ENERGY INDUSTRIES

|  | Parameter | Units | Remarks |
| --- | --- | --- | --- |
| Grid Emission Factor | Share of Low Cost Must Run (LCMR) power plants/units in the electricity system in the past 5 years | % of total generation | All the parameters are as defined in the CDM Methodological Tool 07, version 5 – “Tool to calculate the emission factor of an electricity system” (UNFCCC, CDM, PA Methodologies, 2016) |
| Annual data from each power plant/unit on power generation | MWh | Data should be measured using calibrated meters and collected using the Quality Assurance System (QAS) established by the CEB. |
| Annual data from each power plant/unit on fuel type |  | The fuel type determines the fuels for which emission factors and net calorific values (NCV) are needed. |
| Annual data from each power plant on fuel/unit consumption | t | Data are recorded using the QAS established by the CEB. |
| NCV of each type of fuel used in power plants/units | GJ/tonne fuel | Uses laboratory data from CEB for fuel oil and kerosene, and IPPs for coal. |
| Emission factor of each type of fuel used in power plants/units | tCO2/GJ | Uses IPCC default values. |
| Annual electricity generated from renewable energy sources | MWh | Data should be measured using calibrated meters and collected using the QAS established by the CEB |
| Avoided electricity through demand side management | MWh | * Reduction in electricity use against historical baseline * Surveys carried out by EEMO * Data collected during energy audits * At the project level, the parameters defined in CDM Approved Small-Scale methodologies, such as AMS-II.C; II.D; II.E; II.J; II.L; II.N; II.O; II.Q; II.R; II.S need to be measured (UNFCCC, CDM, SSC Methodologies, 2016). |

LAND TRANSPORT

|  | Parameter | Units | Remarks |
| --- | --- | --- | --- |
| Passenger Mobility | Average annual distance travelled by different types of passenger vehicles (e.g. two-wheelers, car, bus, DPV) and broken down by fuel type (e.g. LPG, gasoline, diesel, hybrid, electric) | km per year | This has to be carried out through sampling and is a parameter that may be collected by the road worthiness test centres. |
| Average occupancy of different types of passenger vehicles and broken down by fuel type | Number of passengers | Data should be measured through surveys. |
| Average fuel consumption of different types of passenger vehicles and broken down by fuel type | L fuel per 100km travelled | Data should be measured through surveys using methodology adopted by the Global Fuel Economy Initiative (GFEI) project. |
| Number of registered passenger vehicles and broken down by fuel type | Number of passenger vehicles | Although these data are not used in the model, they can nevertheless be used to carry out cross verification of the model output. |
| NCV of each type of fuel used in vehicles | GJ/tonne fuel | Uses IPCC default values or can use laboratory data from national authorities (preferred). |
| Emission factor of each type of fuel used in passenger vehicles | tCO2/GJ | Uses IPCC default values or can use Tier 2 factors when available. |
| Freight Mobility | Average annual distance travelled by freight vehicles (diesel or gasoline) | Km per year | This has to be carried out through sampling and is a parameter that may be collected by the road worthiness test centres. Although not used in the model, it will be useful to collect data by categorising freight vehicles by tare or maximum load. |
| Average load of freight carried by vehicles | t | Data should be measured through surveys. |
| Average fuel consumption of freight vehicles | L fuel per 100km travelled | Data should be measured through surveys using methodology adopted by the Global Fuel Economy Initiative (GFEI) project. Data can also be collected for different types of freight vehicles classified by tare. |
| Number of registered freight vehicles by fuel type and size of vehicles (e.g. tare or maximum load) | Number of freight vehicles | Although these data are not used in the model, they can nevertheless be used to carry out cross verification of the model output. |
| Net calorific value (NCV) of each type of fuel used in vehicles | GJ/tonne fuel | Uses IPCC default values or can use laboratory data from national authorities (preferred). |
| Emission factor of each type of fuel used in passenger vehicles | tCO2/GJ | Uses IPCC default values or can use Tier 2 factors when available. |
| Aggregate fuel statistics | Quantity of total annual fuel consumed in land transport by fuel type | t per year | This data are already available at Statistics Mauritius. It is used in the model for carrying out the energy balance and for tracking overall national GHG emissions. |

SOLID WASTE

| Parameter | Units | Remarks |
| --- | --- | --- |
| Population (annual) | Number of persons | Population given by Mauritius Statistical Department |
| Per capita waste generated | Kg/person/year | This value is calculated by dividing the total quantity of MSW generated (tonne) in a year by the population in that year. The Solid Waste Management Division, MoESWMCC, compiles the quantity of total waste generated/collected. |
| Composition of waste | % | The total waste is disaggregated into its various components such as food, garden, paper, wood, inert, etc. The data is taken from the Republic of Mauritius records, ***Fitchner for Year 2000-2008; Gamma for Year 2009-2013 and University of Mauritius for Year 2014*** |
| Quantity of MSW generated | Kg (or equivalent) | Mauritius Statistical Department Republic of Mauritius (ROM) |
|  |  |  |
| Quantity of industrial waste | Kg (or equivalent) | Statistics of Mauritius |
| Quantity of waste diverted from landfill for alternative uses (e.g. recycling, composting and waste-to-energy) | Kg (or equivalent) | These quantities are recorded and are available at the Solid Waste Management Division, MoESWMCC. |
| LFG capture (either for flaring or electricity generation) | Kg CH4 (or equivalent units) | Data are recorded and available at the Solid Waste Division, MoESWMCC |
| Degradable Organic Carbon (DOC) in various types of solid waste | Dimensionless | Uses IPCC default values. |
| Fraction of DOC (DOCf) | Dimensionless | Uses IPCC default values. |
| Emission factor | Dimensionless | Uses IPCC default values |

LULUCF

|  | Parameter | Units | Remarks |
| --- | --- | --- | --- |
| **carbon stocks and change in**  **carbon stocks** | Carbon fraction of tree biomass (CFtree) | t C t-1d.m. | A value of 0.5 shall be used unless transparent and verifiable  information can be provided to justify a different value |
| Carbon fraction of litter biomass (CFLI) | t C t-1 d.m. | IPCC default value of 0.37 t C t-1 d.m. may be used |
| Basic wood density for species j (DJ) | t d.m. m-3 | Values from Table 3A.1.9 of IPCC GPG-LULUCF 2003 are used  unless transparent and verifiable information can be provided to  justify different values |
| Conservative default factor expressing carbon stock in dead wood as  a percentage of carbon stock in tree biomass (DFDW) | Per cent (%) | Defaults conservatively derived from Delaney et al. 1997, Smith et  al. 2006, Glenday 2008, Keller et al. 2004, Eaton and Lawrence  2006, Krankina and Harmon 1995, and Clark et al 2002:15 |
| Default factor for the relationship between carbon stock in litter and  carbon stock in living trees (DFLI) | Per cent (%) | Defaults conservatively derived from sources cited above |
| Root-shoot ratio for species *j (RJ)* | Dimensionless | The value of Rj shall be calculated as: R = exp[-1.085+0.9256xln(A)]/A, where A is above-ground biomass  (t d.m. ha-1) [Source: Table 4.A.4 of IPCC GPG-LULUCF 2003]  unless transparent and verifiable information can be provided to justify a different value |
| Area of stratum *i (*Ai) | Ha | Field measurement [Standard operating procedures (SOPs) prescribed under national  forest inventory are applied. In the absence of these, SOPs from published handbooks, or from the IPCC GPG LULUCF 2003, may be applied] |
| Total area of sample plots in stratum i (Aplot,i) | Ha | Field measurement [Standard operating procedures (SOPs) prescribed under national  forest inventory are applied. In the absence of these, SOPs from published handbooks, or from the IPCC GPG LULUCF 2003, may be applied] |
| Diameter at breast height of a tree (DBH) | cm or any unit of length as specified | Field measurements in sample plots,  Measurement methods -Standard operating procedures (SOPs) prescribed under national  forest inventory are applied. In the absence of these, SOPs from  published handbooks, or from the IPCC GPG LULUCF 2003, may be  applied |
| Height of tree (H) | m or any other unit of length as specified | Field measurements in sample plots  Measurement Procedures- Standard operating procedures (SOPs) prescribed under national forest inventory are applied. In the absence of these, SOPs from published handbooks, or from the IPCC GPG LULUCF 2003, may be applied |
| Time period elapsed between two successive estimations of carbon  Stock (T) | year | If the two successive estimations of carbon stock are carried out at different points of time in year t2 and t1, (e.g. in the month of April in year t1 and in the month of September in year t2), then a fractional value shall be assigned to T |
| GHG emissions attributable to displacement of pre-project agricultural activities | Area of a sample plot; area of a stratum (Aplot, Ashrub, Ai) | Ha | Field measurement  Measurement Procedures- Standard operating procedures (SOPs) prescribed under national forest inventory are applied. In the absence of these, SOPs from published handbooks, or from the IPCC GPG LULUCF 2003, are applied |
| Crown cover of shrubs in shrub biomass stratum i (CCshrub) | Dimensionless | Field measurement  [Considering that the biomass in shrubs is smaller than the biomass in trees, a simplified method of measurement may be used for estimating shrub crown cover. Ocular estimation of crown cover may be carried out or any other method such as the line transect method or the relascope method may be applied] |
| Afforestation and reforestation (sequestration scenarios) | Crown cover of trees in the baseline stratum I (CCtree\_BSL,i) | Dimensionless | Field measurement,  Measurement Procedures- Considering that the biomass in trees in the baseline is smaller compared to the biomass in trees in the project, a simplified method of measurement may be used for estimating tree crown cover. Ocular estimation of tree crown cover may be carried out or any other method such as the line transect method or the relascope method may be applied |
| Area of land from which agricultural activity is being displaced in year t (Adisp,t) | Ha | Field measurement  [Standard operating procedures (SOPs) prescribed under national forest inventory are applied. In the absence of these, SOPs from published handbooks, or from the IPCC GPG LULUCF 2003, are applied] |
| Baseline net GHG removals by sinks in year t | t CO2-e | Calculations of baseline emissions |
| Density Overbark of tree stem for tree species (Dj) | t d.m. m-3 | Calculation of carbon stocks and changes in carbon stock |

LIVESTOCK

|  | Parameter | Units | Remarks |
| --- | --- | --- | --- |
| GHG Mitigation measures and manure management systems | Number of animal heads per year by livestock type | No. of heads | The livestock types covered in the analyses are: dairy cow, other cattle (calves, heifers, local and imported bulls), sheep, goats, horses, swine, poultry and deer).  Purpose: Calculation of baseline and project emissions |
| volatile solids (VS) degradation factor (RVS,n) | Fraction | Animal Manure Management- GHG mitigation – CDM methodologies |
| N2O emission factors (direct and indirect emissions), EFN2O, D,j, EFN2O,ID,j | kg N2O-N/ kg N and kg N2O-N/ kg NH3-N and NOX-N | Default values in IPCC 2006 Guidelines may be used because country specific or region-specific data are not available |
| Fraction of N lost due to volatilization, Fgasm | Fraction | Default values in IPCC 2006 Guidelines may be used because country  specific or region-specific data are not available. |
| N2O emission factor from soil and runoff water (EF) | kg N2O-N/ kg N for EF | Default values in IPCC 2006 Guidelines may be used because country  specific or region-specific data are not available. |
| Methane conversion factor for leakage calculation assumed to be equal to 1 (MCFd) | t/m3 | CDM methodologies ACM 0010 |
| Amount of biogas collected at the digester outlet in year y (Qbiogas,y) | Nm3 biogas | The volumetric flow measurement should always refer to the actual pressure and temperature. Instruments with recordable electronic signal (analogical or digital) are required |
| Average chemical oxygen demand (COD) of the liquid digestate in  year y (PCOD,y) | t COD / m3 | Samples should be collected based on the “2005 Standard Methods for the Examination of Water and Wastewater, 21st. American Public Health Association, Water Environment Federation and American Water Works Association” or any other equivalent national or international standard |
| Amount of liquid digestate stored anaerobically in year y (Qstored,y) | m3 | Using flow meters - “Determining LE storage, y for liquid digestate” |
| Combined margin emission factor for the grid in year y (EFgrid,CM,y) | t CO2/MWh | Calculate the combined margin emission factor, using the procedures in the latest approved version of the “Tool to calculate the emission factor for an electricity system”. As per the “Tool to calculate the emission factor for an electricity system” |
| Quantity of electricity generated and supplied by the project power  plant to the grid in year y  Quantity of electricity generated and supplied by the project power  plant to the consumers/electricity consuming facility i in year y (EGPJ,grid,y or EGPJ,facility,I,y) | MWh/yr | Direct measurement or calculated based on measurements from more than one electricity meters.  [Use electricity meters installed at the grid interface for electricity export to grid and for supply to captive consumers use electricity meters installed at the entrance of the electricity consuming facility]. |
| Oxidation factor (reflecting the amount of methane from SWDS that is  oxidized in the soil or other material covering the waste) (OX) | 0.1 | Based on an extensive review of published literature on this subject,  including the IPCC 2006 Guidelines for National Greenhouse Gas  Inventories.  When methane passes through the top-layer, part of it is oxidized by methanotrophic bacteria to produce CO2. The oxidation factor represents the proportion of methane that is oxidized to CO2 This should be distinguished from the methane correction factor (MCF) which is to account for the situation that ambient air might intrude into  the SWDS and prevent methane from being formed in the upper layer of SWDS |
| Fraction of methane in the SWDS gas (volume fraction) [F] | 0.5 | IPCC 2006 Guidelines for National Greenhouse Gas Inventories [Upon biodegradation, organic material is converted to a mixture of  methane and carbon dioxide] |
| Methane correction factor (MCFdefault) | - | IPCC 2006 Guidelines for National Greenhouse Gas Inventories  [MCF accounts for the fact that unmanaged SWDS produce less methane from a given amount of waste than managed SWDS, because a larger fraction of waste decomposes aerobically in the top layers of unmanaged SWDS. In case of a water table above the bottom of the SWDS, a larger proportion of the SWDS is anaerobic] |
| Fraction of degradable organic carbon in the waste type j (weight  fraction) (DOCj) | - | IPCC 2006 Guidelines for National Greenhouse Gas Inventories  (adapted from Volume 5, Tables 2.4 and 2.5) |
| Decay rate for the waste type j (kj) | 1/yr | IPCC 2006 Guidelines for National Greenhouse Gas Inventories  (adapted from Volume 5, Table 3.3) |