Incineration and co-combustion of waste: accounting of greenhouse gases and global warming contributions - DTU Orbit (31/12/2018)

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Important greenhouse gas (GHG) emissions related to waste incineration and co-combustion of waste were identified and considered relative to critical aspects such as: the contents of biogenic and fossil carbon, N2O emissions, fuel and material consumptions at the plants, energy recovery, and solid residues generated. GHG contributions were categorized with respect to direct emissions from the combustion plant as well as indirect upstream contributions (e.g. provision of fuels and materials) and indirect downstream contributions (e.g. substitution of electricity and heat produced elsewhere). GHG accounting was done per tonne of waste received at the plant. The content of fossil carbon in the input waste, for example as plastic, was found to be critical for the overall level of the GHG emissions, but also the energy conversion efficiencies were essential. The emission factors for electricity provision (also substituted electricity) affected the indirect downstream emissions with a factor of 3—9 depending on the type of electricity generation assumed. Provision of auxiliary fuels, materials and resources corresponded to up to 40% of the direct emission from the plants (which were 347—371 kg CO2-eq. tonne−1 of waste for incineration and 735—803 kg CO2-eq. tonne−1 of waste for co-combustion). Indirect downstream savings were within the range of —480 to —1373 kg CO2eq. tonne−1 of waste for incineration and within —181 to —2607 kg CO2-eq. tonne−1 of waste for co-combustion. N2O emissions and residue management did not appear to play significant roles.