17 Hanbury Close, Cheshunt, Herts EN8 9BZ

Environmental Ratios & Calculations

CO_2 emissions (tonnes) = Energy consumption (kWh) x Fuel emission factor (kg CO_2/kWh) x 0.001

CO_2 emissions (tonnes) = Energy Consumption (kWh) x emission factor (kgCO_2/kWh) x 0.001

CO_2 emissions (tonnes) = 500 x 0.43 (this is the factor for electricity from the grid) x 0.001

CO_2 baseline emissions = 0.22 tonnes CO_2/day

Energy and Fuel Consumed	Emission Factor (kg CO_2/kWh)
Electricity	
Electricity from grid	0.43
Renewable sources	0.00
Fuels	
Natural gas	0.19
Gas/diesel oil	0.25
Petrol	0.24
Heavy fuel oil	0.26
Coal	0.30
Coking coal	0.30
Coke	0.37
LPG	0.21
Jet kerosene	0.24
Ethane	0.20
Naphtha	0.26
Waste	0.25
Petroleum	0.34
Refinery gas	0.20
Other oil	0.24
Renewables	0.00

Table 2. Standard conversion factors for energy units

Energy Unit	Kilowatt hour (kWh) Equivalent
1 tonne oil equivalent	11630
1 therm	29.31
1 Giga joule	277.8

Table 3. Default calorific values

Fuel	Kilowatt hour per tonne	Kilowatt hour per litre
Solid fuels		
Coal (average)	7583	
Coke	8277	
Liquid fuels		
Ethane	14083	5.2
LPG	13722	7.4
Jet kerosene	12833	10.3
Petroleum	13083	9.6
Gas/diesel oil	12666	10.8
Fuel oil	11999	11.9
Lubricating oils	12555	11.1

Naphtha	13249	9.1
Crude oil (average)	12694	10.7
Petroleum products (average)	12555	9.3

Gaseous fuels	Kilowatt hour per m3
Natural gas	11.0
COG	5.6
BFG	0.8
Landfill gas	10.7
Sewage gas	10.7

Solid renewables	
Domestic wood	2778
Industrial wood	3305
Straw	4166
Poultry litter	2444
General industrial waste	4444
Hospital waste	3889
Municipal solid waste	2639
Refuse derived waste	5194
Tyres	8888

GHG Conversion

Green House Gases (GHG) have different properties which make some considerably more potent as greenhouse gases than others. Therefore, per unit emitted, different gases have differing degrees of impact upon global warming, due to the particular property of the gas (e.g. a longer atmospheric lifetime and/or higher efficiency at retaining and emitting heat within the atmosphere).

Therefore to compare the emissions of different GHGs all emissions are referred to as CO_2 equivalents (CO_2e) (i.e. the amount of CO_2 which would have to be released in order to have an equal impact on the atmosphere as the specific amount of another GHG released). This is a scale where CO_2 is the reference point and has a global warming potential of 1, every other GHG listed in the Kyoto Protocol (methane, nitrous oxide, sulphur hexafluoride, perfluorocarbons, hydrofluorocarbons) has a greater GWP compared to CO_2, see following table for details.

GHG	Multiply by the following factor to obtain the CO_2e value
CO_2	1
CH_4	23
N_2O	296
SF_6	22 200
HFCs	12 - 12 000
PFCs	5 700 - 11 900

(data source: Third Assessment IPCC report, 2001).