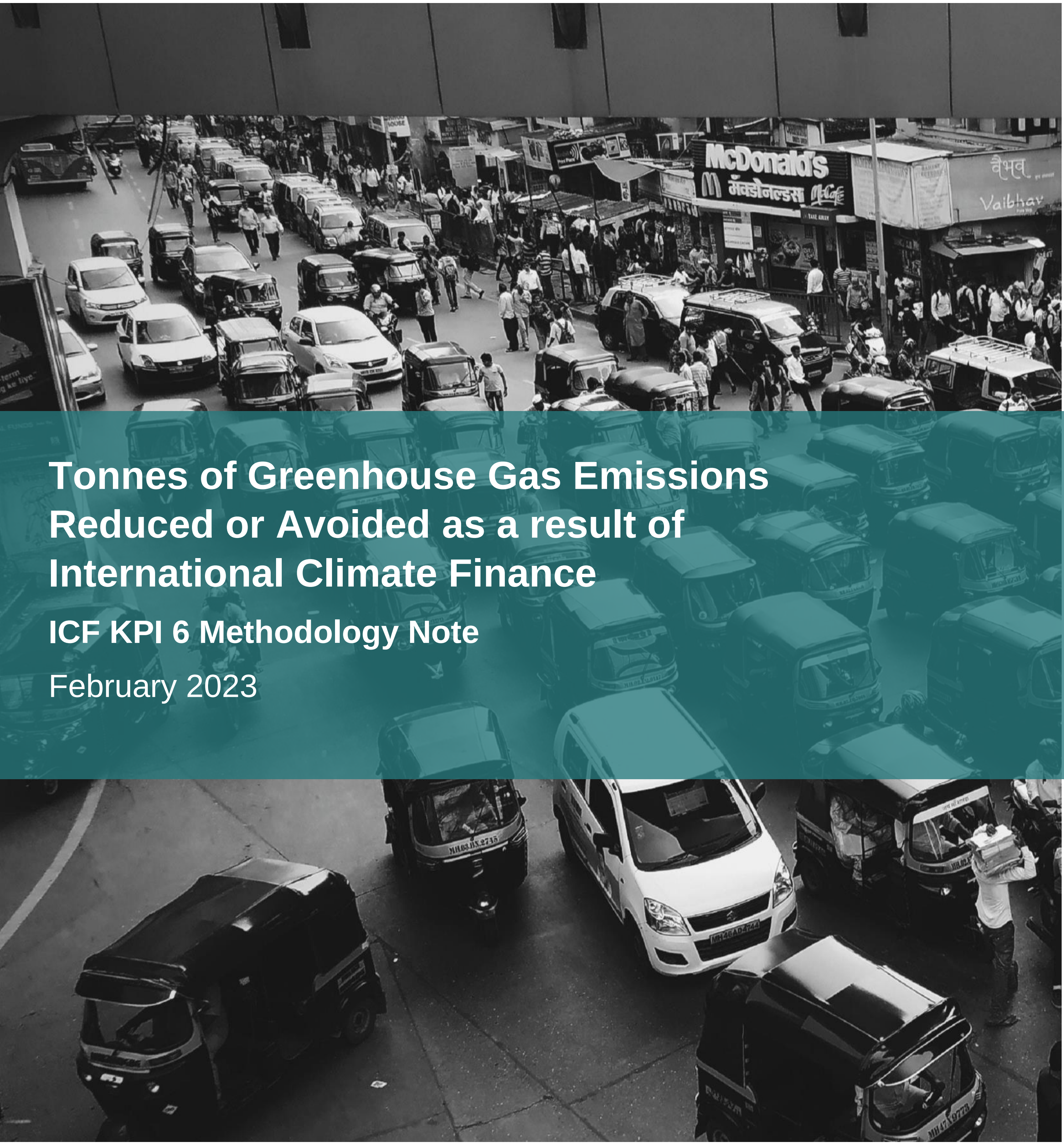
UK Government



Tonnes of Greenhouse Gas Emissions Reduced or Avoided as a result of International Climate Finance

ICF KPI 6 Methodology Note

February 2023

Photograph by [Roshni Sidapara](), Mumbai

Contents

Acronyms

BAU	Business as Usual
BM	Build Margin
CDM	Clean Development Mechanism
CO_2	Carbon Dioxide
CH_4	Methane
CM	Combined Margin
CNG	Compressed Natural Gas
CSP	Concentrated Solar Power
Defra	Department for Environment, Food and Rural Affairs
DESNZ	Department for Energy Security and Net Zero
EF	Emissions Factor
EU	European Union
FCDO	Foreign, Commonwealth and Development Office
gCO_2e/km	Grams of Carbon Dioxide Equivalent per Kilometre
GHG	Greenhouse Gas
HAC	High Activity Clay (soil)
HFCs	Hydrofluorocarbons
ICF	International Climate Finance
IGES	Institute of Global Environmental Strategies
IPCC	Intergovernmental Panel on Climate Change
IRENA	International Renewable Energy Association
KPI	Key Performance Indicator
kWh	Kilowatt Hour
LCD	Low Carbon Development
LED	Light Emitting Diode
LUC	Land Use Change
LULUCF	Land-Use, Land-Use Change and Forestry
MDB	Multilateral Development Banks
MWh	Megawatt Hour
N_2O	Nitrous Oxide
ODA	Official Development Assistance
OM	Operating Margin
PFCs	Perfluorinated Compounds
PV	Photovoltaic
QA	Quality Assurance
RE	Renewable Energy
REDD+	Reduced Emissions from Deforestation and Degradation
MSME	Micro, Small & Medium Enterprises
SF_6	Sulphur hexafluoride
SREP	Scaling Up Renewable Energy Program
tCO_2e	Tonnes of Carbon Dioxide Equivalent
TA	Technical Assistance
UK	United Kingdom

UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
W	Watt

Tonnes of greenhouse gases reduced or avoided as a result of ICF (tCO2e)

Purpose of the document

International Climate Finance (ICF) is Official Development Assistance (ODA) from the UK to support developing countries to reduce poverty and respond to the causes and impacts of climate change. These investments help developing countries to:

- adapt and build resilience to the current and future effects of climate change
- pursue low-carbon economic growth and development
- protect, restore and sustainably manage nature
- accelerate the clean energy transition.

ICF is spent by the Foreign, Commonwealth and Development Office (FCDO), the Department for Environment, Food and Rural Affairs (Defra), and the Department for Energy Security and Net Zero (DESNZ). This methodology note explains how to calculate one of the key performance indicators (KPI) that we use to measure the achievements of UK ICF. The intended audience is ICF programme teams, results leads, climate analysts and our programme implementing partners. Visit **www.gov.uk/guidance/international-climate-finance** to learn more about UK International Climate Finance, its results and read case studies.

Rationale

To limit warming and reduce the impact of climate change requires the achievement of net-zero global greenhouse gas emissions[1]. The UK ICF portfolio includes a range of mitigation programmes which directly abate greenhouse gas emissions and monitoring this level of emissions abated is a key indicator of progress.

ICF KPI 6 is an outcome indicator that measures the amount of greenhouse gas emissions reduced or avoided, as a result of UK ICF mitigation programmes. This indicator reports greenhouse gas emissions as tonnes of Carbon Dioxide Equivalent (tCO2e) which is a global standardised unit consistent with the UNFCCC and Paris Agreements on GHG emissions reductions. This indicator directly related to Sustainable Development Goal 13: take urgent action to combat climate change and its impacts.

[1] IPCC Mitigation of Climate Change

Summary table

Table 1: ICF KPI 6 summary table

Units	Tonnes of Carbon Dioxide Equivalent (tCO_2e)
Headline data to be reported	Tonnes of greenhouse gases reduced or avoided (tCO_2e)
Disaggregations	Results will be disaggregated by: • Sector • Technology Type (where applicable) • Country Carbon credits obtained and sold (where applicable)
Revision history	February 2023: • Modification of the headline data from 'Net change or avoidance of greenhouse gas emissions as a result of ICF' to 'Tonnes of greenhouse gas emissions reduced or avoided as a result of ICF' • Additional guidance on providing disaggregated data and additional disaggregation categories • Guidance on reporting against similar ICF KPIs • Updated guidance on reporting against more complex methodologies and emissions factors • Updated list of appropriate Clean Development Mechanism (CDM) Methodologies • Formatting improvements November 2018: • Guidance on converting ICF KPI 7 into ICF KPI 6 • List of appropriate Clean Development Mechanism (CDM) Methodologies • Step-by-step methodological guidance for GHG reductions from electricity generation, electricity energy efficiency savings, energy efficiency from other sources, forestry, and transport.
Timing	ICF programme teams will be commissioned to report ICF results in spring, according to department-specific processes. Report results for the most recent complete programming year. If reporting lags mean that results are only available more than a year after they

	were delivered, enter them under the relevant earlier year.
Links across the ICF KPI portfolio	ICF KPI 2 (no. of people with improved access to clean energy), 7 (clean energy installed), 8 (hectares of ecosystem loss avoided) and 17 (hectares of area under sustainable management practices) are all output or earlier outcome precedents to ICF KPI 6. Each is a potential contributor to ICF KPI 6 by means of a conversion factor or other methodology. Some programmes reporting on ICF KPI 6 may have been instrumental in driving markets, leverage and driving down technology costs for renewable and low carbon technologies. There is transformational potential through these effects, and hence a link to ICF KPI 15. ICF TA 5 (volume of emissions reductions supported by ICF technical assistance) reports greenhouse gas emissions for technical assistance elements of projects. Some programmes may be eligible to report against both ICF KPI 6 and ICF TA 5 if the programme includes non-technical assistance and technical assistance projects. Please refer to Annex 2 for further details.

Technical definition

This indicator will report on the tonnes of greenhouse gases (GHG) reduced or avoided measured in tCO2e, estimated relative to the assumed business as usual (BAU)[2] emissions trajectory, and will reflect abatement results directly attributable to ICF mitigation and forestry projects over the lifetime of the projects.

GHG emissions refers to the ‘Kyoto basket’ of GHGs which includes:

- Carbon Dioxide (CO_2)
- Methane (CH4)
- Nitrous Oxide (N2O)

[2] A definition of business as usual is available from Annex 6.

- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulphur Hexafluoride (SF6)
- Nitrogen trifluoride (NF3)

This indicator will report on direct GHG emission impacts from all activities within an ICF programme area – corresponding to Scope 1 of the **GHG protocol**. This is consistent with the methodology used by the Intergovernmental Panel on Climate Change (IPCC) to estimate national GHG emissions.

This will not capture indirect emissions (Scope 2 and Scope 3 emissions defined by the GHG protocol), life-cycle impacts or consumption emissions that fall outside the individual programme country(s). In this regard, we recognise that this indicator may not comprehensively capture the full emissions impact.

This indicator will cover all sectors of the economy, including changes in net emissions from all ecosystem and land/sea use change types.

Methodological summary

The net reduction in GHG emissions is estimated through a simple calculation, according to the following steps, which are described in more detail in the **next section**:

1. Determine the counterfactual
2. Estimate the change in fuel consumption due to the ICF intervention relative to the counterfactual
3. Apply an emissions intensity factor
4. If necessary, account for the rebound effect (energy efficiency programmes only)
5. If necessary, factor in the change in degradation multiplier (anti-degradation forestry projects only)
6. If necessary, account for carbon market interactions
7. Calculate attribution
8. Calculate annual tonnes of GHG emissions reduced or avoided and total expected emissions reductions over the installations' lifetime
9. Report disaggregated results

This calculation varies by project type; however, the steps are similar (detailed in **worked examples**). The main project types are typically:

1. Electricity generation
2. Electricity energy efficiency savings
3. Energy efficiency savings from other sources
4. Ecosystems, example Forests
5. Transport

Results should be disaggregated by the following (full details see Annex 3):

- Carbon credits, if carbon credits have been obtained or not, and if these have been sold
- Country the GHG emissions have been reduced or avoided within
- Sector
- Technology Type (where applicable)

Methodology

Below are methodologies to calculate the tonnes of GHG emissions reduced or avoided due to ICF funding for the five project types. There are steps for each intervention type**:**

1) ELECTRICITY GENERATION

1.1 Main Methodology

To calculate GHG emissions savings from switching electricity generation, the following equation should be used with the steps below:

Emissions reduced/avoided (tCO_2e) = [Conventional generation avoided × Emission factor]

1.1.1 Determine the counterfactual

To compare results to the counterfactual and account for additionality, the likely change in GHG emissions without the ICF intervention should be estimated. If you are not able to estimate what the counterfactual is, it is suggested to use an 'adjustment factor', which should be high (e.g. 95%) if you are confident your results are additional, and your data quality is good.[3] A lower 'adjustment factor' (e.g. 50%) should be used if you have a lot of uncertainty surrounding the estimated counterfactual. Please refer to the supplementary methodology note on additionality and attribution' for further details.

1.1.2 Estimate the change in fuel consumption due to ICF activity relative to the counterfactual

Obtain data on the change in fuel consumption due to ICF activity from individual project level reporting (e.g. 10,000 MWh of clean energy generated, to displace conventional energy). Multiply this by the adjustment factor for additionality. If an adjustment factor of 80% is applied this would be 10,000 × 0.8 = 8,000.

[3] Note that outside of 'First of its kind' type technologies, it is rare to consider a project 100% additional, since technological and development progress occurs without development assistance (albeit more slowly).

1.1.3 Apply an emissions intensity factor

GHG emissions factors represent values that relate the quantity GHG released into the atmosphere with an activity. These factors are usually expressed as the mass of GHG divided by a unit mass or volume of fossil fuel.

An emissions intensity factor should be used to calculate the net reduction in GHG emissions (e.g. 8,000MWh × 0.479tCO_2e/MWh = 3,832 tCO_2e/year). A more accurate emissions reductions estimate should be obtained where data is available, by reflecting the time and type of conventional energy generation displaced from the grid using the project's renewable energy. Where project specific information is not available, use country or regional average capacity factors and an average Combined Margin Emissions Factor. Further details on emission factors can be found in **Annex 4**.

Exceptions to using country/regional average factors are listed, as follows:

- When a Renewable Energy (RE) project has a particular 'generation profile', and it has a specific impact on the grid, a different Emissions Factor (EF) from average may be warranted. For example: a wind project that benefits from afternoon on-shore winds (often seen in oceanic islands or continental coastal contexts), and that runs at high capacity in the late afternoon/early evening, but with low output during the rest of the day or night.
    - In this case, the 'wind project Megawatt hours (MWhs) produced' will very likely replace the BAU peak generation capacity. In many developing countries this will be diesel or gas-fired plants. These emissions factors may be substantially higher than the average emission factor if the grid has a large amount of hydro or wind installed, such as in Ethiopia, Ghana, or Brazil.

- For projects that include battery storage [such as Photovoltaic (PV) + battery back-up residential or MSME systems], the battery typically will be 'filled' by Renewable Energy (usually PV), and 'emptied' or discharged when the grid falters (black-out or brown-out[4]). The most common type of back-up generator in the development context is diesel, and therefore these types of projects should use a diesel EF.
    - Where these projects are new and are alternatives to what would otherwise be built (e.g. a hotel includes PV and batteries rather than a diesel 'genset'), then a new and appropriately sized diesel genset should be assumed. Where the project is on an existing structure, with

[4] A black-out is a complete interruption of power in a given service area. A brownout is a partial, temporary reduction in system voltage of total system capacity.

one or more diesel gensets (which are old, or typically over-sized), but are expected to be removed or mothballed due to the battery back-up, a higher diesel EF should be selected.

- Note that for off-grid projects where a mini-grid exists, the generator of the mini-grid should be used – which is typically diesel (EF's above), but sometimes hydro (where an EF of zero must be assumed).
- For off-grid projects where no mini-grid exists, the theoretical assumption is that the installation (i.e. household or business) would eventually be connected to the grid, and therefore the logic of grid emission factors (above) should be applied.

1.1.4 If necessary, account for carbon market interactions

State whether tonnes of reduced or avoided CO_2e has been sold on the carbon market. If credits have been generated or sold, the CDM Methodologies supplementary guidance in **Annex 5** should be consulted.

1.1.5 Calculate attribution

If the UK government is the sole investor in a programme, the full amount of results are attributed to the UK.

If the UK government is one donor among a number of development partners providing funding for a programme, claim results only in proportion to the UK donor share of public co-financing.

In instances where an ICF programme leverages public or private finance that helps to deliver programme results, the share of results associated with any leveraged finance should be attributed to the ICF. Count the leveraged public finance under ICF KPI 11 and the leveraged private finance under ICF KPI 12.

Some funds have multiple investment levels which allow investment both at the fund level and at the individual project level. This means that the initial UK investment in the overall fund blends with project-specific sources of finance further down the delivery chain. For these programmes, attribute results to the UK project by project, then sum these to give the total UK results. Where insufficient information exists on project-level finance, UK attribution can be calculated at the fund level.

See supplementary methodology note on additionality and attribution.

1.1.6 Calculate annual tonnes of GHG emissions reduced or avoided and total expected emissions reductions over the installations' lifetime

Sum all recorded emissions reduced/avoided (e.g. from year 1, year 2, etc.), and add an estimate for total expected emissions reduced/avoided over the installation's lifetime.

1.1.7 Report disaggregated results

Disaggregate the results by the applicable categories, further details in **Annex 3**.

1.2 Calculating emissions reduced/avoided where only installed capacity is known (i.e. converting ICF KPI 7 into ICF KPI 6)

To convert installed capacity of clean energy into expected annual emission reductions, or to convert results reported against ICF KPI 7 [level of installed capacity (MW) of clean energy generated as a result of ICF support] to ICF KPI 6, the following equation should be used with the steps below:

Emissions reduced/avoided (tCO_2e) = Installed capacity of renewable energy × Technology Capacity Factor × Grid Emissions Factor × 24 × 365

1.2.1 Determine the counterfactual

See **Step 1.1.1**.

1.2.2 Estimate the change in fuel consumption due to ICF activity relative to the counterfactual

Multiply the installed capacity of renewable energy (e.g. 100MW of wind power in East Africa) by an adjustment factor to account for the uncertainty in the counterfactual (e.g. 80%) and then by the technology capacity factor, which represents the annual generation time (e.g. 0.37 for East Africa, which means the wind turbines are generating power 37% of the time, net of operating and maintenance).

See **Annex 4** for more detail on capacity factors. Multiply this figure by 24 and 365 for annual hours.

100×0.8×0.37×24×365 = 259,256 MWh per year

1.2.3 Apply an emissions intensity factor

An emissions intensity factor (e.g. 0.603) should be used to calculate the net reduction in GHG emissions. See **Annex 4** for more information on emissions factors.

259,256 × 0.603 = 156,355 tCO_2e/year

1.2.4 If necessary, account for carbon market interactions

See **Step 1.1.4**.

1.2.5 Calculate attribution

See **Step 1.1.5**.

1.2.6 Calculate annual tonnes of GHG emissions reduced or avoided and total expected emissions reductions over the installations' lifetime

Sum all recorded emissions reduced/avoided (e.g. from year 1, year 2, etc.), and add an estimate for total expected emissions reduced/avoided over the installation's lifetime.

When converting ICF KPI 7 into ICF KPI 6, projects should also take account of other circumstances, in particular at major project milestones such as commissioning. Partial year estimates (i.e. replace 365 with the number of days the project operates during the year in the above calculation) should be used. Where projects are uncertain when the clean energy capacity was installed in a given year, they should assume that in the first year, projects generated reduced/avoided emissions for half a year.

Where unplanned or unexpected maintenance/downtime has occurred during a year, projects should deduct that proportion of the year from the electricity generated. It should be noted that the International Renewable Energy Association (IRENA) Capacity Factor data referenced in **Annex 4** is net of regular maintenance, and that unplanned / unexpected maintenance is on top of regular maintenance impact.

1.2.7 Report disaggregated results

Disaggregate the results by the applicable categories, further details in **Annex 3**.

2) ELECTRICITY ENERGY EFFICIENCY SAVINGS

For electricity energy efficiency related emissions savings, the net reduction in GHG emissions is calculated from net reductions electricity consumption relative to the counterfactual. Electricity use is converted into amount of CO_2e by multiplying by the emissions factor (in MWh) as described for electricity generation in Methodology Step 1) above.

The following equation should be used in collaboration with the steps below:

Emissions avoided (tCO_2e) = [MWh of conventional generation avoided or displaced × Emission factor]

2.1 Determine the counterfactual

See **Step 1.1.1**.

2.2 Estimate the change in electricity consumption due to ICF activity relative to the counterfactual

Obtain data on the change in electricity consumption due to ICF activity from individual project level reporting. For most demand side projects, the simplest approach is to calculate the 'per unit' saving, and multiply by the number of units in the project. For each unit (lamp, refrigerator, air conditioner, pump, electric motor, etc) that is replaced[5], take the rated capacity of the unit (in Watts (W), or kilowatts (kW)), and estimate the annual usage (in hours per day × number of days used per year) for the counterfactual (replaced unit), and the project (new unit). Often the usage times will be the same (such as in lighting applications), and in others, the new unit may be more effective as well as more efficient (such as in DC solar pumps) and may run for fewer hours per day or per year.

For example, an energy efficient lighting project in Kenya replaces 15,000 incandescent globes with LEDs. Take a default of 3.5 hours per day of use[6] (a higher number of hours can be used if justified). The electricity use of the 60W counterfactual incandescent lamps is then 3.5 hours/day × 365 days × 60W = 76,650Wh/year = 76.7kWh/year. The replacement LED lamp uses 8.5W to provide equivalent (or better) lighting. Annual use is then: 3.5 hours × 365 × 8.5W = 10,860Wh/year = 10.9kWh/year. Each lamp saves 76.7-10.9 = 65.8kWh/year.

The project overall therefore saves 15,000 lamps × 65.8kWh/year = 987,000 kWh of electricity through energy efficient lighting per year.

Multiply this by the adjustment factor for additionality, taken as 90%: 987,000 × 0.9 = 888,300kWh saved/year).

For projects that involve holistic changes (such as insulating buildings combined with upgraded air-conditioning systems and efficient lighting), to capture the electricity savings from synergies between interventions, it is appropriate to determine the

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[5] Note that 'replaced' refers to removing existing (old) units, such as incandescent lamps, OR providing an alternate (more efficient) product or service instead of continuing with the Business-as-Usual approach. That is, providing LEDs in a new building that would otherwise have used incandescent lamps (as the common practice, or cheapest available) should also be included.

[6] See Annex 5, under Energy Efficiency, Small Scale, (10) AMS-II.J.: Demand-side activities for efficient lighting technologies --- Version 7.0

average total energy use (for example of the building insulation, or industrial process) over the previous three years[7], and compare to the total energy usage after the project, to obtain energy savings.

Where the use of the installation changes (for example higher occupancy or greater product throughput), the energy usage should be normalised to the functionally equivalent unit such as kWh per building occupant per year, or kWh per product or service per year.

For example, in the counterfactual, a building has 300 occupants, and uses 400kWh per person per year, for a total of 120,000kWh/year. In the project, the building has 400 occupants, that use 250kWh/person/year, for a total of 100,000kWh/year. The energy savings should be calculated as:

400 occupants × occupant savings (400-250) = 400 × 150 = 60,000kWh per year.

This reflects the greater service provided, rather than the simple difference in electricity use. Multiply this by the adjustment factor for additionality taken as 90% in this case: 60,000 × 0.9 = 54,000kWh saved/year).

2.3 Apply an emissions intensity factor

An emissions intensity factor should be used to calculate the net reduction in GHG emissions. This is the same approach as described above for electricity generation (section 1):

Emissions avoided (tCO_2e) = [MWh of electricity generation avoided × Emissions factor]

Where data is available, a more accurate emissions reductions estimate should be obtained by reflecting the time and type of generation avoided from the grid due to the efficiency project (see **Step 1.1.3**).

Where project specific information is not available, use country or regional average emissions factors and an average Combined Margin (at 50/50 OM/BM) Emissions Factor. These can be found in the **Annex 4**.

For the example lighting project in Kenya, using the default Emissions Factor of 0.603tCO_2e/MWh for Kenya from **Annex 4**:

888.3MWh saved per year × 0.603tCO_2e/MWh = 536tCO_2e/year emissions reduced or avoided.

[7] Note – three years is suggested as a default to establish a representative data set, and data should be available from annual electricity billing. However, longer, or shorter periods may be used to accommodate data availability, provided the historic data are representative.

The exceptions to this methodological step are listed below:

- For off-grid projects where a mini-grid exists, the generator of the mini-grid should be used - typically diesel (see **Step 1.1.3** or diesel Emissions Factor).
- For off-grid projects where no mini-grid exists (i.e. energy access projects), the theoretical assumption is that the installation (i.e. household or business) would eventually be connected to the grid, and therefore the logic of grid emission factors (above) should be applied. Where lighting projects explicitly target eliminating or reducing household kerosene usage, a default factor of 0.09tCO_2e/lamp replaced/year can be used[9]. If the Kenya example above were replacing kerosene lamps, it would result in 15,000 lamps × 0.09tCO_2e/year = 1,350tCO_2e/year. This figure is significantly higher than calculated above, since the emissions factor from inefficient kerosene burning in household lamps is higher than from Kenyan grid electricity.
- On-grid household lighting projects – typically household lighting coincides with peak grid loads (morning and early evening), and so result in 'peak shaving', and the Megawatt hours (MWhs) saved very likely avoid peak generation capacity. As discussed above, in many developing countries peak load generation will be diesel. These emissions factors may be substantially higher than the average emission factor if the grid has a large amount of hydro or wind installed, such as in Ethiopia, Ghana, or Brazil.

2.4 If necessary, account for the rebound effect

In some cases, users of a more efficient appliance or installation are aware it is more efficient, and therefore use it for longer periods, or more often. For example, people may reduce the habit of 'turn the light off when you leave the room', if they know less energy is used due to efficient LED lights. Conversely, some installations result in multiplier effects: for example, more efficient, brighter lights (such as LEDs) result in turning on fewer lamps.

This 'rebound effect' is widely recognised but difficult to accurately capture. For electricity energy savings projects where no rebound information is available, a default of 20% for residential customers should be applied and 10% for commercial or industrial consumer electricity use in middle and low income countries. This is based on the UK Government's Appraisal guidance text[8], which should be referred to for the most up to date approach.

For the example lighting project in Kenya, the rebound effect is taken as 5%. Thus emissions reductions = 536tCO_2e/year × 0.95 = 509tCO_2e/year.

2.5 If necessary, account for carbon market interactions

See **Step 1.1.4**.

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[8] UK Government Appraisal Guidance. *Accessed February 2023*.

2.6 Calculate attribution

See **Step 1.1.5**.

2.7 Calculate annual tonnes of GHG emissions reduced or avoided and total expected emissions reductions over the installations' lifetime

Sum all recorded emissions reduced/avoided (e.g. from year 1, year 2, etc.), and add an estimate for total expected emissions reduced/avoided over the installation's lifetime.

For the example lighting project in Kenya, assuming 100% ICF funded, and all lamp replacements occur in year 1 of a 5 year project. All lamps are not replaced on 1 January, and the default assumption of half of the year emissions reductions for year 1 is applied. Thus emissions reductions for each year of the project = 509CO_2e/year, except the first year which is 255tCO_2e/year.

The LED lamps are estimated to last for 20 years and therefore the total expected emissions reductions over the installation's lifetime are 509 tCO_2e/year × 20 years = 10,180 tCO_2e.

2.8 Report disaggregated results

Disaggregate the results by the applicable categories, further details in **Annex 3**.

3) NON-ELECTRICITY RELATED ENERGY EFFICIENCY SAVINGS

For energy efficiency projects not related to electricity, emissions savings are calculated from net reductions in fossil fuel consumption relative to the counterfactual. The reduction in fossil fuel consumption is converted into tonnes of CO_2e by multiplying fuel use (in litres, cubic meters or tonnes) by a fuel-specific (and unit specific) emission factor.

Non-electricity related energy efficiency savings mainly relates to industrial energy efficiency such as:

- heat recovery and/or insulation of boilers and steam generation systems
- insulation of buildings to reduce heating requirements; improvements in process efficiencies (pipework, machinery, etc) to reduce heat loss from steam or heat
- upgraded turbine blades, injectors, or other efficiencies (including upstream improvements such as reduction in moisture content of coal, or refinement of liquid fuels to burn more efficiently) in fossil fuel generators of heat, steam, motive power or electricity

- changes in behaviour or management systems (e.g. lower thermostat levels in buildings) to reduce heating oil use; or any other projects that directly reduces the use of fossil fuels.

Projects that replace or partly replace fossil fuel use may also use this approach to estimate emissions reductions. For instance, blending fly ash in cement production; or reducing coal use by replacement with biomass, such as sawmill waste wood or agricultural waste (bagasse, chaff, rice husks, etc). In the latter cases, care must be taken to ensure that biomass sources are sustainable, and do not deplete soil carbon, or risk displacing food production.

Projects that replace the service provided by fossil fuel use (such as using timber rather than concrete or steel in construction; or passive heating building design) can calculate the emissions reductions using this approach but must demonstrate that the projects provide the equivalent service as the fossil fuel-based products or services. Transport projects that may fit this project type are discussed separately below.

For all of these project types, the following general equation should be used in collaboration with the steps below:

Emissions avoided (tCO_2e) = [volume or mass of fuel × Emission factor (defined by fuel)]

3.1 Determine the counterfactual

See **Step 1.1.1**.

3.2 Estimate the change in fuel consumption due to ICF activity relative to the counterfactual

Obtain data on the change in fuel consumption due to ICF activity from individual project level reporting. Typically, this will be obtained from historical data of fossil fuel use, compared to fossil fuel use after project implementation.

For example, a project in Nigeria installs heat recovery systems on boilers, and steam piping insulation in a food processing factory that uses mineral diesel for heat and steam production. In the previous three years, the site used an average of 50,000 litres of diesel per month, or 600,000l/year. After the project, the site uses 40,000l/month, or 480,000l/year, for a 120,000l/year saving.

In instances where production levels vary significantly, or change over time, it may be necessary to normalise fuel savings against production levels. That is, comparing litres of diesel used per kg of food product before and after the project.

Multiply the fuel savings by the adjustment factor for additionality, taken as 80% in this case (e.g. 120,000 × 0.8 = 960,000/year).

3.3 Apply an emissions intensity factor

For direct fossil fuel reductions the emissions factors are scientific, related to the carbon content of the fuel. A summary of common fuels and their emissions factors can be found in the UK's GHG Conversion Factor Reporting[9]. This should be used for known fuel types reduced. If the fuel type displaced in the project is not listed below, refer to the link in the footnote for other fuel types. For household kerosene (typically used for lighting and sometimes cooking in developing countries), use an emissions factor of 2.4 $kgCO_2e$/litre.

3.4 If necessary account for the rebound effect

In larger scale or industrial applications, the rebound effect is less pronounced, or even eliminated as commercial imperatives seek to maximise financial gains from efficiency measures. There may be 'negative rebound', where production is preferentially shifted to more efficient units, and away from older, less efficient units. Nonetheless, a rebound factor is recommended to ensure conservative emissions reductions claims. Where no rebound information is available, a default of 10%[10] should be used for non-electricity-related energy savings projects.

For the example project in Nigeria, the rebound effect is taken as 10%. Thus emissions reductions = 258tCO_2e/year × 0.90 = 232tCO_2e/year.

3.5 If necessary, account for carbon market interactions

See **Step 1.1.4**.

3.6 Calculate attribution

See **Step 1.1.5**.

3.7 Calculate annual tonnes of GHG emissions reduced or avoided and total expected emissions reductions over the installations' lifetime

See **Step 1.1.6**.

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[9] Greenhouse gas reporting conversion factors. *Accessed February 2023.* Fossil fuel conversion rates do not vary significantly internationally for all fuels except coal. For coal, country specific figures should be sought. Where these are not available, use the UK values as a default.

[10] The assumption differs from that of electricity energy efficiency savings as for industrial processes we assume rebound effect is likely to be less pronounced, or even eliminated as commercial imperatives seek to maximise financial gains from efficiency measures. If non-commercial, this should be reviewed.

3.8 Report disaggregated results

Disaggregate the results by the applicable categories, further details in **Annex 3**.

4) ECOSYSTEM, FORESTS, LAND / SEA USE & OTHER NATURE BASED SOLUTIONS

For nature-based solutions including interventions in LULUCF and agriculture, avoided deforestation, reforestation, conservation, natural managed land solutions and coastal, marine interventions, related emissions savings should be calculated as the net reduction in GHG emissions from net reductions in land use relative to the counterfactual. Land/sea use is converted into a corresponding amount of CO_2e by multiplying land/sea use (in hectares) by a specific emission factor.

To calculate emissions savings from forest projects, the following equations should be used in collaboration with the steps below:

Where the forest type remains the same, but its quantity has changed e.g. in an avoided deforestation project:
Emissions avoided (tCO_2e) = [change in forest land area × emission factor]

Where the quantity of forest remains the same, but its condition has changed e.g. in an anti-degradation project:
Emissions avoided (tCO_2e) = [forest land area × emission factor × change in degradation multiplier]

4.1 Determine the counterfactual

To compare results to the counterfactual and account for additionality, the projected level of GHG emissions avoided without the ICF intervention should be determined. Where the counterfactual case is not clear, use an 'adjustment factor', which should be high (e.g. 95%) if you are confident your results are additional, and your data quality is good. A lower 'adjustment factor' (e.g. 50%) should be used if you have a lot of uncertainty surrounding the estimated counterfactual. Please refer to the 'additionality' section below for further details.

For illustration, use of a 100% adjustment factor would indicate that none of the decrease in deforestation in programme areas below the counterfactual would have occurred without the programme. This may be unlikely in countries with domestic deforestation policies. Furthermore, 100% adjustment factor would not reflect impacts of other similar initiatives operating in the programme area. This would need to be explicitly confirmed as there is often overlap between donor programmes in forestry interventions.

4.2 Estimate the change in land/sea use due to ICF activity relative to the counterfactual

Obtain data on the change in land use area due to ICF activity from individual project level reporting (e.g. 10,000 hectares of ecosystem loss avoided). Multiply this by the adjustment factor for additionality, in this case taken as 80% (e.g. 10,000 × 0.8 = 8,000).

Relevant programmes in this category should apply a leakage factor to account for displaced ecosystem loss from the programme area. In the example for forests, typically for ICF programmes this is assumed to be 25% however adjustments may be included within programme design. Leakage rate assumptions should be reduced when an intervention addresses the underlying drivers of deforestation or degradation. Equally, leakage may increase if the programme does not effectively address underlying drivers.

4.3 Apply an emissions intensity factor

Land / sea use emissions factors (in tCO_2e per hectare) vary by vegetation type (e.g. dry forest), climate (e.g. tropical), soil type (e.g. acidic) and forest condition (e.g. no degradation, low degradation). The latter is important for measuring the impact of projects that reduce forest degradation. Note the emission factors are often negative because forests are generally a sink of GHGs.

To capture the change in emissions from a project that addresses illegal logging, wood-balance and import-source analyses should both be used.

In addition, the method of land / sea use change should be taken into account. For example, forest loss through fire releases more GHGs than forest loss through felling.

4.4 For anti-degradation projects, factor in the change in degradation multiplier

Factor in the change in degradation multiplier for anti-degradation projects (e.g. 0.9-0.2). Descriptors of degradation include: none; very low; low; moderate; large; and extreme. Degradation is ranked between 0 and 1, reflecting the carbon storage per hectare. Zero degradation (i.e. pristine forest) is very rare in practice, and extreme degradation (clear felling and erosion) still ranks at 0.2.

4.5 If necessary, take into account carbon market interactions

See **Step 1.1.4**.

4.6 Calculate attribution

See **Step 1.1.5**.

4.7 Calculate annual tonnes of GHG emissions reduced or avoided and total expected emissions reductions over the installations' lifetime

Sum all recorded emissions reduced/avoided (e.g. from year 1, year 2, etc.), and add an estimate for total expected emissions reduced/avoided. This may be carried out within models or using the Food and Agriculture Organization (FAO) EX-ACT Tool may be beneficial.

FAO EX-ACT Tool:

The UN maintains a spreadsheet tool that may be used for calculating changes in GHG emissions. It is freely available online at **FAO EX-ACT**. The tool is based on IPCC tier 1 'emissions factors' and can be used to complete **step 4.3** of the above methodology.

The process is explained within the spreadsheet[11], and requires input on Tab 1 of:

- **Continent**
- **Climate**: where not known, climate type can be determined by clicking on the link in the question mark icon (?) which gives a map of IPCC climate zones or refer to tab 10 ('help') of the spreadsheet.
- **Moisture regime**: where not known, moisture regime can be determined by clicking on the (?) icon or referring to tab 10 ('help') of the spreadsheet.
- **Soil**: where not known, soil type can be determined by clicking on the (?) icon or referring to tab 10 ('help') which gives a map of IPCC soil classifications.
- **Project Duration**: the 'implementation' (when actions are taken) and 'capitalisation' (monitoring and maintenance of actions) times should add to the total project reporting period (e.g. 5 years).

After entering the project details on Tab 1, users can calculate first estimates for changes in GHG emissions from deforestation, afforestation/reforestation and other land / sea use change projects in Tab 2.

The process requires inputs of:

- **Type of vegetation to be deforested**: this is defined in row 8 (just above where you select vegetation type and get the choice of zone 1, zone 2 etc) and if further clarification is required click on (?) icon or refer to tab 10 ('help') of the spreadsheet.
- **Type of land use after deforestation**: such as annual crops or grassland.
- **Areas**: the 'start' refers to the baseline, and 'without' refers to the expected land use change if no project is implemented. 'With' refers to the forested

[11] With further guidance available at: http://www.fao.org/tc/exact/user-guidelines/en/

area remaining after project implementation. For example, a 10,000ha target area (start) is expected to be deforested to leave only 1000ha of forest remaining. If all forest is protected by the project, the ‘with’ will be 10,000ha.

The results (for the project duration specified) are automatically calculated in column T, ‘balance’. The result should appear as a negative amount (that is, negative emissions, or emissions avoided). To see annual results, refer to tab 9 ‘Results’ in column Q.

More detail can be input to the model in tabs 3 to 8, but these tabs require more detailed baseline and project implementation data.

4.8 Report disaggregated results

Disaggregate the results by the applicable categories, further details in **Annex 3**.

5) TRANSPORT

Transport projects can be considered in three broad types:

a. *Efficiency*: for example, introducing and enforcing vehicle efficiency standards on a gCO_2e/km basis[12];
b. *Modal Shift*: for example, improving bus services to encourage people to take public transport and discourage individual vehicle use;
c. *Systematic/planning*: for example, changing zoning laws and providing for public transport hubs, bicycle lanes and walkable cities.

Many successful projects[13] combine these approaches to at least some extent, for example by providing efficient buses, with prioritised routes and upgraded bus stations, along with awareness raising and incentives for public transport use.

This guidance note outlines the types of quantification that can be undertaken and references other applicable methodologies.

a) Efficiency projects

For projects where there is a direct and comparable efficiency improvement, the simplified approach of **Section 3** (non-electricity related energy efficiency savings) above can be used. For example, a replacement or upgrade of a city bus fleet from diesel to CNG, the counterfactual (diesel) and project (CNG) are directly comparable – assuming the same bus routes, frequency, etc. The difficulty arises in assessing additionality. Since fuel efficiency improvements rarely justify the early retirement of transport stock (i.e. buses, cars, trucks etc), their early replacements *are* additional.

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[12] Such as is done in the EU: EU emissions in the automotive sector

[13] Such as the highly successful TransMilenio project in Bogata

On the other hand, the transport stock has a finite life, and will eventually be replaced. Replacement vehicles are typically considerably more efficient than older, worn-out vehicles. Considering additionality in the bus fleet example, the counterfactual should be a combination of the time of early replacement (i.e. some years in which the old diesel bus would have run, replaced with new CNG), and the expected BAU replacement (likely a new diesel bus). This considerably adds to complexity, and in the development context vehicles are often run until they break down, and the idea of 'planned replacement' is difficult to apply.

Where data availability or complexity limits prevail, a simplified approach may still be used, by either:

- using the BAU replacement counterfactual (i.e. assume all buses would be replaced by new diesel rather than CNG) and a high adjustment factor (i.e. 90%, if CNG use is not yet common in the local context); or
- use a sufficiently conservative adjustment factor, such as 50%, to account for estimation uncertainty.

Note that a new, quieter, faster and more efficient transport system (e.g. the CNG bus) is likely to attract greater ridership/usage. This simplified efficiency calculation would not include any emissions reductions benefits from the modal shift.

Relevant approaches and data for more comprehensive calculations on specific vehicle fleets (e.g. a bus company) or jurisdictions (e.g. public transport in a state), can be found in CDM methodologies in **Annex 5** (for example AMS-III.AK, and AMS-III-AY for vehicle fleet improvements on the CDM methodologies).

b) Modal Shift

While direct efficiency projects may achieve reductions in the order of 10-30%, a modal shift (e.g. from car to train, or from air to train) can reduce emissions by 70%-90% [14].

The key to estimating emissions reductions is to ensure functional equivalence of service. This is typically defined in emissions per passenger or cargo kilometre (gCO_2e/passenger km, or gCO_2e/kg or t of cargo km)[15]. The challenge is in obtaining sufficient data on service rates in the counterfactual and project. It can be relatively straightforward to monitor the increase in ridership after an upgrade of an existing public transport system that is more attractive to users, such as the diesel-CNG bus replacement example above. However, the counterfactual of the new users is more difficult to establish. Were they driving a car? Was this alone, or in a car-share? Were they using train, mini-bus, bicycle, or walking? Or were they taking this trip less frequently or not at all?

[14] See for example, European modal shift emissions

[15] Note these metrics typically use grams of CO2 rather than tonnes of CO2 per kilometre.

Establishing a reliable emissions reduction estimate requires at least a reasonable overview of transport use in the project area (city, region or country), including:

- assessment of share of movements by mode (car, bus, train, air, non-motorised);
- load factor (for cargo – full or partially loaded; cars - single drivers or shared; public transport – how many riders per vehicle (e.g. bus or train)); and
- their relative distances.

In many development contexts, particularly in rapid, unplanned development and urbanisation, this information is not available. A significant amount of work will be required to establish the counterfactual.

A more narrowly defined intervention may be possible, for example a Bus Rapid Transit (BRT) system[16] that aims to directly reduce traffic congestion on a particular route. In this case, a counterfactual road use traffic count (i.e. number of vehicles passing start and end points of the route), with survey of vehicle types and occupancy, combined with an 'after project implementation' count and survey can be undertaken. Combining the road use data with before and after bus ridership numbers, an estimate of modal shift can be made. An estimate of emissions reductions can then be obtained from the difference in passenger kilometres between modes (that is, gCO_2e/passenger km by car, compared to gCO_2e/passenger km by bus). Given that UK per vehicle fleet emissions are significantly lower than most development contexts, average modal emissions published by UK Government[17] can be used to obtain a conservative estimate.

Where a more accurate emissions reduction estimate is required, and/or the project determines that more detailed transport data is needed to optimise project design (such as sizing of buses) in addition to seeking emissions estimates, it is recommended that the relevant CDM methodologies are used in full or in part. Transport CDM methodologies are listed in **Annex 5**.

c) Systematic/planning

To achieve near 100% emissions reductions from transport, a holistic and systematic approach to urban development is required. This includes zoning to plan for mixed commercial/residential areas, walkable cities, public transport hubs at key destinations, safe and effective cycle paths, and prioritisation of human movement over vehicle movement. This makes walking, cycling and public transport the preference and the norm for the vast majority of journeys.

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[16] This typically involves a dedicated bus lane, that may be partly or fully separated from the main road, with improved bus stops and priority signals at traffic lights.

[17] See for example the tab 'Business travel - land' for data on kgCO2e/passenger km on the greenhouse gas reporting: conversion factors excel sheet

This is, of course, rare globally, and virtually unheard of in the development context. Nonetheless, ICF projects seeking transformational change (see ICF KPI 15 Guidance Note) in transport will target some of these aspects. Establishing credible emissions reductions estimates requires determining the ‘transport not taken’ through an understanding of the BAU counterfactual development. This is highly location-specific, and there are no applicable CDM methodologies.

To establish a reductions estimate, a bespoke analysis is needed. This should establish relevant local counterfactual and draw on elements of CDM methodologies as needed (such as AM0031: Bus rapid transit projects, see **Annex 5**).

When to use more complex methodologies

More complex approaches may be required for a small number of ICF projects, where a very high degree of reporting accuracy is necessary. In these instances, methodologies can be drawn upon from the CDM which apply to certified emissions reductions under the Kyoto Protocol, included in **Annex 5** for reference.

Voluntary standards are available for jurisdictional and project-level emissions reductions quantification methodologies; each has relative merits which should be reviewed before methodology selection. Examples of voluntary standards include the Gold Standard[18] Plan Vivo[19], ART-TREES[20], and Verra[21] which includes the Verified Carbon Standard (VCS). Implementing partners or the standards organisations themselves typically undertake project monitoring, reporting, and facilitation of verification of the credits, and often make adjustments for leakage and create buffers for reversals.

The approaches set out in the ‘Methodology’ section are sufficient for most ICF project reporting, and are consistent with, but not as comprehensive as the CDM methodologies. Projects that MUST apply more comprehensive approaches include:

- Projects that expect to generate carbon credits during the ICF funding period. This includes cases where ICF does not intend to sell credits, but implementing partners or other funding agencies intend to sell carbon credits generated in entirety or in part by ICF funding.
    - Such projects should use the more complex methodologies listed above. All ICF programmes must transparently report any carbon credits generated, bought, or sold. To report ICF KPI 6, programmes generating carbon credits must demonstrate additionality.
    - Where credits are sold to the voluntary market, their end uses should be monitored where possible. This is because, credits used for corporate social responsibility purposes may have different additionality compared to credits used to meet legal obligations, for example.

18 Gold standard
19 Plan Vivo
20 Art Trees
21 Verra

    - If credits are sold into the compliance market, these are unlikely to be additional and the supplementary guidance should be followed, which will mean that ICF KPI 6 cannot be reported.

Projects that could consider applying more comprehensive approaches include:

- Projects that expect to generate quantified emissions reductions used outside of the host country as Internationally Transferred Mitigation Outcomes (ITMOs) under Article 6 of the Paris Agreement. While ICF KPI 6 does not count towards domestic or international carbon accounting or NDCs and is not reported to the UNFCCC, ICF should maintain an awareness of where emissions reductions are contributing to NDCs. In particular, ICF KPI 6 results may be counted where credits are used towards developing country NDCs, however should not be counted where credits are used towards developed country NDCs due to a lack of additionality.
- Projects that have a ‘Results Based Payment’, ‘Results Based Finance’, or other ‘pay for performance’ approaches, where the primary ‘result’ or performance indicator sought is emissions reductions (tCO2e). Such projects may already follow a more complex methodology as part of programme design e.g. REDD+ programming. Others need not use the entire CDM methodology, for instance, they may not use the ‘Demonstration of Additionality section but may wish to refer to parts of the methodology, particularly the quantification of emissions reductions. Be aware that programme design may already include a retiring mechanism or uncertainty buffer to account for measurement errors for the rate of deforestation during the programme, and potentially also for non-permanence, leakage and reversals. Clearly explain any adjustments made either in programme design or by ICF to account for these.
- Projects that are a demonstration of concepts or technologies, and include as part of the project exit strategy, a plan for a funding stream for the project to be generated from carbon credits or monetising the emissions reductions in some way. In these projects, it is not necessary for CDM methodologies to be used for ICF reporting but is recommended to be used to ensure any monitoring and reporting challenges are addressed, such that the subsequent (i.e. post-ICF funding) projects can readily be scaled-up.

Data quality

Portfolio ICF results are published annually in autumn in **voluntary compliance with the UK statistics authority code of practice for official statistics**. This means that we make efforts to maximise the trustworthiness, quality and value of the statistics.

To support ICF data quality, please:

1. Review ICF KPI results provided by programme partners, ensuring that methodologies have been adhered to, and calculations are documented and correct.
2. Ask a suitable analyst or climate adviser to quality assure ICF results before submission.
3. Submit ICF results following the instructions specific to your department. Include supporting documentation of calculations and any concerns about data quality.
4. A revision to historical results may be needed if programme monitoring systems or methodologies are improved, or historical data errors are found. Please update results for earlier years as necessary, and make a note in the return. ICF results are reported cumulatively, therefore it is important to make these corrections.

Questions about results reporting can be discussed with central ICF analysts, who undertake a further stage of quality assurance before publication.

A project that has been installing clean energy capacity will have reported results each year with the following:

- *Achieved results: tonnes of greenhouse gas emissions avoided (tCO2e) in the reporting year and any updates to previous years' data. Additions to previous years' data may occur due to delays in reporting. These changes should be clearly documented within the results return.*
- *Total lifetime expected results: expected greenhouse gas emissions (tCO2e) avoided from clean capacity or energy efficient technologies installed over the whole lifetime of the installation. This may be beyond the length of the ICF programme investment.*

Any increases in emissions (e.g. reversals), should be recorded in the reported results where possible. Further analysis of these increases can be explored through evaluation, whether they are natural (e.g. forest fire) or anthropogenic (e.g. poor forest management, or abandonment of project commitments).

For forest projects or other ecosystems, this indicator includes net reductions through GHG sequestration. The lifetime for a forest project is more difficult to establish than for projects in the energy supply sector, as there is a greater risk of non-permanence, reversals, and leakage. For example, a forest preserved through a

UK Government intervention in year 1 may be cut down in year 3 or displace deforestation activities to an area outside of the ICF intervention.

Annex 1: Synergies with reporting against ICF TA 5

ICF TA 5 (volume of emissions reductions supported by ICF technical assistance) reports greenhouse gas emissions for technical assistance elements of projects. Some programmes may be eligible to report against both ICF KPI 6 and ICF TA 5 if the programme includes non-technical assistance and technical assistance projects.

If an ICF programme provides capital only, it reports direct emissions abatement under ICF KPI 6.

If an ICF programme/programmes provide capital spend and technical assistance, they can report under both this indicator (ICF KPI 6) and supported emissions abatement under ICF TA 5.

If an ICF programme provides technical assistance but a non-ICF UK Government programme provides capital, only the supported emissions abatement should be reported under ICF TA 5, as non-ICF programmes would not report the direct emissions abatement against this indicator (ICF KPI 6).

Annex 2: Worked examples

Worked Example 1: New Power Generation

Based on fictitious programme where UK Government funds 10 MW of new solar capacity in a single year in Ghana

Emissions reduced/avoided (tCO_2e) = [MWh or kWh of conventional generation avoided or displaced × Emission factor]

Step 1: Determine the counterfactual

The solar plant will be grid connected, and the baseline supply of electricity is the grid mix. This is the first scale solar plant in the country, so we can be confident of its additionality. Therefore, we use an additionality factor of 95%.

Step 2: Estimate the change in fuel consumption due to ICF activity relative to the counterfactual

The fuel consumption for the solar plant is zero, thus the change in consumption is the total MWh fed into the grid by the solar plant. Ghana solar has a capacity factor of 0.2 (for Africa, see Annex 4). The total solar electricity generated per year is simply: 10MW ×0.2×24×365 = 17,520MWh.

Multiply this by the adjustment factor: = 17,520 × 0.95 = 16,644MWh.

Step 3: Apply an *emissions intensity factor*

Since Ghana has electricity demand that frequently exceeds supply (as seen by recurrence of blackouts), a reduction in peak load would mean the baseline generation would still be fully operational, so a Build Margin should be selected (or a Combined Margin with a higher BM component). If data is not available to establish the BM, the default from Annex 4 should be used. For Ghana, this is 0.479tCO_2e/MWh.

Thus, the annual emissions reductions is: 16,644MWh × 0.479tCO_2e/MWh = 7,972tCO_2e/year.

Step 4: If necessary, take into account carbon market interactions

No carbon offsets or emissions reductions were sold from the project, thus no adjustment is made.

Step 5: Calculate attribution

The project is 60% funded by ICF, and 40% by host government. Thus, the UK Government's attribution is 60%. Thus: 7,972tCO_2e/year × 0.6 = 4,783tCO_2e/year.

Step 6: Calculate annual tonnes of GHG emissions reduced or avoided and total expected emissions reductions over the installations' lifetime

The annual emissions reduction is 4,783tCO_2e/year when fully operational. However, the 5-year project included siting and design, and the plant began operation after 2 years. That is, zero emissions reductions in year 1 and year 2, and 4,783tCO_2e in years 3, 4 and 5.

The solar plant has a design life of 25 years, therefore a further 4,783tCO_2e/year × 22 years = 105,225tCO_2e of emissions reductions is expected over the installation life.

Step 7: Report disaggregated data

- Sector: Energy
- Technology Type (where applicable): Solar PV
- Country: Ghana
- Carbon credits obtained and sold (where applicable): Not applicable

Worked Example 2: Forests (this could apply to any ecosystem)

Based on fictitious programme where UK Government funds reducing forest degradation in the Congo Basin in the Democratic Republic of the Congo. The programme reduces degradation on 10,000 hectares of forestland. It is assumed that the project has a permanent effect and that no other donor programmes are operating in the intervention area.

Step1: Determine the counterfactual
An adjustment factor of 95% was selected as there is confidence that the results are additional, and data quality is good.

A leakage factor is applied of 25%, as the reduced degradation activities may cause some local land-degrading activities to relocate to another area and continue. In the absence of better evidence the typical rate is used but this should be revised at a later stage in the programme when programme specific evidence on leakage becomes available.

Step 2: Estimate the change in land use due to ICF activity relative to the counterfactual and account for leakage where necessary
10,000 ha × (0.95-0.25) = 7,000 ha

Step 3: Apply an emissions intensity factor
In this example, the project is working with type 1 forest, in a tropical humid climate in Africa, with High Activity Clay (HAC) soils. The emission factors are:

- biomass (below and above ground) - 745tCO2/hectare
- soils - 240tCO2e/hectare
- total -985tCO2e/hectare

Note - the emission factors in this example are negative because forests are generally a natural carbon sink for GHGs.

Emissions reductions = [forest land area × emission factor]
Emissions reductions = 7,000ha × (985tCO_2/ha) Emissions reductions = 6,895,000tCO_2e/year

Step 4: Factor in degradation multiplier

In this example, a qualitative assessment is made that there would have been 'extreme' degradation without the project. The associated degradation multiplier is 0.2. After the project, there is 'very low' degradation. The associated degradation multiplier is 0.9.

Emissions reductions = [forest land area × emission factor × change in degradation multiplier]
Emissions reductions = 7,000 ha × (-985tCO_2/ha) × (0.9-0.2)
Emissions reductions = 4,826,000tCO_2e/year

Step 5: If necessary, take into account Carbon market interactions

No carbon credits are generated or sold from this programme.

Step 6: Calculate attribution

The project is 100% ICF funded, thus 4,826,000tCO_2e/year

Step 7: Calculate annual tonnes of GHG emissions reduced or avoided and total expected emissions reductions over the installations' lifetime

Annual net reduction in GHG emissions = 4,826,0006tCO_2e/year

With regards to total expected emissions reductions, this emissions outcome assumes the land use change (i.e. extreme degradation avoided) is effectively permanent (i.e. 4,826,0006tCO_2e/year every year) and that degradation does not occur in the years after project implementation. The IPCC defines the atmospheric lifetime of carbon dioxide as 100 years. Practically, a project claiming this emissions impact must have compelling mechanisms to ensure the long-term forest protection. While 100 years is impractical, governance mechanisms (such as declaration as

National Park, with enforcement provisions in place) that credibly provide assurance of longevity of protection (at least 30 years) must be included. The treatment of time is not straightforward for forest projects, as the rate of forest growth and decay is non-linear, and varies by forest type. This has an impact on emissions. Hence it is best to use the UN spreadsheet tool described above, as the tool is programmed to take account of varying rates of growth and decay.

For further worked examples with more complex attribution methodologies please refer to the '[Supplementary Guidance to ICF Results Methodology Notes: Additionality and Attribution']

Step 8: Report disaggregated data

- Sector: Forestry
- Technology Type (where applicable): Not applicable
- Country: Democratic Republic of the Congo
- Carbon credits obtained and sold (where applicable): Not applicable

Annex 3: Data disaggregation

Results should be disaggregated by:
- Sector
- Technology Type (where applicable)
- Country
- Carbon credits obtained and sold (where applicable)

Sector

Disaggregate all results by Sector:

Sector	Examples
Energy supply	Oil & Gas; Electricity; Power; Utilities
Industrial processes	Mining; Chemicals; Electronics; material; cement; manufacturing
Business	Retail; supply chain; customer services; Financial; banking & capital markets; insurance; investors; Leisure; tourism; hospitality
Public	Healthcare; Education; Research
Residential	Housing; Domestic combustion; Composting
Transport	Transport; Automotive; Aviation; Shipping
Agriculture	Agribusiness; Food & Beverages
Fisheries and aquaculture	Fisheries; Aquaculture
Waste management	Solid Waste Disposal; Waste Incineration; Wastewater Handling
Forestry	Forestry; wood products
Lan/sea-use and Land/sea-use change	Environment; construction and spatial planning; land-use change
Water	Water management; water & sanitation

Technology type

Where applicable, disaggregate by technology type:

Technology Type	Definition[22]
Wind power	Energy derived from wind.
Solar photovoltaic (PV)	The technology of converting light energy directly into electricity by mobilizing electrons in solid state devices. The specially prepared thin sheet semiconductors are called PV cells.
Concentrated solar power (CSP)	Systems which use either lenses or

[22] Full definitions are available from the IPCC Renewable Energy Sources and Climate Change Mitigation report

	mirrors to capture large amounts of solar energy and focus it down to a smaller region of space. The higher temperatures produced can operate a thermal steam turbine or be used in high-temperature industrial processes
Mixed solar	A mix of Solar PV and Solar CSP.
Marine energy (including wave and tidal energy)	Energy obtained from the ocean via waves, tidal ranges, tidal and ocean currents, and thermal and saline gradients.
Hydropower	Energy derived from flowing water.
Carbon capture and storage (CCS)	CO2 from industrial and energy-related sources is separated, compressed and transported to a storage location for long-term isolation from the atmosphere.
Biofuels	Any liquid, gaseous or solid fuel produced from biomass, for example, soybean oil, alcohol from fermented sugar, black liquor from the paper manufacturing process, wood as fuel, etc.
Clean cookstoves	More efficient cookstoves that materially improve energy efficiency
Biomass	Combustion of material of biological origin (plants or animal matter), excluding material embedded in geological formations and transformed to fossil fuels or peat.
Process heating/drying	
Multiple/Mixed Renewable Energy	Multiple or a mix of technologies.
Other	Renewable energy technologies which are not listed above.

Country

For the purposes of this indicator, a country is a legal entity that is recognised by the UK government[23].

[23] A full list of officially recognised countries can be found here: Country Names.csv

Carbon Credits

Projects that expect to sell carbon credits during the ICF funding period[24]. This includes cases where ICF does not intend to sell credits, but implementing partners or other funding agencies intend to sell carbon credits. Such projects can use CDM, Gold Standard (https://www.goldstandard.org/) or Verra (http://verra.org/), depending on the market credits intend to be sold to. Implementing partners, or external service providers typically undertake project monitoring, reporting, and facilitation of verification. Note that any such projects must transparently report any carbon credits bought or sold.

[24] It is often not appropriate for the UK to fund programmes that receive or expect to receive revenues from carbon credits, and therefore advice should be sought on a case by case basis.

Annex 4: Energy Intensity Factors and Renewable Energy Capacity Factors

GHG Emissions Factors represent values that relate the quantity of GHG released into the atmosphere with an activity. These factors are usually expressed as the mass of GHG divided by a unit mass or volume of fossil fuel.

An *emissions intensity factor* should be used to calculate the net reduction in GHG emissions. An emissions reductions estimate should be obtained where data is available, by reflecting the time and type of conventional energy generation displaced from the grid using the project's renewable energy. This is reflected in the *Operating Margin* (when reducing the generation of operating plants) and the *Build Margin* (when the construction of newly built plants is avoided or postponed).

This emissions reduction estimate is based on a Grid Emissions Factor, and should be calculated using the CDM Methodological Tool[25] to calculate the emissions factor for an electricity system:

- Variable Generation (Solar and wind): Combined Margin (CM) = [0.75 × Operating Margin (OM)] + [0.25 × Build Margin (BM)]. Solar and wind have this ratio due to their intermittent and non-dispatchable nature.

- Firm Generation (other Renewable Energy projects such as hydro, geothermal, biomass): Combined Margin (CM) = [0.33 × OM] + [0.63 × BM], balancing current operating margins and estimated built margins. [26]

Where project specific information is not available, use country or regional average capacity factors and an average Combined Margin (at 50/50 OM/BM) Emissions Factor. These can be accessed from the Institute of Global Environmental Strategies[27], based on publicly available sources on the **UNFCCC website**[28] and should be calculated using the CDM Methodological Tool.[29]

[25] CDM Methodological Tool. *Accessed February 2023.*

[26] List of harmonised GHG accounting standards/approaches and guidelines. *Accessed February 2023.*

[27] Institute of Global Environmental Strategies Grid Emissions Factors. *Accessed February 2023.*

[28] UNFCCC website. *Accessed February 2023*.

[29] For guidance on how to establish the emission factor: CDM Methodological Tool and for guidance on how it is applied to the most common CDM methodologies. *Accessed February 2023*.

Renewable Energy Capacity Factors are available from the International Renewable Energy Association[30] (IRENA) *Renewables 2022: Global Status Report*[31].

Capacity Factors are unlikely to vary widely from year-to-year, and data is updated on an ad-hoc basis by IRENA from multiple sources. It is recommended to use the most up to date capacity factors from the most recent IRENA publication (IRENA's publication cycle for Methodologies is annual). Generally, Capacity factors do not vary widely between ODA countries within the same geographical region. Whereas they vary widely by project location and are based on technology variations. For this reason, country level metrics are generally not more useful than regional level metrics, and furthermore, these are capacity factor estimates intended to provide a broad-based reporting outcome.

Wherever possible, project location and technology specific factors should be used.

[30] International Renewable Energy Association (IRENA) is an intergovernmental organisation supporting countries in their transition to a sustainable energy future. IRENA is the premiere global organisation dedicated to the promotion of 100% renewable energy worldwide, and is the world's largest repository of free information on renewable energy. IRENA is an official United Nations observer, and boasts membership of 167 states and the European Union (with a further 16 in the process of accession). Note that CDM Executive Board figures not used on a per project basis. There is no other relevant international database to rely upon for Capacity Factors.

[31] REN 21: Renewables 2022 Global Status Report

Annex 5: Applicable CDM methodologies

CDM Methodologies are used to calculate total emissions reductions from clean energy/clean technology projects towards carbon credit eligibility in the context of the Kyoto Protocol. The United Nations Framework Convention on Climate Change (UNFCCC) 2021 Methodology Booklet states: *The Clean Development Mechanism (CDM) requires the application of a baseline and monitoring methodology in order to determine the amount of Certified Emission Reductions (CERs) generated by a mitigation CDM project activity in a host country.*[32]

The determination of the usage of the appropriate UNFCCC CDM Methodology is normally undertaken by the delivery partners, or by a third party GHG/CDM Accountant. The level of rigour and accuracy of CDM reporting is substantially higher than the simplified approach outlined above. This is typically outsourced to a professional, such as an international consulting firm.

The CDM is the largest database of emissions reduction projects and has a comprehensive set of methodologies unmatched elsewhere. Therefore, these should be considered best practices. For ICF reporting, the most relevant sections from the most commonly used CDM Methodologies have been identified in the Table (Applicable CDM Methodologies) below.

This table outlines the most common International Climate Finance (ICF) intervention types, with links to applicable UNFCCC CDM methodologies.[33] Reducing Emissions from Deforestation and forest Degradation, Transport and Energy Efficiency programmes are not covered by these methodologies.).[34]

This Table contains notes on which methodology version to select (where more than one choice is available for any given clean energy technology type); and the most relevant sections of the source reference are highlighted.

Steps to Identify CDM Methodology
Step 1: Identify/Determine your Project's/Programme's Target Technology in the Table below and copy the reference and methodology title from the Table.
Step 2: Navigate to the **UNFCCC methodologies** and paste the reference and methodology title into the methodology search bar.
Step 3: Select the applicable CDM Methodology link associated with that project's renewable energy technology. Ensure you select the appropriate CDM Methodology

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[32] UNFCCC CDM Methodology Booklet, Thirteenth Edition (updated December 2021)

[33] Table requires annual or 2-year update, as methodologies will be periodically amended or replaced with the introduction of new technologies. Default numbers or country-specific data are not available, as Renewable Energy CDM methodologies/modalities are technology & project-specific and can be quite complex, and generally not governed by geographical conditions/factors.

[34] Transport and energy efficiency interventions are not included, as they only cover a small proportion of ICF programmes reporting against. CDM methodologies not included in this document can be found here

version (e.g. grid-connected or mini-grid) and check it is still listed as an 'active' Methodology.
Step 4: A typical CDM Methodology is 25-30 pages, most of which is irrelevant and can be ignored by going to the pages referenced for 'Applicability', to check that this Methodology is applicable to your specific Project/Programme.
Step 5: Proceed to the pages referenced for 'Baseline Methodology', to calculate emissions avoided due to the renewable energy Project/Programme.
Step 6: Establish the 'Project Boundary' in accordance with the CDM Baseline Methodology.
Step 7: For most RE CDM Project's supported by ICF (e.g. solar, wind & biogas), leakage is immaterial and Project emissions are insignificant.[35]

Note: If the Methodology process cannot be practically followed, a simplified estimate of project outcomes can be obtained by multiplying the annual renewable production from the Project in MWh by the Emissions Factor (given per country in Annex 4 above).

Table 5: Applicable CDM Methodologies

ICF Intervention Type	Applicable CDM Methodologies (Reference and Methodology Title)	Notes on Which Document to Select
Hydro (large scale)	ACM000002: Grid-connected electricity generation from renewable sources	Only one choice
Hydro (small scale)	(1) AMS-I.D.: Grid connected renewable electricity generation	(1) Grid connected
	(2) AMS-I.F.: Renewable electricity generation for captive use and mini-grid	(2) Mini grid
Wind (large scale)	ACM0002: Grid-connected electricity generation from renewable sources	Only one choice
Wind (small scale)	AMS-I.A.: Electricity generation by the user	Only one choice
Geothermal (large scale)	ACM0002: Grid-connected electricity generation from renewable sources	Only one choice
Geothermal (small scale)	(1) AMS-I.D.: Grid connected renewable electricity generation	(1) Grid connected
	(2) AMS-I.F.: Renewable electricity generation for captive use and mini-grid	(2) Mini grid

[35] *IFC GHG Reduction Accounting Guidance, May 2017:* Leakage is a change in GHG emissions beyond the project boundary and can result from displacing a source of GHG emissions off-site or causing an unrelated increase in GHG emissions at a third party operation. For the most part, leakage is negligible unless otherwise described in specific project-type methodologies.

Solar Power Plant (large scale)	ACM0002: Grid-connected electricity generation from renewable sources --- Version 17.0	Only one choice
Solar PV (small scale)	(1) AMS-I.D.: Grid connected renewable electricity generation	(1) Grid connected
	(2) AMS-I.F.: Renewable electricity generation for captive use and mini-grid	(2) Mini grid
	(3) AMS-I.L.: Electrification of rural communities using renewable energy	(3) Mini grid and household level
	(4) AMS-I.A.: Electricity generation by the user	(4) Household
	(5) AMS-I.J.: Solar water heating systems (SWH)	(5) Solar water heating
Wave/Tidal (large scale)	ACM0002: Grid-connected electricity generation from renewable sources	Only one choice
Wave/Tidal (small scale)	(1) AMS-I.D.: Grid connected renewable electricity generation	(1) grid connected
	(2) AMS-I.F.: Renewable electricity generation for captive use and mini-grid	(2) Mini grid
Biomass (large scale)	(1) ACM0006: Electricity and heat generation from biomass	(1) See if directly relevant from project title
	(2) ACM0018: Electricity generation from biomass residues in power-only plants	(2) See if directly relevant from project title
	(3) ACM0020: Co-firing of biomass residues for heat generation and/or electricity generation in grid connected power plants	(3) See if directly relevant from project title
Biomass (small scale)	(1) AMS-I.D.: Grid connected renewable electricity generation	(1) Grid connected
	(2) AMS-I.F.: Renewable electricity generation for captive use and mini-grid	(2) Mini grid
	(3) AMS-I.A.: Electricity generation by the user	(3) Household level
Biofuels (large scale)	ACM0017: Production of biofuel	Only one choice
Biofuels (small scale)	AMS-I.I.: Biogas/biomass thermal applications for households/small users	Only one choice

Cookstoves (small scale)	(1) AMS-I.C.: Thermal energy production with or without electricity	(1) E.g. solar thermal water heaters and dryers, solar cookers, energy derived from renewable biomass.
	(2) AMS-II.G.: Energy efficiency measures in thermal applications of non-renewable biomass	(2) E.g. replacement of existing biomass fired cookstoves or ovens or dryers with
	(3) AMS-I.I.: Biogas/biomass thermal applications for households/small users	(3) E.g. biogas cookstoves, biomass briquette cookstoves, small scale baking and drying systems, water heating, or space heating systems
	(4) AMS-I.E.: Switch from non-renewable biomass for thermal applications by the user	(4) E.g. biogas cookstoves, solar cookers, and water boiling using renewable biomass
	(5) AMS-I.K.: Solar cookers for households	(5) Solar cookers
Waste to Energy (large scale)	ACM0012: Waste energy recovery	Only one choice
Waste to Energy (small scale)	AMS-III.Q.: Waste energy recovery	Only one choice
Low Carbon Agriculture (large scale)	(1) AM0073: GHG emission reductions through multi-site manure collection and treatment in a central plant	(1) See if directly relevant from project title

	(2) ACM0010: GHG emission reductions from manure management systems	(2) See if directly relevant from project title
Low Carbon Agriculture (small scale)	(1) AMS-III.D.: Methane recovery in animal manure management systems	(1) See if directly relevant from project title
	(2) AMS-III.R.: Methane recovery in agricultural activities at household/small farm level	(2) See if directly relevant from project title
	(3) AMS-III.A.: Offsetting of synthetic nitrogen fertilizers by inoculant application in legumes-grass rotations on acidic soils on existing cropland	(3) See if directly relevant from project title
	(4) AMS-III.AU.: Methane emission reduction by adjusted water management practice in rice cultivation	(4) See if directly relevant from project title
	(5) AMS-III.BE.: Avoidance of methane and nitrous oxide emissions from sugarcane pre-harvest open burning through mulching	(5) See if directly relevant from project title
	(6) AMS-III.BF.: Reduction of N2O emissions from use of Nitrogen Use Efficient (NUE) seeds that require less fertilizer application	(6) See if directly relevant from project title
	(7) AMS-III.BK: Strategic feed supplementation in smallholder dairy sector to increase productivity	(7) See if directly relevant from project title
Afforestation and Reforestation (large scale)	(1) AR-AM0014: Afforestation and reforestation of degraded mangrove habitats	(1) Afforestation and reforestation on mangrove
	(2) AR-ACM0003: Afforestation and reforestation of lands except wetlands	(2) Afforestation and reforestation on dry land
Afforestation and Reforestation	(1) AR-AMS0003: Afforestation and reforestation project activities implemented on wetlands	(1) Afforestation and reforestation on wetlands

(small scale)	(2) AR-AMS0007: Afforestation and reforestation project activities implemented on lands other than wetlands	(2) Afforestation and reforestation on dry land
Energy Efficiency (large scale)	(1) AM0017: Steam system efficiency improvements by replacing steam traps and returning condensate	(1) See if directly relevant from project title
	(2) AM0018: Baseline methodology for steam optimization systems	(2) See if directly relevant from project title
	(3) AM0020: Baseline methodology for water pumping efficiency improvements	(3) See if directly relevant from project title
	(4) AM0038: Methodology for improved electrical energy efficiency of an existing submerged electric arc furnace used for the production of silicon and ferro alloys	(4) See if directly relevant from project title
	(5) AM0044: Energy efficiency improvement projects - boiler rehabilitation or replacement in industrial and district heating sectors	(5) See if directly relevant from project title
	(6) AM0046: Distribution of efficient light bulbs to households	(6) See if directly relevant from project title
	(7) AM0056: Efficiency improvement by boiler replacement or rehabilitation and optional fuel switch in fossil fuel-fired steam boiler systems	(7) See if directly relevant from project title
	(8) AM0058: Introduction of a district heating system	(8) See if directly relevant from project title
	(9) AM0060: Power saving through replacement by energy efficient chillers	(9) See if directly relevant from project title
	(10) AM0061: Methodology for rehabilitation and/or energy efficiency improvement in existing power plants	(10) See if directly relevant from project

		title
	(11) AM0062: Energy efficiency improvements of a power plant through retrofitting turbines	(11) See if directly relevant from project title
	(12): AM0067: Methodology for installation of energy efficient transformers in a power distribution grid	(12) See if directly relevant from project title
	(13) AM0068: Methodology for improved energy efficiency by modifying ferroalloy production facility	(13) See if directly relevant from project title
	(14) AM0070: Manufacturing of energy efficient domestic refrigerators	(14) See if directly relevant from project title
	(15) AM0084: Installation of cogeneration system supplying electricity and chilled water to new and existing consumers	(15) See if directly relevant from project title
	(16) AM0086: Distribution of zero energy water purification systems for safe drinking water	(16) See if directly relevant from project title
	(17) AM0091: Energy efficiency technologies and fuel switching in new and existing buildings	(17) See if directly relevant from project title
	(18) AM0104: Interconnection of electricity grids in countries with economic merit order dispatch	(18) See if directly relevant from project title
	(19) AM0105: Energy efficiency in data centres through dynamic power management	(19) See if directly relevant from project title

	(20) AM0106: Energy efficiency improvements of a lime production facility through installation of new kilns	(20) See if directly relevant from project title
	(21) AM0113: Distribution of compact fluorescent lamps (CFL) and light-emitting diode (LED) lamps to households	(21) See if directly relevant from project title
	(22) AM0114: Shift from electrolytic to catalytic process for recycling of chlorine from hydrogen chloride gas in isocyanate plants	(22) See if directly relevant from project title
	(23) AM0116: Electric taxiing systems for airplanes	(23) See if directly relevant from project title
	(24) AM0118: Introduction of low resistivity power transmission line	(24) See if directly relevant from project title
	(25) AM0120: Energy-efficient refrigerators and air-conditioners	(25) See if directly relevant from project title
	(26) ACM0023: Introduction of an efficiency improvement technology in a boiler	(26) See if directly relevant from project title
Energy efficiency (small scale)	(1) AMS-II.A.: Supply side energy efficiency improvements – transmission and distribution	(1) See if directly relevant from project title
	(2) AMS-II.B.: Supply side energy efficiency improvements – generation	(2) See if directly relevant from project title

(3) AMS-II.C.: Demand-side energy efficiency activities for specific technologies	(3) See if directly relevant from project title
(4) AMS-II.D.: Energy efficiency and fuel switching measures for industrial facilities	(4) See if directly relevant from project title
(5) AMS-II.E.: Energy efficiency and fuel switching measures for buildings	(5) See if directly relevant from project title
(6) AMS-II.F.: Energy efficiency and fuel switching measures for agricultural facilities and activities	(6) See if directly relevant from project title
(7) AMS-II.G.: Energy efficiency measures in thermal applications of non-renewable biomass	(7) See if directly relevant from project title
(8) AMS-II.H.: Energy efficiency measures through centralization of utility provisions of an industrial facility --- Version 3.0	(8) See if directly relevant from project title
(9) AMS-II.I.: Efficient utilization of waste energy in industrial facilities	(9) See if directly relevant from project title
(10) AMS-II.J.: Demand-side activities for efficient lighting technologies This methodology is complemented by AMS-III.AR: Substituting fossil-fuel based lighting with LED/CFL lighting systems Version 06.0	(10) See if directly relevant from project title Kerosene replacement with clean energy lighting.
(11) AMS-II.K.: Installation of co-generation or tri-generation systems supplying energy to commercial building	(11) See if directly relevant from project title

	(12) AMS-II.L.: Demand-side activities for efficient outdoor and street lighting technologies	(12) See if directly relevant from project title
	(13) AMS-II.M.: Demand-side energy efficiency activities for installation of low flow hot water savings devices	(13) See if directly relevant from project title
	(14) AMS-II.N. Demand-side energy efficiency activities for installation of energy efficient lighting and/or controls in buildings	(14) See if directly relevant from project title
	(15) AMS-II.O. Dissemination of energy efficient household appliances	(15) See if directly relevant from project title
	(16) AMS-II.P. Energy efficient pump-set for agriculture use	(16) See if directly relevant from project title
	(17) AMS-II.Q. Energy efficiency and/or energy supply projects in commercial buildings	(17) See if directly relevant from project title
	(18) AMS-II.R. Energy efficiency space heating measures for residential buildings	(18) See if directly relevant from project title
	(19) AMS-II.S. Energy efficiency in motor systems	(19) See if directly relevant from project title
	(20) AMS-III.X. Energy Efficiency and HFC134a Recovery in Residential Refrigerators	(20) See if directly relevant from project title
	(21) AMS-III.Z. Fuel Switch, process improvement and energy efficiency in brick manufacture	(21) See if directly relevant from project

		title
	(22) AMS-III.AA.: Transportation Energy Efficiency Activities using Retrofit Technologies	(22) See if directly relevant from project title
	(23) AMS-III.AE. Energy efficiency and renewable energy measures in new residential buildings	(23) See if directly relevant from project title
Transport (large scale)	(1) AM0031: Bus rapid transit projects	(1) See if directly relevant from project title
	(2) AM0090: Modal shift in transportation of cargo from road transportation to water or rail transportation	(2) See if directly relevant from project title
	(3) AM0101: High speed passenger rail systems	(3) See if directly relevant from project title
	(4) AM0110: Modal shift in transportation of liquid	(4) See if directly relevant from project title
Transport (small scale)	(1) AMS-III.U. Cable Cars for Mass Rapid Transit System (MRTS)	(1) See if directly relevant from project title
	(2) AMS-III.AK.: Biodiesel production and use for transport applications	(2) See if directly relevant from project title
	(3) AMS-III.AY. Introduction of LNG buses to existing and new bus routes	(3) See if directly relevant from project title
	(4) AMS-III.BC. Emission reductions through improved efficiency of vehicle fleets	(4) See if directly relevant from project title

	(5) AMS-III.BM. Lightweight two and three wheeled personal transportation	(5) See if directly relevant from project title
Transport / Energy Efficiency (small scale)	(1) AMS-III.AP.: Transport energy efficiency activities using post	(1) See if directly relevant from project title
	(2) AMS-III.AT.: Transportation energy efficiency activities installing digital tachograph systems to commercial freight transport fleets	(2) See if directly relevant from project title

Annex 6: Definitions

Additionality: Impacts or results are additional if they are beyond the results that would have occurred in the absence of the ICF-supported intervention. That is, results are additional if they go beyond what would have been expected under a BAU counterfactual.

Attribution: Attribution refers to allocating responsibility for impacts or results among all actors that have played a causal role in programmes that deliver additional results. Results are commonly attributed to causal actors based on their financial contributions to programmes (though there may be cases where greater nuance is needed, as with ICF KPI 11 and ICF KPI 12).

Capacity Factor: This is a unitless ratio of actual electrical energy output over a given period of time to the maximum possible electrical energy output over that period.

Causality: Causality refers to the assessment that one or more actors bear responsibility for additional results or impacts, because of funding provided though the ICF or actions taken under an ICF programme. Multiple development partners may be assessed to have played a causal role in delivering results.

Counterfactual: The situation one might expect to have prevailed at the point in time in which a programme is providing results, under different conditions. Commonly, this is used to refer to a 'business as usual' (BAU) counterfactual case that would have been observed if the ICF-supported intervention had not taken place.

Grid Emissions Factor: CO2 emission factor (tCO2e/MWh) associated with each unit of electricity provided by an electricity system.

Leakage: Prevented deforestation activities within one area can result in displacement of deforestation to an area outside of the ICF intervention.

Non-dispatchable: This refers to the electricity generation from technologies that cannot (or have limited ability to) adjust their power output to match electricity demand, as their source is weather-dependent.

Rebound effect: In some cases, users of a more efficient appliance or installation are aware it is more efficient, and therefore use it for longer periods, or more often. For example, people may reduce the habit of 'turn the light off when you leave the room', if they know less energy is used due to efficient LED lights. This is referred to as the 'rebound effect'.