence and units of productivity.	L, m ³ , or other	Measured	Direct metering or reconciliation of volume in storage (including volumes received)	Continuous Metering or invoice reconciliation	Frequency of metering and reconciliation is most frequent as possible.
	CO ₂ Emissions Factor for combustion of each type of fuel (EF _{Fuel_i CO₂})	Kg CO ₂ per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory.
	CH ₄ Emissions Factor for combustion of each type of fuel (EF _{Fuel_i CH₄})	Kg CH ₄ per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory.
	N ₂ O Emissions Factor for combustion of each type of fuel (EF _{Fuel_i N₂O})	Kg N ₂ O per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory.
	Electricity consumed from grid. This amount should be adjusted for both functional equivalence and units of productivity.	kWh	Measured	Direct metering or reconciliation of invoices	Continuous Metering or invoice reconciliation	Frequency of metering and reconciliation is most frequent as possible.

	CO ₂ e Emissions Factor for electricity from the grid.	Kg CO ₂ e per kWh	Estimated	Official electricity generation and transmission company statistics should be used to determine the value.	Annual	These emission factors are adjusted annually in each countries emission's inventory
	Steamed consumed at the facility. This amount should be adjusted for both functional equivalence and units of productivity.	tonnes	Measured	Direct metering or reconciliation of invoices	Continuous Metering or invoice reconciliation	Frequency of metering and reconciliation is most frequent as possible.
	CO ₂ e Emissions Factor for local generation of steam	Kg CO ₂ e per tonne	Estimated	Using IPCC guidelines, an appropriate emissions factor should be specified in accordance with the facilities steam source	Annual	Steam generation characteristics are likely to remain relatively stable over a year's time.

SS	Parameter	Unit	Measured / Estimated	Method	Frequency	Justify measurement or estimation and frequency
P9 Unit Operation: Biological / Chemical / Mechanical Processes	Emissions_{Unit Operation} = $\sum [(Vol. Fuel_i * EF_{Fuel_i CO_2}) ; (Vol. Fuel_i * EF_{Fuel_i CH_4}) ; (Vol. Fuel_i * EF_{Fuel_i N_2O})] + [Electricity * EF_{Grid CO_2e}] + [Steam * EF_{Steam CO_2e}]$					
	Emissions _{Unit Operation}	Kg of CO ₂ ; CH ₄ ; N ₂ O; CO _{2e}	N/A	N/A	N/A	The Quantity being calculated in aggregate form.
	Volume of each type of fuel combusted. This volume of fuel should be adjusted for both functional equivalence and units of productivity.	L, m ³ , or other	Measured	Direct metering or reconciliation of volume in storage (including volumes received)	Continuous Metering or invoice reconciliation	Frequency of metering and reconciliation is most frequent as possible.
	CO ₂ Emissions Factor for combustion of each type of fuel (EF _{Fuel_i CO₂})	Kg CO ₂ per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory.
	CH ₄ Emissions Factor for combustion of each type of fuel (EF _{Fuel_i CH₄})	Kg CH ₄ per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory.
	N ₂ O Emissions Factor for combustion of each type of fuel (EF _{Fuel_i N₂O})	Kg N ₂ O per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory.
	Electricity consumed from grid. This amount should be adjusted for both functional equivalence and units of productivity.	kWh	Measured	Direct metering or reconciliation of invoices	Continuous Metering or invoice reconciliation	Frequency of metering and reconciliation is most frequent as possible.

	CO ₂ e Emissions Factor for electricity from the grid.	Kg CO ₂ e per kWh	Estimated	Official electricity generation and transmission company statistics should be used to determine the value.	Annual	These emission factors are adjusted annually in each countries emission's inventory
	Steamed consumed at the facility. This amount should be adjusted for both functional equivalence and units of productivity.	tonnes	Measured	Direct metering or reconciliation of invoices	Continuous Metering or invoice reconciliation	Frequency of metering and reconciliation is most frequent as possible.
	CO ₂ e Emissions Factor for local generation of steam	Kg CO ₂ e per tonne	Estimated	Using IPCC guidelines, an appropriate emissions factor should be specified in accordance with the facilities steam source	Annual	Steam generation characteristics are likely to remain relatively stable over a year's time.

SS	Parameter	Unit	Measured / Estimated	Method	Frequency	Justify measurement or estimation and frequency
B10 Energy Consumption from Waste Processing	Emissions $\text{Energy Consumption from Waste Processing} = \sum [(Vol. Fuel_i * EF_{Fuel_i CO_2}) ; (Vol. Fuel_i * EF_{Fuel_i CH_4}) ; (Vol. Fuel_i * EF_{Fuel_i N_2O})] + [Electricity * EF_{Grid CO_2e}] + [Steam * EF_{Steam CO_2e}]$					
	Emissions Energy Consumption from Waste Processing	Kg of CO ₂ ; CH ₄ ; N ₂ O; CO ₂ e	N/A	N/A	N/A	The Quantity being calculated in aggregate form.
	Volume of each type of fuel combusted. This volume of fuel should be adjusted for both functional equivalence and units of productivity.	L, m ³ , or other	Measured	Direct metering or reconciliation of volume in storage (including volumes received)	Continuous Metering or invoice reconciliation	Frequency of metering and reconciliation is most frequent as possible.
	CO ₂ Emissions Factor for combustion of each type of fuel (EF _{Fuel_i CO₂})	Kg CO ₂ per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory.
	CH ₄ Emissions Factor for combustion of each type of fuel (EF _{Fuel_i CH₄})	Kg CH ₄ per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory.
	N ₂ O Emissions Factor for combustion of each type of fuel (EF _{Fuel_i N₂O})	Kg N ₂ O per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory.
	Electricity consumed from grid. This amount should be adjusted for both functional equivalence and units of productivity.	kWh	Measured	Direct metering or reconciliation of invoices	Continuous Metering or invoice reconciliation	Frequency of metering and reconciliation is most frequent as possible.

	CO ₂ e Emissions Factor for electricity from the grid.	Kg CO ₂ e per kWh	Estimated	Official electricity generation and transmission company statistics should be used to determine the value.	Annual	These emission factors are adjusted annually in each countries emission's inventory
	Steamed consumed at the facility. This amount should be adjusted for both functional equivalence and units of productivity.	tonnes	Measured	Direct metering or reconciliation of invoices	Continuous Metering or invoice reconciliation	Frequency of metering and reconciliation is most frequent as possible.
	CO ₂ e Emissions Factor for local generation of steam	Kg CO ₂ e per tonne	Estimated	Using IPCC guidelines, an appropriate emissions factor should be specified in accordance with the facilities steam source	Annual	Steam generation characteristics are likely to remain relatively stable over a year's time.

SS	Parameter	Unit	Measured / Estimated	Method	Frequency	Justify measurement or estimation and frequency
B13 Energy Consumption from Waste Processing	Emissions $\text{Energy Consumption from Waste Processing} = \sum [(Vol. Fuel_i * EF_{Fuel_i CO_2}) ; (Vol. Fuel_i * EF_{Fuel_i CH_4}) ; (Vol. Fuel_i * EF_{Fuel_i N_2O})] + [Electricity * EF_{Grid CO_2e}] + [Steam * EF_{Steam CO_2e}]$					
	Emissions _{Energy Consumption from Waste Processing}	Kg of CO ₂ ; CH ₄ ; N ₂ O; CO ₂ e	N/A	N/A	N/A	The Quantity being calculated in aggregate form.
	Volume of each type of fuel combusted. This volume of fuel should be adjusted for both functional equivalence and units of productivity.	L, m ³ , or other	Measured	Direct metering or reconciliation of volume in storage (including volumes received)	Continuous Metering or invoice reconciliation	Frequency of metering and reconciliation is most frequent as possible.
	CO ₂ Emissions Factor for combustion of each type of fuel (EF _{Fuel_i CO₂})	Kg CO ₂ per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory.
	CH ₄ Emissions Factor for combustion of each type of fuel (EF _{Fuel_i CH₄})	Kg CH ₄ per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory.
	N ₂ O Emissions Factor for combustion of each type of fuel (EF _{Fuel_i N₂O})	Kg N ₂ O per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory.
	Electricity consumed from grid. This amount should be adjusted for both functional equivalence and units of productivity.	kWh	Measured	Direct metering or reconciliation of invoices	Continuous Metering or invoice reconciliation	Frequency of metering and reconciliation is most frequent as possible.

	CO ₂ e Emissions Factor for electricity from the grid.	Kg CO ₂ e per kWh	Estimated	Official electricity generation and transmission company statistics should be used to determine the value.	Annual	These emission factors are adjusted annually in each countries emission's inventory
	Steamed consumed at the facility. This amount should be adjusted for both functional equivalence and units of productivity.	tonnes	Measured	Direct metering or reconciliation of invoices	Continuous Metering or invoice reconciliation	Frequency of metering and reconciliation is most frequent as possible.
	CO ₂ e Emissions Factor for local generation of steam	Kg CO ₂ e per tonne	Estimated	Using IPCC guidelines, an appropriate emissions factor should be specified in accordance with the facilities steam source	Annual	Steam generation characteristics are likely to remain relatively stable over a year's time.

SS	Parameter	Unit	Measured / Estimated	Method	Frequency	Justify measurement or estimation and frequency
B14 Waste Decomposition and Methane Release	Emissions _{Waste Decomposition and Methane Release} = (Mass _{Residue Disposed} * MCF * DOC * DOCF * F * 16/12 - R) * (1 - OX)					
	Emissions _{Waste Decomposition and Methane Release}	kg of CH ₄	N/A	N/A	N/A	The Quantity being calculated in aggregate form.
	Mass of Waste Material Sent to Landfill	kg	Measured	Direct measurement of mass of waste sent for disposal.	Continuous Metering or invoice reconciliation.	Both methods are standard practice. Frequency of metering is highest level possible.
	Methane Correction Factor[MCF]	-	Estimated	Calculated based on IPCC and CDM guidelines.	Annual	Values calculated based on values published by IPCC. Reference values adjusted periodically.
	Degradable Organic Carbon [DOC]	-	Estimated	Calculated based on IPCC and CDM guidelines.	Annual	Values calculated based on values published by IPCC. Reference values adjusted periodically.
	Fraction of Degradable Organic Carbon Dissimilated [DOCF]	-	Estimated	Calculated based on IPCC and CDM guidelines.	Annual	Values calculated based on values published by IPCC. Reference values adjusted periodically.
	Fraction of CH ₄ in Landfill Gas [F]	-	Estimated	From IPCC guidelines.	Annual	Values calculated based on values published by IPCC. Reference values adjusted periodically.

	Recovered CH4 at Landfill [R]	kg of CH4	Measured	Direct metering ⁴	Annual	Mass of methane collected and destroyed.
	Oxidation Factor / OX	-	Estimated	From IPCC guidelines.	Annual	Values calculated based on values published by IPCC. Reference values adjusted periodically.

⁴ If the landfill is unwilling to share their recovery factor, the project developer may use a conservative estimated value.

SS	Parameter	Unit	Measured / Estimated	Method	Frequency	Justify measurement or estimation and frequency
P10 Energy Consumption from Waste Processing	Emissions $\text{Energy Consumption from Waste Processing} = \sum [(Vol. Fuel_i * EF_{Fuel_i CO_2}) ; (Vol. Fuel_i * EF_{Fuel_i CH_4}) ; (Vol. Fuel_i * EF_{Fuel_i N_2O})] + [Electricity * EF_{Grid CO_2e}] + [Steam * EF_{Steam CO_2e}]$					
	Emissions _{Energy Consumption from Waste Processing}	Kg of CO ₂ ; CH ₄ ; N ₂ O; CO ₂ e	N/A	N/A	N/A	The Quantity being calculated in aggregate form.
	Volume of each type of fuel combusted. This volume of fuel should be adjusted for both functional equivalence and units of productivity.	L, m ³ , or other	Measured	Direct metering or reconciliation of volume in storage (including volumes received)	Continuous Metering or invoice reconciliation	Frequency of metering and reconciliation is most frequent as possible.
	CO ₂ Emissions Factor for combustion of each type of fuel (EF _{Fuel_i CO₂})	Kg CO ₂ per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory.
	CH ₄ Emissions Factor for combustion of each type of fuel (EF _{Fuel_i CH₄})	Kg CH ₄ per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory.
	N ₂ O Emissions Factor for combustion of each type of fuel (EF _{Fuel_i N₂O})	Kg N ₂ O per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory.
	Electricity consumed from grid. This amount should be adjusted for both functional equivalence and units of productivity.	kWh	Measured	Direct metering or reconciliation of invoices	Continuous Metering or invoice reconciliation	Frequency of metering and reconciliation is most frequent as possible.

	CO ₂ e Emissions Factor for electricity from the grid.	Kg CO ₂ e per kWh	Estimated	Official electricity generation and transmission company statistics should be used to determine the value.	Annual	These emission factors are adjusted annually in each countries emission's inventory
	Steamed consumed at the facility. This amount should be adjusted for both functional equivalence and units of productivity.	tonnes	Measured	Direct metering or reconciliation of invoices	Continuous Metering or invoice reconciliation	Frequency of metering and reconciliation is most frequent as possible.
	CO ₂ e Emissions Factor for local generation of steam	Kg CO ₂ e per tonne	Estimated	Using IPCC guidelines, an appropriate emissions factor should be specified in accordance with the facilities steam source	Annual	Steam generation characteristics are likely to remain relatively stable over a year's time.

SS	Parameter	Unit	Measured / Estimated	Method	Frequency	Justify measurement or estimation and frequency
P13 Waste Transportation to Landfill	Emissions_{Waste Transportation to Landfill} = $\sum [(Vol. Fuel_i * EF_{Fuel_i CO_2}) ; (Vol. Fuel_i * EF_{Fuel_i CH_4}) ; (Vol. Fuel_i * EF_{Fuel_i N_2O})]$					
	Emissions _{Waste Transportation to Landfill}	Kg of CO ₂ ; CH ₄ ; N ₂ O	N/A	N/A	N/A	The Quantity being calculated in aggregate form.
	Volume of each type of fuel combusted. This amount should be adjusted for both functional equivalence and units of productivity (i.e. tonnes of waste transported)	L, m ³ , or other	Measured	Direct metering or reconciliation of volume in storage (including volumes received)	Continuous Metering or invoice reconciliation	Frequency of metering and reconciliation is most frequent as possible.
	CO ₂ Emissions Factor for combustion of each type of fuel (EF _{Fuel_i CO₂})	Kg CO ₂ per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory
	CH ₄ Emissions Factor for combustion of each type of fuel (EF _{Fuel_i CH₄})	Kg CH ₄ per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory
	N ₂ O Emissions Factor for combustion of each type of fuel (EF _{Fuel_i N₂O})	Kg N ₂ O per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory

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SS	Parameter	Unit	Measured / Estimated	Method	Frequency	Justify measurement or estimation and frequency
P14 Waste Decomposition and Methane Release	Emissions _{Waste Decomposition and Methane Release} = (Mass _{Residue Disposed} * MCF * DOC * DOCF * F * 16/12 - R) * (1 - OX)					
	Emissions _{Waste Decomposition and Methane Release}	kg of CH ₄	N/A	N/A	N/A	The Quantity being calculated in aggregate form.
	Mass of Waste Material Sent to Landfill	kg	Measured	Direct measurement of mass of waste sent for disposal.	Continuous Metering or invoice reconciliation.	Both methods are standard practice. Frequency of metering is highest level possible.
	Methane Correction Factor [MCF]	-	Estimated	Calculated based on IPCC and CDM guidelines.	Annual	Values calculated based on values published by IPCC. Reference values adjusted periodically.
	Degradable Organic Carbon [DOC]	-	Estimated	Calculated based on IPCC and CDM guidelines.	Annual	Values calculated based on values published by IPCC. Reference values adjusted periodically.
	Fraction of Degradable Organic Carbon Dissimilated [DOCF]	-	Estimated	Calculated based on IPCC and CDM guidelines.	Annual	Values calculated based on values published by IPCC. Reference values adjusted periodically.
	Fraction of CH ₄ in Landfill Gas [F]	-	Estimated	From IPCC guidelines.	Annual	Values calculated based on values published by IPCC. Reference values adjusted periodically.

	Recovered CH4 at Landfill [R]	kg of CH4	Measured	Direct metering ⁵	Annual	Mass of methane collected and destroyed.
	Oxidation Factor [OX]	-	Estimated	From IPCC guidelines.	Annual	Values calculated based on values published by IPCC. Reference values adjusted periodically.

⁵ If the landfill is unwilling to share their recovery factor, the project developer may use a conservative estimated value.

SS	Parameter	Unit	Measured / Estimated	Method	Frequency	Justify measurement or estimation and frequency
P15 Waste Transportation to Alternative Location	Emissions $\text{Waste Transportation to Alternative Location} = \sum [(Vol. Fuel_i * EF_{Fuel_i CO_2}) ; (Vol. Fuel_i * EF_{Fuel_i CH_4}) ; (Vol. Fuel_i * EF_{Fuel_i N_2O})]$					
	Emissions _{Waste Transportation to Alternative Location}	Kg of CO ₂ ; CH ₄ ; N ₂ O	N/A	N/A	N/A	The Quantity being calculated in aggregate form.
	Volume of each type of fuel combusted. This amount should be adjusted for both functional equivalence and units of productivity (i.e. tonnes of waste transported)	L, m ³ , or other	Measured	Direct metering or reconciliation of volume in storage (including volumes received)	Continuous Metering or invoice reconciliation	Frequency of metering and reconciliation is most frequent as possible.
	CO ₂ Emissions Factor for combustion of each type of fuel (EF _{Fuel_i CO₂})	Kg CO ₂ per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory
	CH ₄ Emissions Factor for combustion of each type of fuel (EF _{Fuel_i CH₄})	Kg CH ₄ per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory
	N ₂ O Emissions Factor for combustion of each type of fuel (EF _{Fuel_i N₂O})	Kg N ₂ O per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory

SS	Parameter	Unit	Measured / Estimated	Method	Frequency	Justify measurement or estimation and frequency
P16 Energy Consumed from alternative waste processing / use	Emissions $\text{Energy Consumed from alternative waste processing / use} = \sum [(\text{Vol. Fuel}_i * \text{EF Fuel}_{i\text{CO}_2}) ; (\text{Vol. Fuel}_i * \text{EF Fuel}_{i\text{CH}_4}) ; (\text{Vol. Fuel}_i * \text{EF Fuel}_{i\text{N}_2\text{O}})] + [\text{Electricity} * \text{EF Grid}_{\text{CO}_2\text{e}}] + [\text{Steam} * \text{EF Steam}_{\text{CO}_2\text{e}}]$					
	Emissions _{Energy Consumed from alternative waste processing / use}	Kg of CO ₂ ; CH ₄ ; N ₂ O; CO ₂ e	N/A	N/A	N/A	The Quantity being calculated in aggregate form.
	Volume of each type of fuel combusted. This volume of fuel should be adjusted for both functional equivalence and units of productivity.	L, m ³ , or other	Measured	Direct metering or reconciliation of volume in storage (including volumes received)	Continuous Metering or invoice reconciliation	Frequency of metering and reconciliation is most frequent as possible.
	CO ₂ Emissions Factor for combustion of each type of fuel (EF Fuel _{iCO₂})	Kg CO ₂ per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory.
	CH ₄ Emissions Factor for combustion of each type of fuel (EF Fuel _{iCH₄})	Kg CH ₄ per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory.
	N ₂ O Emissions Factor for combustion of each type of fuel (EF Fuel _{iN₂O})	Kg N ₂ O per L, m ³ , or other	Estimated	From National GHG Inventory reference documents	Annual	These emission factors are adjusted annually in each countries emission's inventory.
	Electricity consumed from grid. This amount should be adjusted for both functional equivalence and units of productivity.	kWh	Measured	Direct metering or reconciliation of invoices	Continuous Metering or invoice reconciliation	Frequency of metering and reconciliation is most frequent as possible.

	CO ₂ e Emissions Factor for electricity from the grid.	Kg CO ₂ e per kWh	Estimated	Official electricity generation and transmission company statistics should be used to determine the value.	Annual	These emission factors are adjusted annually in each countries emission's inventory
	Steamed consumed at the facility. This amount should be adjusted for both functional equivalence and units of productivity.	tonnes	Measured	Direct metering or reconciliation of invoices	Continuous Metering or invoice reconciliation	Frequency of metering and reconciliation is most frequent as possible.
	CO ₂ e Emissions Factor for local generation of steam	Kg CO ₂ e per tonne	Estimated	Using IPCC guidelines, an appropriate emissions factor should be specified in accordance with the facilities steam source	Annual	Steam generation characteristics are likely to remain relatively stable over a year's time.

SS	Parameter	Unit	Measured / Estimated	Method	Frequency	Justify measurement or estimation and frequency
P17 Process Emissions from Alternative Waste Processing	Emissions $\text{Process Emissions from Alternative Waste Processing} = \sum [(\text{Mass}_{\text{CO}_2}) ; (\text{Mass}_{\text{N}_2\text{O}}) ; (\text{Mass}_{\text{CH}_4})]$					
	Emissions Process Emissions from Alternative Waste Processing	Kg of CO ₂ ; CH ₄ ; N ₂ O	N/A	N/A	N/A	The Quantity being calculated in aggregate form.
	Mass of CO ₂ emitted as a process emissions	Kg	Measured or Estimated	Measurement preferred – estimations based on IPCC and industry accepted method	Monthly or Event Based	Frequency should be determined based on the nature of the vented process stream
	Mass of CH ₄ emitted as a process emissions	Kg	Measured or Estimated	Measurement preferred – estimations based on IPCC and industry accepted method	Monthly or Event Based	Frequency should be determined based on the nature of the vented process stream
	Mass of N ₂ O emitted as a process emissions	Kg	Measured or Estimated	Measurement preferred – estimations based on IPCC and industry accepted method	Monthly or Event Based	Frequency should be determined based on the nature of the vented process stream

9.1 Description of the Monitoring Plan

Describe the criteria and procedures for obtaining, recording, compiling and analyzing data and information important for quantifying and reporting GHG emissions and/or removals relevant for the project and baseline scenario.

In general, data quality management must include sufficient data capture such that the mass and energy balances may be easily performed with the need for minimal assumptions and use of contingency procedures. The data should be of sufficient quality to fulfill the quantification requirements and be substantiated by company records for the purpose of verification.

The SCPS shall establish and apply quality management procedures to manage data and information. Written procedures should be established for each measurement task outlining responsibility, timing and record location requirements. The greater the rigor of the management system for the data, the more easily an audit will be to conduct for the project.

Record keeping practices should include:

- a. Electronic recording of values of logged primary parameters for each measurement interval;
- b. Offsite electronic back-up of all logged data;
- c. Written logs of operations and maintenance of the project system including notation of all shut-downs, start-ups and process adjustments;
- d. Retention of copies of logs and all logged data for a period of 7 years; and
- e. Keeping all records available for review by a verification body.

QA/QC should also be applied to add confidence that all measurements and calculations have been made correctly. These include, but are not limited to:

- a. Protecting monitoring equipment (sealed meters and data loggers);
- b. Protecting records of monitored data (hard copy and electronic storage);
- c. Checking data integrity on a regular and periodic basis (manual assessment, comparing redundant metered data, and detection of outstanding data/records);
- d. Comparing current estimates with previous estimates as a 'reality check';
- e. Provide sufficient training to operators to perform maintenance and calibration of monitoring devices;
- f. Establish minimum experience and requirements for operators in charge of project and monitoring; and
- g. Performing recalculations to make sure no mathematical errors have been made.

Sampling eligibility of a Territory within a SC

- Territory Project units connected to SC and which apply all or part of the SC activities (Identified EE ECM and Waste Diversion and Transportation Alternative Processing) are eligible for sampling as long their SC data are collected and stored in the SCSP system.
- The SCSP data collection and storage shall be centrally controlled and administered and demonstrate its capacity to identify those Project Units whose data impact inappropriately the confidence interval of the SC; these Project Units shall either be audited or excluded from the SC.

a. Sampling size

- The sample should be partly selective based on factors, such as importance of activities and GHG reduction volume, range of activities being conducted, exceptional performance (beyond Territory and sectoral performance) and partly nonselective, with at least 20% of the sample being selected at random.
- The SCSP shall have a documented procedure for determining the sample to be taken when verifying Project sites and submit for approval to the verification bodies.

b. For a Territory, there are 3 different levels of sampling:

- Normal: the size of the sample should be the square root of the number of Territory Project Units connected to the SCSP, rounded to the upper whole number.
- Reduced: the size of the sample should be the square root of the number of Territory Project Units connected to the SCSP reduced by a coefficient (max. 0.6) when the overall interval confidence of the SC data overpass the target value.
- Reinforced: the size of the sample should be the square root of the number of Territory Project Units connected to the SCSP increased by a coefficient (max. 1.3) when the overall interval confidence of the SC data is below the target value.

10 Appendices

Appendix A: CDM, “Tool for the demonstration and assessment of additionality”, (Version 05.2). <http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v5.2.pdf>



Methodological Tool

“Tool for the demonstration and assessment of additionality”

(Version 05.2)

- (1) The use of the “Tool for the demonstration and assessment of additionality” is not mandatory for project participants when proposing new methodologies. Project participants may propose alternative methods to demonstrate additionality for consideration by the Executive Board. They may also submit revisions to approved methodologies using the additionality tool.
- (2) Once the additionally tool is included in an approved methodology, its application by project participants using this methodology is mandatory.
- (3) Project activities with a start date before the date of validation shall specifically take into account the guidance provided in Chapter B “Specific guidelines for completing the Project Design Document (CDM-PDD)” section B, sub-section B-5. The “start date of a project activity” is as defined in paragraph 76 of thirty-third report of the Board.¹
- (4) Project activities that apply this tool in context of approved consolidated methodology ACM0002, only need to identify that there is at least one credible and feasible alternative that would be more attractive than the proposed project activity.

I. SCOPE AND APPLICABILITY

- (5) This document provides for a step-wise approach to demonstrate and assess additionality. These Steps include:
 - Identification of alternatives to the project activity;
 - Investment analysis to determine that the proposed project activity is either: 1) not the most economically or financially attractive, or 2) not economically or financially feasible;
 - Barriers analysis; and
 - Common practice analysis.

Based on the information about activities similar to the proposed project activity, the common practice analysis is to complement and reinforce the investment and/or barriers analysis.² The Steps are summarized in the flow-chart on page 2 of this document.

- (6) The document provides a general framework for demonstrating and assessing additionality and is applicable to a wide range of project types. Some project types may require adjustments to this general framework.
- (7) This tool does not replace the need for the baseline methodology to provide a step-wise approach to identify the baseline scenario. Project participants that propose new baseline methodologies shall ensure consistency between the determination of additionality of a project activity and the determination of a baseline scenario. Project participants can also use the “Tool for identification

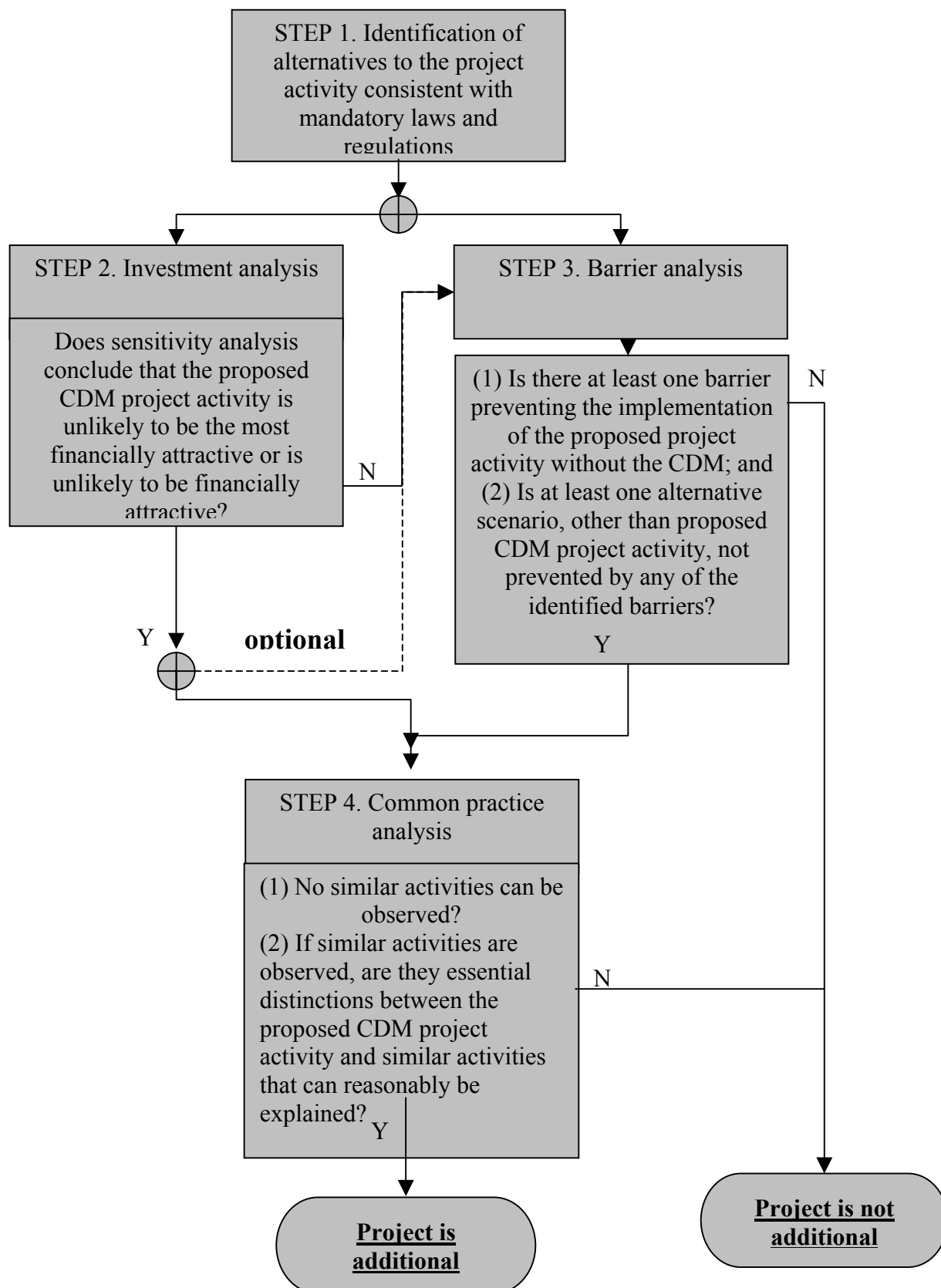
¹ The Board agreed to clarify that the primary purpose of defining the start date of a project activity is to ensure that project activities submitted for registration comply with the requirements of paragraph 13 of Decision 17/CP.7. In this context, it has always been the Board’s view that the start date of a CDM project activity is the earliest of the dates at which the implementation or construction or real action of the project activity begins.

² Project participants can use either investment analysis or barrier analysis step. They may, if they so wish, use both investment and barrier analysis step.



of baseline scenario and demonstration of additionality”, which provides a procedure for baseline scenario identification as well as additionality demonstration.

- (8) In validating the application of this tool, Designated Operation Entities (DOEs) shall carefully assess and verify the reliability and creditability of all data, rationales, assumptions, justifications and documentation provided by project participants to support the demonstration of additionality. The elements checked during this assessment and the conclusions shall be documented transparently in the validation report.



***Step 1: Identification of alternatives to the project activity consistent with current laws and regulations***

Define realistic and credible alternatives³ to the project activity(s) through the following Sub-steps:

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

- (1) Identify realistic and credible alternative(s) available to the project participants or similar project developers⁴ that provide outputs or services comparable with the proposed CDM project activity.⁵ These alternatives are to include:
 - (a) The proposed project activity undertaken without being registered as a CDM project activity;
 - (b) Other realistic and credible alternative scenario(s) to the proposed CDM project activity scenario that deliver outputs services (e.g., cement) or services (e.g. electricity, heat) with comparable quality, properties and application areas, taking into account, where relevant, examples of scenarios identified in the underlying methodology;
 - (c) If applicable, continuation of the current situation (no project activity or other alternatives undertaken).

If the proposed CDM project activity includes several different facilities, technologies, outputs or services, alternative scenarios for each of them should be identified separately. Realistic combinations of these should be considered as possible alternative scenarios to the proposed project activity.⁶

For the purpose of identifying relevant alternative scenarios, the project participant should include the technologies or practices that provide outputs (e.g. cement) or services (e.g. electricity, heat) with comparable quality, properties and application areas as the proposed CDM project activity and that have been implemented previously or are currently being introduced in the relevant country/region.

³ Reference to “alternatives” throughout this document denotes “alternative scenarios”.

⁴ For example, a coal-fired power station or hydropower may not be an alternative for an independent power producer investing in wind energy or for a sugar factory owner investing in a co-generation, but may be an alternative for a public utility. Alternatives are, therefore, related to technology and circumstances as well as to the investor.

⁵ For example:

- In the case of a project reducing emissions in the aluminum or cement production, the output provided by the alternative scenarios should be the production of the same quality of aluminum or the production of a cement type that can be used in the same applications as the cement type produced by the project activity.
- In the case of a project improving the energy efficiency of motors in a facility, the service provided is mechanical energy. Different scenarios to produce the same quantity of mechanical energy should be considered.
- In the case of a landfill gas capture project, the service provided by the project includes operation of a landfill. Alternatives scenarios to the project could include different ways to operate the landfill, such as no capture of methane, capture and flaring of the methane or capture and combustion of the methane for energy generation.

⁶ For example:

- In case of a cogeneration project activity, alternative scenarios for heat and electricity generation should be established separately.
- In case of a project that improves energy efficiency in several boilers with rather different characteristics (e.g. size, technology, age, etc), alternative scenarios should be established for each boiler or for types of boilers with broadly similar characteristics.



Outcome of Step 1a: Identified realistic and credible alternative scenario(s) to the project activity

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

- (2) The alternative(s) shall be in compliance with all mandatory applicable legal and regulatory requirements, even if these laws and regulations have objectives other than GHG reductions, e.g. to mitigate local air pollution. (This Sub-step does not consider national and local policies that do not have legally-binding status.)
- (3) If an alternative does not comply with all mandatory applicable legislation and regulations, then show that, based on an examination of current practice in the country or region in which the law or regulation applies, those applicable legal or regulatory requirements are systematically not enforced and that noncompliance with those requirements is widespread in the country. If this cannot be shown, then eliminate the alternative from further consideration;
- (4) If the proposed project activity is the only alternative amongst the ones considered by the project participants that is in compliance with mandatory regulations with which there is general compliance, then the proposed CDM project activity is not additional.

Outcome of Step 1b: Identified realistic and credible alternative scenario(s) to the project activity that are in compliance with mandatory legislation and regulations taking into account the enforcement in the region or country and EB decisions on national and/or sectoral policies and regulations.

“Proceed to Step 2 (Investment analysis) or Step 3 (Barrier analysis). (Project participants may also select to complete both Steps 2 and 3.)”

Step 2: Investment analysis

Determine whether the proposed project activity is not:

- (a) The most economically or financially attractive; or
- (b) Economically or financially feasible, without the revenue from the sale of certified emission reductions (CERs).

Please note guidance provided by the Board on investment analysis (attached as annex to this tool) shall be taken into account when applying this Step.

To conduct the investment analysis, use the following Sub-steps:

Sub-step 2a: Determine appropriate analysis method

- (1) Determine whether to apply simple cost analysis, investment comparison analysis or benchmark analysis (Sub-step 2b). If the CDM project activity and the alternatives identified in Step 1 generate no financial or economic benefits other than CDM related income, then apply the simple cost analysis (Option I). Otherwise, use the investment comparison analysis (Option II) or the benchmark analysis (Option III).

Sub-step 2b: Option I. Apply simple cost analysis

- (2) Document the costs associated with the CDM project activity and the alternatives identified in Step 1 and demonstrate that there is at least one alternative which is less costly than the project activity.

“If it is concluded that the proposed CDM project activity is more costly than at least one alternative then proceed to Step 4 (Common practice analysis)”.

Sub-step 2b: Option II. Apply investment comparison analysis

- (3) Identify the financial indicator, such as IRR, NPV, cost benefit ratio, or unit cost of service (e.g., levelized cost of electricity production in \$/kWh or levelized cost of delivered heat in \$/GJ) most suitable for the project type and decision-making context.

Sub-step 2b: Option III. Apply benchmark analysis

- (4) Identify the financial/economic indicator, such as IRR, most suitable for the project type and decision context.
- (5) When applying Option II or Option III, the financial/economic analysis shall be based on parameters that are standard in the market, considering the specific characteristics of the project type, but not linked to the subjective profitability expectation or risk profile of a particular project developer. Only in the particular case where the project activity can be implemented by the project participant, the specific financial/economic situation of the company undertaking the project activity can be considered.⁷
- (6) Discount rates and benchmarks shall be derived from:
 - (a) Government bond rates, increased by a suitable risk premium to reflect private investment and/or the project type, as substantiated by an independent (financial) expert or documented by official publicly available financial data;
 - (b) Estimates of the cost of financing and required return on capital (e.g. commercial lending rates and guarantees required for the country and the type of project activity concerned), based on bankers views and private equity investors/funds' required return on comparable projects;
 - (c) A company internal benchmark (weighted average capital cost of the company), only in the particular case referred to above in paragraph 5. The project developers shall demonstrate that this benchmark has been consistently used in the past, i.e. that project activities under similar conditions developed by the same company used the same benchmark;
 - (d) Government/official approved benchmark where such benchmarks are used for investment decisions;
 - (e) Any other indicators, if the project participants can demonstrate that the above Options are not applicable and their indicator is appropriately justified.

⁷ For example, when the project activity upgrades an existing process or uses a resource (i.e. some waste) available on the project site and that is not traded.

Sub-step 2c: Calculation and comparison of financial indicators (only applicable to Options II and III):

- (7) Calculate the suitable financial indicator for the proposed CDM project activity and, in the case of Option II above, for the other alternatives. Include all relevant costs (including, for example, the investment cost, the operations and maintenance costs), and revenues (excluding CER revenues, but possibly including *inter alia* subsidies/fiscal incentives,⁸ ODA, etc, where applicable), and, as appropriate, non-market cost and benefits in the case of public investors if this is standard practice for the selection of public investments in the host country.
- (8) Present the investment analysis in a transparent manner and provide all the relevant assumptions, preferably in the CDM-PDD, or in separate annexes to the CDM-PDD, so that a reader can reproduce the analysis and obtain the same results. Refer to all critical techno-economic parameters and assumptions (such as capital costs, fuel prices, lifetimes, and discount rate or cost of capital). Justify and/or cite assumptions in a manner that can be validated by the DOE. In calculating the financial/economic indicator, the project's risks can be included through the cash flow pattern, subject to project-specific expectations and assumptions (e.g. insurance premiums can be used in the calculation to reflect specific risk equivalents).
- (9) Assumptions and input data for the investment analysis shall not differ across the project activity and its alternatives, unless differences can be well substantiated.
- (10) Present in the CDM-PDD submitted for validation a clear comparison of the financial indicator for the proposed CDM activity and:
 - (a) The alternatives, if Option II (investment comparison analysis) is used. If one of the other alternatives has the best indicator (e.g. highest IRR), then the CDM project activity can not be considered as the most financially attractive;
 - (b) The financial benchmark, if Option III (benchmark analysis) is used. If the CDM project activity has a less favourable indicator (e.g. lower IRR) than the benchmark, then the CDM project activity cannot be considered as financially attractive.

Sub-step 2d: Sensitivity analysis (only applicable to Options II and III):

- (11) Include a sensitivity analysis that shows whether the conclusion regarding the financial/economic attractiveness is robust to reasonable variations in the critical assumptions. The investment analysis provides a valid argument in favour of additionality only if it consistently supports (for a realistic range of assumptions) the conclusion that the project activity is unlikely to be the most financially/economically attractive (as per Step 2c para 11a) or is unlikely to be financially/economically attractive (as per Step 2c para 11b).

Outcome of Step 2: If after the sensitivity analysis it is concluded that: (1) the proposed CDM project activity is unlikely to be the most financially/economically attractive (as per Step 2c para 11a) or is unlikely to be financially/economically attractive (as per Step 2c para 11b), then proceed to Step 4 (Common practice analysis).⁹

⁸ See EB guidance on the consideration of national/local/sectoral policies and measures for the baseline setting.

⁹ If the project participants so wish, they may apply the Step 3 (Barrier analysis) as well.

Otherwise, unless barrier analysis below is undertaken and indicates that the proposed project activity faces barriers that do not prevent at least one alternative from occurring, the project activity is considered not additional.

Step 3: Barrier analysis

If this Step is used, determine whether the proposed project activity faces barriers that:

- (a) Prevent the implementation of this type of proposed project activity; and
- (b) Do not prevent the implementation of at least one of the alternatives.

The identified barriers are only sufficient grounds for demonstration of additionality if they would prevent potential project proponents from carrying out the proposed project activity undertaken without being registered as a CDM project activity.

If the CDM does not alleviate the identified barriers that prevent the proposed project activity from occurring, then the project activity is not additional.

Use the following Sub-steps:

Sub-step 3a: Identify barriers that would prevent the implementation of the proposed CDM project activity:

- (1) Establish that there are realistic and credible barriers that would prevent the implementation of the proposed project activity from being carried out if the project activity was not registered as a CDM activity. Such realistic and credible barriers may include, among others:
 - (a) Investment barriers, other than the economic/financial barriers in Step 2 above, *inter alia*:
 - For alternatives undertaken and operated by private entities: Similar activities have only been implemented with grants or other non-commercial finance terms. Similar activities are defined as activities that rely on a broadly similar technology or practices, are of a similar scale, take place in a comparable environment with respect to regulatory framework and are undertaken in the relevant country/region;
 - No private capital is available from domestic or international capital markets due to real or perceived risks associated with investment in the country where the proposed CDM project activity is to be implemented, as demonstrated by the credit rating of the country or other country investments reports of reputed origin.
 - (b) Technological barriers, *inter alia*:
 - Skilled and/or properly trained labour to operate and maintain the technology is not available in the relevant country/region, which leads to an unacceptably high risk of equipment disrepair and malfunctioning or other underperformance;
 - Lack of infrastructure for implementation and logistics for maintenance of the technology (e.g. natural gas can not be used because of the lack of a gas transmission and distribution network);



- Risk of technological failure: the process/technology failure risk in the local circumstances is significantly greater than for other technologies that provide services or outputs comparable to those of the proposed CDM project activity, as demonstrated by relevant scientific literature or technology manufacturer information;
- The particular technology used in the proposed project activity is not available in the relevant region.

(c) Barriers due to prevailing practice, *inter alia*:

The project activity is the “first of its kind”.

(d) Other barriers, preferably specified in the underlying methodology as examples.

Outcome of Step 3a: Identified barriers that may prevent one or more alternative scenarios to occur.

Sub-step 3 b: Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the proposed project activity):

- (2) If the identified barriers also affect other alternatives, explain how they are affected less strongly than they affect the proposed CDM project activity. In other words, demonstrate that the identified barriers do not prevent the implementation of at least one of the alternatives. Any alternative that would be prevented by the barriers identified in Sub-step 3a is not a viable alternative, and shall be eliminated from consideration.
- (3) In applying Sub-steps 3a and 3b, provide transparent and documented evidence, and offer conservative interpretations of this documented evidence, as to how it demonstrates the existence and significance of the identified barriers and whether alternatives are prevented by these barriers. Anecdotal evidence can be included, but alone is not sufficient proof of barriers. The type of evidence to be provided should include at least one of the following:
 - (a) Relevant legislation, regulatory information or industry norms;
 - (b) Relevant (sectoral) studies or surveys (e.g. market surveys, technology studies, etc) undertaken by universities, research institutions, industry associations, companies, bilateral/multilateral institutions, etc;
 - (c) Relevant statistical data from national or international statistics;
 - (d) Documentation of relevant market data (e.g. market prices, tariffs, rules);
 - (e) Written documentation of independent expert judgments from industry, educational institutions (e.g. universities, technical schools, training centres), industry associations and others.

“If both Sub-steps 3a – 3b are satisfied, proceed to Step 4 (Common practice analysis)”.

“If one of the Sub-steps 3a – 3b is not satisfied, the project activity is not additional”.

Step 4: Common practice analysis

Unless the proposed project type has demonstrated to be first-of-its kind (according to Sub-step 3a), the above generic additionality tests shall be complemented with an analysis of the extent to which the proposed project type (e.g. technology or practice) has already diffused in the relevant sector and region. This test is a **credibility check** to complement the investment analysis (Step 2) or barrier analysis (Step 3). Identify and discuss the existing common practice through the following Sub-steps:

Sub-step 4a: Analyze other activities similar to the proposed project activity:

- (1) Provide an analysis of any other activities that are operational and that are similar to the proposed project activity. Projects are considered similar if they are in the same country/region and/or rely on a broadly similar technology, are of a similar scale, and take place in a comparable environment with respect to regulatory framework, investment climate, access to technology, access to financing, etc. Other CDM project activities (registered project activities and project activities which have been published on the UNFCCC website for global stakeholder consultation as part of the validation process) are not to be included in this analysis. Provide documented evidence and, where relevant, quantitative information. On the basis of that analysis, describe whether and to which extent similar activities have already diffused in the relevant region.

Sub-step 4b: Discuss any similar Options that are occurring:

- (2) If similar activities are widely observed and commonly carried out, it calls into question the claim that the proposed project activity is financially unattractive (as contended in Step 2) or faces barriers (as contended in Step 3). Therefore, if similar activities are identified above, then it is necessary to demonstrate why the existence of these activities does not contradict the claim that the proposed project activity is financially/economically unattractive or subject to barriers. This can be done by comparing the proposed project activity to the other similar activities, and pointing out and explaining essential distinctions between them that explain why the similar activities enjoyed certain benefits that rendered it financially/economically attractive (e.g., subsidies or other financial flows) and which the proposed project activity cannot use or did not face the barriers to which the proposed project activity is subject. If necessary data/information of some similar projects are not accessible for PPs to conduct this analysis, such projects can be excluded from this analysis. In case similar projects are not accessible, the PDD should include justification about non-accessibility of data/information.
- (3) Essential distinctions may include a serious change in circumstances under which the proposed CDM project activity will be implemented when compared to circumstances under which similar projects were carried out. For example, new barriers may have arisen, or promotional policies may have ended, leading to a situation in which the proposed CDM project activity would not be implemented without the incentive provided by the CDM. The change must be fundamental and verifiable.

“If Sub-steps 4a and 4b are satisfied, i.e.(i) similar activities cannot be observed or (ii) similar activities are observed, but essential distinctions between the project activity and similar activities can reasonably be explained, then the proposed project activity is additional)”.



“If Sub-steps 4a and 4b are not satisfied, i.e. similar activities can be observed and essential distinctions between the project activity and similar activities cannot reasonably be explained, the proposed CDM project activity is not additional.”



Annex: Guidance on the Assessment of Investment Analysis:

(Version 02)

Background

1. In consideration of issues identified through request for reviews and reviews of requests for registration the Executive Board considers it necessary to provide project participants and DOEs with guidance on the preparation, presentation and validation of investment analysis.
2. This general guidance is to be considered as a complement to existing materials in this area including, the “Tool for the demonstration and assessment of additionality”, “Combined tool to identify the baseline scenario and demonstrate additionality” and “Non-binding best practice examples to demonstrate additionality for SSC project activities”. The general guidance will be revised as appropriate to reflect the evolution of knowledge and best practice in this area.

General issues in calculation and presentation

3. **Guidance:** The period of assessment should not be limited to the proposed crediting period of the CDM project activity. Both project IRR and equity IRR calculations shall as a preference reflect the period of expected operation of the underlying project activity (technical lifetime), or - if a shorter period is chosen - include the fair value of the project activity assets at the end of the assessment period. In general a minimum period of 10 years and a maximum of 20 years will be appropriate. The IRR calculation may include the cost of major maintenance and/or rehabilitation if these are expected to be incurred during the period of assessment. Project participants are requested to justify and DOEs are requested to validate the appropriateness of the period of assessment in the context of the underlying project activity, without reference to the proposed CDM crediting period.
Rationale: The purposes of undertaking an investment analysis is to determine whether or not the project activity would be financially viable without the incentive of the CDM. The actual project activity is not limited in time to the crediting period being requested.
4. **Guidance:** The fair value of any project activity assets at the end of the assessment period should be included as a cash inflow in the final year. The fair value should be calculated in accordance with local accounting regulations where available, or international best practice. It is expected that such fair value calculations will include both the book value of the asset and the reasonable expectation of the potential profit or loss on the realization of the assets.
Rationale: Net Present Value (NPV) or Internal Rate of Return (IRR) calculations are designed to calculate the return on the cost of investment, in cases where the capital expenditures have not been fully devalued this should be reflected as a cash inflow. Not to apply a residual value would imply that the project must repay the full value of the capital expenditure before the value of this expenditure had been consumed.
5. **Guidance:** Depreciation, and other non-cash items related to the project activity, which have been deducted in estimating gross profits on which tax is calculated, should be added back to net profits for the purpose of calculating the financial indicator (e.g. IRR, NPV). Taxation should only be included as an expense in the IRR/NPV calculation in cases where the benchmark or other comparator is intended for post-tax comparisons.
Rationale: Depreciation is not an actual expense incurred by the company and as such does not directly affect the financial viability of the project. To treat both the capital cost of the assets and their

depreciation as an expense to the project would be a double counting of this cost. Taxation can only be considered a relevant expense if the indicator used for comparison purposes is intended for post tax comparisons.

6. **Guidance:** Input values used in all investment analysis should be valid and applicable at the time of the investment decision taken by the project participant. The DOE is therefore expected to validate the timing of the investment decision and the consistency and appropriateness of the input values with this timing. The DOE should also validate that the listed input values have been consistently applied in all calculations.

Rationale: The use of investment analysis to demonstrate additionality is intended to assess whether or not a reasonable investor would or not decide to proceed with a particular project activity without the benefits of the CDM. This decision will therefore be based on the relevant information available at the time of the investment decision and not information available at an earlier or later point. Any expenditures occurred prior to the decision to proceed with the investment in the project will not impact the final investment decision as such expenses sunk costs which remain unaffected by the decision to proceed or not with a project activity.

7. **Guidance:** In the case of project activities for which implementation ceases after the commencement and where implementation is recommenced due to consideration of the CDM the investment analysis should reflect the economic decision making context at point of the decision to recommence the project. Therefore capital costs incurred prior to the revised project activity start date can be reflected as the recoverable value of the assets, which are limited to the potential reuse/resale of tangible assets.¹⁰

Rationale: At the point of taking a decision to restart implementation of a project as a CDM project activity, the key issue of interest to an investor is the costs and revenues including the incentives from the CDM accruing from continuation of the investment.

8. **Guidance:** Project participants should supply spreadsheet versions of all investment analysis. All formulas used in this analysis be readable and all relevant cells be viewable and unprotected. The spreadsheet will be made available to the Executive Board, UNFCCC secretariat and others contracted to assess the request for registration on behalf of the Board including assigned members of the Registration and Issuance Team. In cases where the project participant does not wish to make such a spreadsheet available to the public an exact read-only or PDF copy shall be provided for general publication. In case the PP wishes to black-out certain elements of the publicly available version, a clear justification for this shall be provided to the UNFCCC secretariat by the DOE when requesting registration.

Rationale: Paragraph 6 of Step 2 of the Tool for the demonstration and assessment of additionality (version 4) requires that investment analysis be presented in a transparent manner, to the extent that the reader can reproduce the results.

¹⁰ Capital expenditures should be included not at the original investment costs but at the market fair value at the point of the decision to proceed with the investment, demonstrating the value through assessments done by chartered specialists.

Specific Guidance on the Calculation of Project IRR and Equity IRR

9. **Guidance:** The cost of financing expenditures (i.e. loan repayments and interest) should not be included in the calculation of project IRR.
Rationale: The purpose of the project IRR calculation is to determine the viability of the project to service debt. Therefore to include the cost of financing as an expense in this calculation would result in a double counting of this cost in the ultimate analysis.
10. **Guidance:** In the calculation of equity IRR only the portion of investment costs which is financed by equity should be considered as the net cash outflow, the portion of the investment costs which is financed by debt should not be considered a cash outflow.
Rationale: The purpose of the equity IRR calculation is to determine the final return on the initial equity investment. In such calculations cost of servicing debt (interest and principle payments) are considered as costs. Therefore to consider all investment costs to be a cash outflow would double count the cost of debt to the equity investor.

Selection and Validation of Appropriate Benchmarks

11. **Guidance:** In cases where a benchmark approach is used the applied benchmark shall be appropriate to the type of IRR calculated. Local commercial lending rates or weighted average costs of capital (WACC) are appropriate benchmarks for a project IRR. Required/expected returns on equity are appropriate benchmarks for an equity IRR. Benchmarks supplied by relevant national authorities are also appropriate if the DOE can validate that they are applicable to the project activity and the type of IRR calculation presented.
Rationale: For the same project activity the project IRR and equity IRR will be different, therefore the benchmark shall be appropriate to the type of calculation applied.
12. **Guidance:** In the cases of projects which could be developed by an entity other than the project participant the **benchmark** should be based on publicly available data sources which can be clearly validated by the DOE. Such data sources may include local lending and borrowing rates, equity indices, or benchmarks determined by relevant national authorities. The DOE's validation of such benchmarks shall also include its opinion of the suitability of the benchmark applied in the context of the underlying project activity.
Rationale: If the project could be developed by a different entity the unwillingness of one investor to assume the associated risks is not sufficient evidence that the project is additional, as this may be based on the subjective profit expectations of that investor. The applied benchmark must be suitable for the specific proposed project activity. It is not suitable to compare the return of low risk investments with the returns achieved or achievable by higher risk investments.
13. **Guidance:** Internal company benchmarks/expected returns (including those used as the expected return on equity in the calculation of a weighted average cost of capital - WACC), should only be applied in cases where there is only one possible project developer and should be demonstrated to have been used for similar projects with similar risks, developed by the same company or, if the company is brand new, would have been used for similar projects in the same sector in the country/region. This shall require as a minimum clear evidence of the resolution by the company's Board and/or shareholders and will require the validating DOE to undertake a thorough assessment of the financial statements of the project developer - including the proposed WACC - to assess the past financial behavior of the entity during at least the last 3 years in relation to similar projects.

Rationale: Paragraph 4 of the Tool for the demonstration and assessment of additionality (version 3) requires that benchmarks should not include the subjective profitability expectations or risk profile of a particular project developer.

14. **Guidance:** Risk premiums applied in the determination of required returns on equity shall reflect the risk profile of the project activity being assessed, established according to national/international accounting principles. It is not considered reasonable to apply the rate general stock market returns as a risk premium for project activities that face a different risk profile than an investment in such indices. **Rationale:** The required rate of return for any project activity will necessarily reflect the underlying risk profile of this project. To apply generalized risk profiles may result in an over statement of the rate of return required to attract investment in a specific project type.

Investment comparison analysis and benchmark analysis

15. **Guidance:** If the proposed baseline scenario leaves the project participant no other choice than to make an investment to supply the same (or substitute) products or services, a benchmark analysis is not appropriate and an investment comparison analysis shall be used. If the alternative to the project activity is the supply of electricity from a grid this is not to be considered an investment and a benchmark approach is considered appropriate. **Rationale:** The purpose of an investment analysis in the context of the CDM is to determine whether the project is less financially attractive than at least one alternative in which the project participants could have invested. In cases where the alternative requires investment anyhow and baseline emissions are based on that alternative, the only means of determining that the project activity is less financially attractive than at least one alternative is to conduct an investment comparison analysis. 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.

Sensitivity analysis

16. **Guidance:** Only variables, including the initial investment cost, that constitute more than 20% of either total project costs or total project revenues should be subjected to reasonable variation (all parameters varied need not necessarily be subjected to both negative and positive variations of the same magnitude), and the results of this variation should be presented in the PDD and be reproducible in the associated spreadsheets.. Where a DOE considers that a variable which constitute less than 20% have a material impact on the analysis they shall raise a corrective action request to include this variable in the sensitivity analysis **Rationale:** The initial objective of a sensitivity analysis is to determine in which scenarios the project activity would pass the benchmark or become more favorable than the alternative.
17. **Guidance:** The DOE should assess in detail whether the range of variations is reasonable in the project context. Past trends may be a guide to determine the reasonable range. As a general point of departure variations in the sensitivity analysis should at least cover a range of +10% and –10%, unless this is not deemed appropriate in the context of the specific project circumstances. In cases where a scenario will result in the project activity passing the benchmark or becoming the most financially attractive alternative the DOE shall provide an assessment of the probability of the occurrence of this scenario in comparison to the likelihood of the assumptions in the presented investment analysis, taking into consideration correlations between the variables as well as the specific socio-economic and policy context of the project activity.



Rationale: The ultimate objective of the sensitivity analysis is to determine the likelihood of the occurrence of a scenario other than the scenario presented, in order to provide a cross-check on the suitability of the assumptions used in the development of the investment analysis.

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History of the document

Version	Date	Nature of revision
05.2	26 August 2008	Updated with version 2 of the annex “Guidance on the assessment of investment analysis”.
05.1	25 July 2008	Addition of the “Guidance on the assessment of investment analysis” as an annex to the Additionality Tool.
05	EB 39, Annex 10 16 May 2008	• Changes in scope and applicability. • Clarity in the conditions under which different approaches, provided in Step 2: Investment analysis can be applied. • Clarity in the appropriate choice of the benchmark for the assessment of additionality when using benchmark analysis. • Footnote 6 deleted.
04	EB 36, Annex 16 30 November 2007	Footnote 7 revised.
03	EB 29, Annex 05 16 February 2007	• Removed Step-0 and Step-5 from Tool and other small changes done. • The tool is aligned with combined tool.
02	EB 22, Annex 08 25 November 2005	Footnote 2 added providing clarity on evidence for the incentive from CDM to be submitted by project proponents as per Step-0 1b).
01	EB 16, Annex 01 22 October 2004	Initial adoption.