Protocol for the quantification
of greenhouse gas emissions from
waste management activities

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Table 1 -> Synthesis of main direct & indirect source types met in waste management activities

Activity	Direct Emissions Sources	Indirect Emissions Sources	Avoided Emissions Sources	Biogenic CO_2 Emissions Sources
Collection & Transportation	-> CO_2 from fuel consumption -> HFC from A/C leakages	-> CO_2 from electric vehicles -> CO_2 from outsourced transport	N.A.	-> CO_2 from consumption of biomass energy (biofuels, bioliquids, solid biomass, biogases)
Transfer	-> CO_2 from fuel consumption	-> CO_2 from purchased electricity consumption	N.A.	-> CO_2 from consumption of biomass energy (biofuels, bioliquids, solid biomass, biogases)
Mechanical Pre-treatment (dismantling)	-> CO_2 from fuel consumption	-> CO_2 from purchased electricity consumption	N.A.	-> CO_2 from consumption of biomass energy (biofuels, bioliquids, solid biomass, biogases)
Sorting, Recycling & Recovering	-> CO_2 from fuel consumption -> HFC emissions from WEEE dismantling	-> CO_2 from purchased electricity consumption	-> Potential avoided GHG emissions corresponding to the difference between virgin raw material production emissions and material recovery emissions -> Potential avoided GHG emissions corresponding to the difference between burning fossil fuel and solid recovered fuels (SRF)	-> CO_2 from consumption of biomass energy (biofuels, bioliquids, solid biomass, biogases)
Physico-chemical waste treatment	-> CO_2 from fuel consumption	-> CO_2 from purchased electricity consumption	-> Potential avoided GHG emissions corresponding to the difference between burning fossil fuel and alternative fuels	-> CO_2 from consumption of biomass energy (biofuels, bioliquids, solid biomass, biogases)
Biological Treatment (composting)	-> CO_2 from fuel consumption -> Process emissions (CH_4 and N_2O)	-> CO_2 from purchased electricity consumption	-> Potential avoided GHG emissions corresponding to the difference between use of chemical fertilizer and compost spreading	-> CO_2 from consumption of biomass energy (biofuels, bioliquids, solid biomass, biogases) -> CO_2 process emissions

Table 1 (continued)

Activity	Direct Emissions Sources	Indirect Emissions Sources	Avoided Emissions Sources	Biogenic CO₂ Emissions Sources
Biological Treatment (Anaerobic Digestion)	-> CO2 from fuel consumption -> Process emissions (CH4 and N2O)	-> CO2 from purchased electricity consumption	-> Potential avoided GHG emissions corresponding to the difference between biogas recovery emissions (as power, heat and/or fuel) and substituted energy production emissions	-> CO2 from consumption of biomass energy (biofuels, bioliquids, solid biomass, biogases) -> CO2 process emissions -> CO2 from biogas combustion
Landfill	-> CO2 from fuel consumption -> Diffuse CH4 emissions -> CH4 from incomplete landfill gas combustion	-> CO2 from purchased electricity consumption	-> Potential avoided GHG emissions corresponding to the difference between landfill gas recovery emissions (as power, heat and/or fuel) and substituted energy production emissions	-> CO2 from consumption of biomass energy (biofuels, bioliquids, solid biomass, biogases) -> Diffuse CO2 & oxidised CH4 emissions -> CO2 from landfill gas combustion process
Thermal treatment	-> CO2 from fuel consumption -> N2O process emissions -> CO2 process emissions (only the fossil carbon share of the waste)	-> CO2 from purchased electricity consumption	-> Potential avoided GHG emissions corresponding to the difference between energy from thermal treatment processes recovery (as power and/or heat) emissions and substituted energy production emissions. -> Potential avoided GHG emissions corresponding to the difference between virgin raw material production emissions and material recovery emissions (e.g. slag, scrap, metals and bottom ashes)	-> CO2 from consumption of biomass energy (biofuels, bioliquids, solid biomass, biogases) -> CO2 process emissions (the biogenic carbone share of the waste)
Mechanical Biological Treatment (MBT)	-> CO2 from fuel consumption -> Process emissions (CH4, N2O)	-> CO2 from purchased electricity consumption	-> Potential avoided GHG emissions corresponding to the difference between biogas recovery emissions (as power, heat and/or fuel) and substituted energy production emissions -> Potential avoided GHG emissions corresponding to the difference between virgin raw material production emissions and material recovery emissions (compost production, alternative fuels, material recovery,...)	-> CO2 from consumption of biomass energy (biofuels, bioliquids, solid biomass, biogases) -> CO2 process emissions