EU Results Framework Indicator Methodology Note

1. Indicator name
Greenhouse gas (GHG) emissions avoided (tonnes CO_2 eq) with EU support
2. Associated EU Results Framework statement and primary SDG
SDG 13 - Climate Action EU RF results statement - Implement the 2030 Agenda and the Paris Climate Change Agreement through coordinated and coherent action that promote resilience, reduce climate risk and contribute to reduce greenhouse gas emissions
3. Technical Definition
This indicator measures the net change in the GHG emissions relative to the assumed "business as usual" or baseline scenario for typical year of operation as, in tonnes of CO_2 equivalent (tonnes CO_2 eq) primarily focused on interventions in the energy sector. Where easily available, net change in GHG emissions should also be reported for the other sectors. GHG emissions include all carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs) and Sulphur hexafluoride (SF_6) emissions. The net change in GHG emissions is not directly observable but can be **estimated** relative to the assumed business as usual emissions case. The exact calculations will vary by type of intervention but the **calculation steps** are similar and as follows. More specific details are given in section 7 on data calculation. 1) Identify the business as usual or baseline scenario and determine the baseline GHG emissions per year by the use of emissions factors. The baseline scenario is the theoretical alternative that is feasible and creditable (e.g. do not break any existing laws, can achieve expected objectives, etc). 2) Identify estimated GHG emissions per year for intervention scenario per year by the use of emissions factors. 3) Identify estimated net change in GHG emissions per year (step 2- step 1). The net change in GHG emissions could be negative or positive. The net change in GHG emissions should take account of **direct GHG emissions** and where possible the indirect GHG emissions. However, the inclusion of the latter is not mandatory. **When to report?** The estimated GHG avoided per year should be reported for the EU RF **once the relevant intervention has started implementation** e.g. after project identification and preparation. At intervention level, expected estimates calculated should be reported at the appropriate period during the project cycle.
4. Rationale (including policy priorities and links to this indicator)
The Paris Agreement needs strong Monitoring, Review and Reporting (MRV) mechanisms to ensure a

proper follow-up of its implementation. The evolution of GHG emissions levels is a central part of MRV systems.

One of the 3 bets of the Staff Working Document on "Empowering Development: Implementation of the new European Consensus on Development in energy cooperation[1]" is to contribute to the fight against climate change through reducing GHG emissions.

5. Level of disaggregation and other reporting requirements

n/a

6. Data Sources (including issues on different definitions by source and level of availability of the data)

The preferred data source of the net change in GHG emissions per year is the intervention feasibility or appraisal report. **Estimates are expected to be available at the design stage of the intervention**. Whether indirect emissions are included will vary by interventions.

If no estimates are provided by the intervention reports, estimates may be calculated using the default emissions factors (and net calorific value if needed) from the following data sources using the methods outlined in section 7 on data calculations.

Emissions factors and Net Calorific Values by fuel type - The 2006 IPCC Guidelines for National Greenhouse Gas Inventories provides a set of internationally agreed emission factors and net calorific values (https://www.ipcc-ggip.iges.or.jp/public/2006gl/index.html).

The most relevant volume for direct combustion of different fuels is Volume 2 Energy

Country specific margin emissions factor – typically used for electricity generation baseline estimations**.** The Institution Institute for Global Environmental Strategies (IGES), List of Grid Emission Factors (https://pub.iges.or.jp/pub/iges-list-grid-emission-factors). This source provides the average marginal grid emission factors calculated for Clean Development Mechanism projects. While not all countries have country specific margin emissions factors, region and world averages are available.

7. Data calculation (including any assumptions made)

The GHG emissions avoided over a typical year of operation estimate should come from intervention information where ever possible. The intervention estimations should be based on feasible and credible assumptions and using as much as possible country/ technology/ intervention specific emission factors. This applies to interventions in the energy sectors as well as those in other sectors.

For the energy sector, in rare cases where no information is available, the following simplified methods/ assumptions may be used to estimate the direct GHG emissions avoided over a typical year of operation for the following types of interventions

Renewable electricity generation interventions - we can assume that emissions factors for renewable sources of electricity generation are zero. Thus the direct GHG emission per year from supported renewable electricity generation interventions would be zero. This means the direct net change in GHG

[1] https://ec.europa.eu/europeaid/empowering-development-implementation-new-european-consensus-development-energy-cooperation_en

emissions per year is then then same as the GHG emissions per year in the baseline scenario. So the estimated direct net change in emissions per year:

electricity produced per year (MWh) x country specific combined margin emission factor (tCO_2e/MWh)

Please refer to above data source on the country specific average combined margin emission factor. If country specific average combined margin emission factor is not available, please use the regional combined margin emission factor. The world average may be used as a last resort (801 tCO2e/MWh, IGES version 10.2[2]).

The operating or build margin grid emissions factor may be used instead of the combined margin emission factor if they are deemed to be more suitable for the context[3].

If generation capacity installed is used as basis to estimate the electricity produced per year, please remember plants will not be performing at 100% at all times so the average power generation will not be the same as the generation capacity installed. Please use an appropriate capacity factor.

Electricity efficiency interventions – intervention information regarding energy savings is often available and the estimated net change in GHG emissions per year may be estimated as follows. Please see guidance above on the use of country specific average combined margin emission factor.

electricity savings (MWh) x country specific average combined margin emission factor (tCO_2e/MWh).

For clean cooking or heating systems interventions - the estimated net change in GHG emissions per year may be estimated as follow using fuel saving information reported by the intervention.

fuel savings (MJ or MWh or kg) x fuel specific emission factor (tCO_2e/MJ or tCO_2eq/MWh or tCO_2e/kg).

Emission factors by fuels may be selected directly from the IPCC default emission factors from the energy volume of the 2006 IPCC guidelines. Some useful emissions factors[4] below:

- Firewood - 1.75 kgCO_2eq/kg or 0.11 kg CO_2eq/MJ.
- Charcoal –3.3 Kg CO_2eq/kg or 0.11 kg/MJ
- Natural Gas residential heat boiler - 202 kgCO2eq/MWh th
- Diesel residential heat boiler - 267 kgCO2eq/MWh th

[2] Institute for Global Environmental Strategies (IGES), List of Grid Emission Factors, version 10.2, accessed on 27/06/2018. Source: https://pub.iges.or.jp/pub/iges-list-grid-emission-factors

[3] The **operating margin emissions factor** is the factor used when the proposed intervention is likely to displace electricity generation from existing in-country power plants. The **build margin emission** factor is the factor used when the proposed intervention is like to displace electricity that would otherwise need to come from building new power plants. The **combined margin emission factor** is a weighted average of the two, and can be used when the proposed intervention is likely to displace mixture of existing and new build plants. The exact weights can vary by interventions and this is often used to appraise the CDM interventions.

[4] The 2006 IPCC Guidelines for National Greenhouse Gas Inventories provides a set of internationally agreed emission factors and net calorific values – volume 2: Energy

8. Worked examples

Installation of solar power generation in Tanzania

Electricity production (from intervention information) = 10 MWh/yr

Combined margin emission factor for Tanzania (IGES database v10.2) = 0.529 tCO_2/MWh

Assume solar power generation has no emission, and 10 MWh/year electricity production would have come from a combination of existing and new power plants if solar power generation was not available.

Net change in GHG emissions per year = 10 x 0.529 = 5.29 tCO_2e per year

9. Is it used by another organisation or in the framework of international initiatives, conventions, etc? If so, which?

African Development Bank Group - emissions reduction in energy (thousand tons CO_2).

World Bank Group/World Bank Corporate Scorecards tier 2 indicator - Emission reductions with support of special climate instruments (millions tons CO_2 eq).

The Asian Development Bank - Greenhouse gas emission reduction (tCO2-equiv/year).

The European Investment Bank measures the carbon footprint of projects financed by the Bank. See http://www.eib.org/attachments/strategies/eib_project_carbon_footprint_methodologies_en.pdf

USAID - greenhouse gas emissions, measured in metric tons of CO2 equivalent reduced or sequestered, or avoided through clean energy activities.

10. Other issues

Data quality will vary between interventions, and those using solely partner government data systems may be of a lower quality. The feasibility and credibility of the assumptions used, especially used to estimate the baseline emissions estimates will also vary. Where possible, it is good practice to check their feasibility and credibility.

This indicator is designed to capture direct net change in GHG emissions per year only, although where available indirect changes are also captured but the latter is not mandatory.