

Energy Programme in Romania
Call for Proposals – Small Grants Scheme 2 (SGS-2) – Energy Audits

Conversion Guidelines - Greenhouse gas emissions -

Climate change is the greatest environmental challenge facing the world today and is caused by the release of greenhouse gases (GHG) into the atmosphere. Identifying which of your organization activities use a lot of energy, helps you reduce energy and resource use, and ultimately save money and understand your organization's contribution towards climate change.

For those activities in your organisation which release greenhouse gas emissions and for which you intend to implement energy efficiency measures, gather data (measured or estimated), e.g.:

- electricity and gas use – kWh (data sources: electricity and bills, meters etc.),
- fuel used in owned equipment/vehicles and industrial processes – litre or tons of fuel (data sources: invoices, receipts, bills, etc.);
- waste disposal and recycling - tonnes of waste-to-landfill and recycled (data sources: waste collection provider, own data, contracts etc.)
- water supply – cubic meters (data sources: water bill, meters etc.)
- water treatment – cubic meters (data sources: water bill, meters etc.)

Recommendation: choose at least a 12-month reference period to collect data on (yearly basis).

Calculate the associated greenhouse gas emissions using emission factors:

$$\text{Greenhouse gas emissions} = \text{Data} \times \text{Emission Factor}$$

(quantity of emissions in tonnes of carbon dioxide equivalent -CO₂eq)

Emission Factors

Burning:

- 1 ton coal = 2,86 ton CO₂
- 1 m³ natural gas = 1,9 kg CO₂
- 1 ton waste incinerated = 0,445 ton CO₂

Electricity production:

- 1 MWh from coal fired plant = 850 kg CO₂
- 1 MWh from oil fired power plant = 590 kg CO₂
- 1 MWh from gas fired power plant = 185 kg CO₂

- 1 MWh Romania mix (2016) = 306 kg CO₂
- 1 MWh EU28 mix (2016) = 295,8 kg CO₂
- 1 MWh Norsk mix 2007-2011 = 50 kg CO₂

District heating, hot water

- 1 MWh = 3.600 MJ from coal = 0,414 tons CO₂
- 1 MWh = 3.600 MJ from natural gas = 0,227 tons CO₂
- 1 MWh = 3.600 MJ from pellets (10% moisture) = 0,091 tons CO₂

Transport:

- 1 litre diesel = 2,640 kg CO₂
- 1 litre gasoline = 2,392 kg CO₂
- 1 personal car = 2,25 tons CO₂/year (150 g CO₂/km, 15.000 km/year)

Others

- 1 ton plastic recycled = 2300 kg CO₂ saved
- 1 ton metal recycled = 1750 kg CO₂ saved
- 1 ton paper recycled = 795 kg CO₂ saved
- 1 ton glass recycled = 529 kg CO₂ saved
- 1 m³ water (supply) = 0,344 kg CO₂ saved
- 1 m³ water (treatment) = 0,708 kg CO₂ saved

Presentation of results

CO₂ data will be summarized in a table containing the following information, presented preferably in Microsoft Excel or similar file format.

Data, (amount and type of energy/fuel, measured or estimated; <u>relevant for those activities where there is the intention to implement energy efficiency measures</u>)	Reference period	Emission Factor used (as per your selection from the "Emission Factors" list provided in this document)	Greenhouse gas emissions [= Data x Emission Factor, kg CO ₂ eq]	Comments*
<i>(e.g. measured, 200 m³ natural gas, used in the reference period)</i>	<i>(e.g. last 12 months, February 2018-January 2019)</i>	<i>(e.g. "1 m³ natural gas = 1,9 kg CO₂")</i>	<i>(e.g. 380 kg CO₂eq)</i>	<i>(e.g. estimated data, with these assumptions used: ...) (e.g. data sources for the emission factors used: ...) (e.g. assumptions used to estimate the yearly energy savings: ...) ...</i>

<i>(e.g. estimated, 3 MWh electricity, used in the reference period)</i>	<i>(e.g. last 12 months, February 2018-January 2019)</i>	<i>(e.g. "1 MWh EU27 mix = 542 kg CO₂")</i>	<i>(e.g. 1.626 kg CO₂eq)</i>	<i>(e.g. estimated data, with these assumptions used: ...) (e.g. data sources for the emission factors used: ...) (e.g. assumptions used to estimate the yearly energy savings: ...) ...</i>
...
...
-	Current level of CO₂ emissions of the object(s) subject to energy efficiency measure(s): <i>(sum of the above cells, in kg CO₂eq, in the reference period: ...) (e.g. 2.006 kg CO₂eq, in the reference period: last 12 months, February 2018-January 2019)</i>		-	

**Include in this column at least the following information:*

- *specify if the data/amounts are estimated or measured; if data is estimated please state the assumptions used for estimating the amounts;*
- *indicate the source(s) for the data used in column "Emission factors", in case you used emission factors that are not specified in this document.*