Climate Change Compass helps the UK Government monitor, evaluate and learn from UK International Climate Finance

Net Change in Greenhouse Gas Emissions (tCO2e) – tonnes of GHG emissions reduced or avoided as a result of ICF

KPI 6 Methodology Note

November 2018

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About Climate Change Compass
The UK government has committed to provide at least £5.8 billion of International Climate Finance between 2016 and 2020 to help developing countries respond to the challenges and opportunities of climate change.

Visit **www.gov.uk/guidance/international-climate-finance** to learn more about UK International Climate Finance, its results and read case studies. Visit **www.climatechangecompass.org** to learn more about how Climate Change Compass is supporting the UK Government to monitor, evaluate, and learn from the UK International Climate Finance portfolio.

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
DFID	Department for International Development
EF	Emissions Factor
EU	European Union
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
N2O	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
UK	United Kingdom
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
W	Watt

***PLEASE NOTE: This document provides a simplified but reasonable estimate of emissions reductions to report against KPI 6. It also provides links to more complex and more accurate approaches. The more complex approaches are expected in a small number of ICF projects where additional resources may be required for KPI 6 reporting.*

Net Change in Greenhouse Gas Emissions (tCO2e) – tonnes of GHG emissions reduced or avoided as a result of ICF

Rationale

A key priority of International Climate Finance (ICF) is to demonstrate low carbon development is feasible and to achieve emission reductions. Monitoring the level of emissions abated from ICF projects is a key indicator of progress and results of direct action on the ground.

Summary table

Table 1: KPI 6 Summary Table

Units	Tonnes of Carbon Dioxide Equivalent (tCO_2e)
Disaggregation Summary (click for more info)	Results will be disaggregated by each sector, allocated by source and defined by the United Nations Framework Convention on Climate Change (UNFCCC) Inventory Categories. Please report if carbon credits have been obtained or not, and if these have been sold.
Headline Data To Be Reported	Absolute mass of greenhouse gas emissions reduced or avoided (tCO_2e)
Latest revision	September 2018. The main revisions to this Methodology Note are: • Guidance on converting KPI 7 into 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 issues	*When to report:* ICF programmes will be required to report ICF results once each year in March. Please bear in mind how much time is needed to collect data required to report ICF results and plan accordingly. *Reporting lags*: Your programme may have produced results estimates earlier in the year, for example during your programme's Annual Review. It is acceptable to provide these results as long as they were produced in the 12 months preceding the March results commission. In some cases data required for producing results estimates will be available after the results were achieved – if it is the case that because of this, results estimates are only available more than a year away from when a results estimate is produced it should be noted in the results return that this is the case.
Links across the KPI portfolio	The LCD indicators, KPIs 2 (no. of people with improved access to clean energy), 7 (clean energy installed), 9 (number of domestic low carbon technology units delivered), 16 (net change in energy consumption), and forestry

	indicator KPI 8 (hectares of deforestation avoided), are all output/outcome precedents to KPI 6 (impact). Each is a potential contributor to KPI6 by means of a conversion factor or other methodology. Some programmes reporting on 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 KPI 15.

Technical Definition

This indicator will report on the net change in greenhouse gas (GHG) emissions measured in tCO_2e, estimated relative to the assumed *business as usual* 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 (CH_4)
- Nitrous Oxide (N_2O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulphur Hexafluoride (SF_6)

This indicator will report on GHG emission impacts from all activities within an ICF project or programme area. This is consistent with the methodology used by the Intergovernmental Panel on Climate Change (IPCC) to estimate national GHG emissions.

This will not capture life-cycle impacts or consumption emissions that fall outside the individual country. 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 Land-Use, Land-Use Change and Forestry (LULUCF) – and results will be disaggregated by each sector, allocated by source and defined by the UNFCCC Inventory Categories:

- Energy supply
- Industrial processes
- Business
- Public
- Residential
- Transport
- Agriculture
- Waste Management
- Land Use, Land Use Change and Forestry (LULUCF)

For the Low Carbon Development (LCD) theme, results will predominately be reported under the energy supply sector from: changes in power generation and electrical energy efficiency improvements; or emission savings from energy efficiency measures in the industrial, business, residential or transport sectors.

For the Forestry theme, results will be reported under the LULUCF and Agriculture sector and will estimate changes in emissions from deforestation and forest degradation, forest conservation, sustainable management of forests and enhancement of forest carbon stocks (REDD+).

Methodological Summary

The net change in GHG emissions is estimated through a simple calculation – it is not a directly observable result. This calculation varies by project type, with the main project types being:

1) Electricity generation
2) Electricity energy efficiency savings
3) Energy efficiency savings from other sources
4) Forestry
5) Transport

The calculation steps are similar for each project type (detailed in worked examples), and are set out as follows:

This indicator will report realised net changes in GHG emissions from the project, reporting progress by each year of the project and providing an estimate for the total expected emissions reductions over the installation's lifetime.

For example:

- Project year 1 results = tCO_2e avoided in year 1 from clean capacity or energy efficient technologies installed in first year of project
- Project year 2 results = tCO_2e avoided in year 2 from clean capacity or energy efficient technologies installed in first and second year of project.
- Project year 5 results = tCO_2e avoided in year 5 from clean capacity or energy efficient technologies installed in first and second year of project.
- Total lifetime expected results = expected tCO_2e avoided from clean capacity or energy efficient technologies installed over lifetime of project.

Similarly, for forestry projects, this indicator will report on annual reductions and the total expected lifetime tCO_2e avoided, including through GHG sequestration. The lifetime for a forestry project is more difficult to establish than for some LCD projects, as there is a greater risk of non-permanence. For example, a forest preserved through an HMG intervention in year 1 may be cut down in year 3.

The lifetime of a project should be estimated in the business case appraisal and, if necessary, be re-assessed during project implementation. Any increases in emissions (e.g. reversals), should be recorded in the evaluation, whether they are natural (e.g. forest fire) or anthropogenic (e.g. poor forest management, or abandonment of project commitments).

The target results for the indicator will be based on the business case project appraisal, developed in consultation with the delivery partner, but may then be subsequently updated. The business case is likely an early estimate, and they might be updated when we have a fixed pipeline of projects.

Net change takes into account the emissions increases, as well as reductions owing to an intervention - capturing direct rebound effects (which may occur when people use some of the financial savings they have gained from improved energy efficiency to purchase more energy, or when people increase forest clearance because of an increase in the return to alternative land uses, for example). Indirect rebound effects from an intervention may also arise – however the ability for individual projects to capture this impact will be limited. Thus, this indicator will not aim to capture these indirect rebound impacts.

Figure 1: KPI 6 Methodological Summary

KPI 6: Net Change in Greenhouse Gas Emissions (tCO2e) – tonnes of GHG emissions reduced or avoided

1. Determination of the baseline counterfactual
2. Estimating the change in activity of fuel consumption owing to the ICF intervention relative to the baseline counterfactual
3. Estimating the net change in GHG emissions through the application of an emissions intensity factor to the activity level data
4. Taking into account carbon market interactions
5. Calculate pro-rata share where HMG only funded part of a project / programme
6. Calculate annual net change in GHG emissions and total expected emissions reductions over the installation's lifetime

**Additional step (between steps 3 and 4) for energy efficiency projects: "Account for the rebound effect if applicable"*
*** Additional step (between steps 3 and 4) for anti-degradation forestry projects: "Factor in the change in degradation multiplier"*

Methodology

Below are high-level methodologies to calculate the net positive change in GHG emissions due to ICF funding. These methodologies are split between the following energy intervention types:

1) Electricity generation
2) Electricity energy efficiency savings
3) Energy efficiency savings from other sources
4) Forestry
5) Transport

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 UNFCCC Clean Development Mechanism (CDM), included in Annex 6. Alternate 'voluntary standard' project-level emissions reductions quantification methodologies are available with the Gold Standard (https://www.goldstandard.org/) and Verra (http://verra.org/). Additional resources may be required for this more in-depth approach.

The approaches set out below 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 sell carbon credits during the ICF funding period[1]. 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 or Verra methodologies, depending on the market credits intend to be sold to. Implementing partners, or external service providers typically undertake project monitoring, reporting, and facilitation of

[1] From ICF Appraisal Guidance: 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'

verification. Note that any such projects must transparently report any carbon credits bought or sold.

- Projects that expect quantified emissions reductions to be included in any international transfers of credits under Article 8 of the Paris Agreement, in the context of host government Nationally Determined Contributions (NDCs). No ICF projects are currently in this situation, but future projects (post-2020) may be. In these cases, the agreed quantification approach must be agreed with the host government. The CDM methodologies are considered best practice, so is a likely set of approaches, but other approaches may also be used. The simplified methodologies described below are unlikely to be sufficient.

Projects that SHOULD apply more comprehensive approaches include:

- 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 (tCO_2e). Such projects 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.
- 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.

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 in concert with the steps below:

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

1.1.1 Determination of the baseline 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 (E.g. it could be judged that 80% of the intervention is additional). If no baseline data is available, consider reducing the total number of GHG emissions avoided by a factor of 50%.

1.1.2 Estimate the change in fuel consumption due to ICF activity relative to the baseline 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 additionality factor (e.g. 10,000 x 0.8 = 8,000). 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. A lower 'adjustment factor' (e.g. 50%) should be used if there is significant uncertainty, and there are other partners in the area undertaking similar activities.

1.1.3 Estimate the net positive change in GHG emissions using an *emissions intensity factor* to the activity level data

An *emissions intensity factor* should be used to calculate the net positive change in GHG emissions (e.g. 8,000MWh x 0.479tCO_2e/MWh = 3,832 tCO_2e/year. Country specific emission factors can be found in Annex 5.

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. 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). See Annex 5 for full definitions of Operating Margin (OM) and Build Margin (BM).

This more accurate emissions reduction estimate is based on a more accurate Grid Emissions Factor, and should be calculated using the CDM Methodological Tool[2] to calculate the emissions factor for an electricity system:

- Variable Generation (Solar and wind): Combined Margin (CM) = [0.75 x Operating Margin (OM)] + [0.25 x 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) = [0.50 x OM] + [0.50 x BM] - balancing current operating margins and estimated built margins.

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 found in Annex 2.

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 peak generation capacity. In many developing countries this will be diesel (Emissions Factors typically ranging between 0.5-0.7tCO_2e/MWh) or gas-fired (Emissions Factors typically ranging between 0.4 to 0.6tCO_2e/MWh) 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[3]). 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.

[2] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v4.0.pdf

[3] 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

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, with an EF of typically 0.5tCO_2e/MWh. Where the project is on an existing structure, with 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, typically 0.7tCO_2e/MWh.

- 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 Take into account carbon market interactions

State whether tonnes of reduced or avoided CO_2e has been sold on the carbon market. This amount must be deducted from total emissions reductions to avoid double-counting[4].

1.1.5 Calculate pro-rata share where HMG only funded part of a project/programme (attribution)

See attribution section below.

1.1.6 Calculate annual net change in GHG emissions and total expected emissions reductions over the installation's 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.

1.2) CALCULATING EMISSIONS REDUCED/AVOIDED WHERE ONLY INSTALLED CAPACITY IS KNOWN (I.E. CONVERTING KPI 7 INTO KPI 6)

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

Emissions reduced/avoided (tCO2e) = Installed capacity of renewable energy x Technology Capacity Factor x Grid Emissions Factor x 24 x 365

1.2.1 Determination of the baseline counterfactual

To compare results to the counterfactual and account for additionality, the projected level of GHG emissions reduced or avoided without the ICF intervention should be determined (E.g. it could be judged that 80% of the intervention is additional). 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. A lower 'adjustment factor' (e.g. 50%) should be used if there is significant uncertainty and there are other partners in the area undertaking similar activities.

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

[4] if an Implementing Partner decides to sell or transfer part or all of their emissions reductions, after, or separate from HMG's legitimate project impact, these emissions reductions should NOT be deducted from HMG share of impact

Multiply the installed capacity of renewable energy (e.g. 100MW of wind power in East Africa) by a factor to account for the counterfactual (e.g. 0.8) 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 a full list of technology 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 Estimate the net change in GHG emissions using an emissions intensity factor to the activity level data

An emissions intensity factor (e.g. 0.603) should be used to calculate the net change in GHG emissions. See Annex 5 for a full list of grid emissions factors.

*259,256 * 0.603 = 156,355 tCO_2e/year*

1.2.4 Take into account carbon market interactions

State whether tonnes of reduced or avoided CO_2e has been sold on the carbon market. This amount must be deducted from total emissions reductions to avoid double-counting[5].

1.2.5 Calculate pro-rata share where HMG only funded part of a project/programme (attribution)

See attribution section below.

1.2.6 Calculate annual net change in GHG emissions and total expected emissions reductions over the installation's 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 KPI 7 into 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.

2) ELECTRICITY ENERGY EFFICIENCY SAVINGS

For electricity energy efficiency related emissions savings, the net change in GHG emissions is calculated from net changes electricity consumption relative to the baseline. Electricity use is converted into amount of CO_2e by multiplying by the emissions factor (in MWh or kWh) as described for electricity generation in A) above.

[5] if an Implementing Partner decides to sell or transfer part or all of their emissions reductions, after, or separate from HMG's legitimate project impact, these emissions reductions should NOT be deducted from HMG share of impact

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

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

2.1 Determine the baseline 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 (E.g. it could be judged that 80% of the intervention is additional). If you are not able to estimate what the counterfactual 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. 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). For example, most end-use energy efficiency applications (such as household appliances), see an efficiency gain of 1-2% per year through incremental improvements is typical.

A lower 'adjustment factor' (e.g. 50%) should be used if you have a lot of uncertainty and there are other partners in the area undertaking similar activities.

2.2 Estimate the change in electricity consumption due to ICF activity relative to the baseline 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[6], take the rated capacity of the unit (in Watts (W), or kilowatts (kW)), and estimate the annual usage (in hours per day x number of days used per year) for the baseline (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[7] (a higher number of hours can be used if justified). The electricity use of the 60W baseline incandescent lamps is then 3.5 hours/day x 365 days x 60W = 76,650Wh/year = 76.7kWh/year. The replacement LED lamp uses 8.5W to provide equivalent (or better) lighting. Annual use is then: 3.5hours x 365 x 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 x 65.8kWh/year = 987,000 kWh of electricity through energy efficient lighting per year. Multiply this by the additionality factor, for a lighting project, taken as 10%: 987,000 x 0.9 = 888,300kWh saved/year).

For projects that involve holistic changes (such as insulating building envelopes combined with upgraded AC systems and efficient lighting), to capture the electricity savings from synergies between interventions, it is appropriate to determine the average total energy use (for example of the building envelope, or industrial process) over the previous three years[8], and compare to the total energy usage after the project, to obtain energy savings.

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[6] 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.

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

[8] 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.

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

This reflects the greater service provided, rather than the simple difference in electricity use (120,000kWh/year – 100,000kWh/year = 20,000kWh/year).

Each of these calculation approaches should multiply the energy saving by the additionality factor, as above.

2.3 Estimate the net change in GHG emissions through the application of an emissions intensity factor to the activity data

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

Emissions avoided (tCO_2e) = [MWh or kWh of electricity generation avoided x 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 Operating Margin and Build Margin discussion on p7 above).

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 5.

For the example lighting project in Kenya, using the default Emissions Factor of $0.603tCO_2e/MWh$ for Kenya from Annex 5:

888,300kWh saved per year x $0.603tCO_2e/MWh$ = 888.3MWh x $0.603tCO_2e/MWh$
= $536tCO_2e$/year.

The exceptions to this are listed below:

- For off-grid projects where a mini-grid exists, the generator of the mini-grid should be used - typically diesel (see p8 for 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 x $0.09tCO_2e$/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)

[9] Taken from CDM methodology, referred in Annex 6: (10) AMS-II.J.: Demand-side activities for efficient lighting technologies --- Version 7.0

saved very likely avoid peak generation capacity. As discussed above, in many developing countries peak load generation will be diesel (Emissions Factors typically 0.5-0.7tCO_2e/MWh). 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 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 HMG Appraisal guidance text, 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 x 0.95 = 509tCO_2e/year.

2.5 Take into account carbon market interactions

State whether tonnes of reduced or avoided CO_2e has been sold on the carbon market. This amount must be deducted from total emissions reductions to avoid double-counting[10].

2.6 Calculate pro-rata share where HMG only funded part of a project/programme (attribution)

See attribution section below.

2.7 Calculate annual net change in GHG emissions and total expected emissions reductions over the installation's 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 = 516tCO_2e/year, except the first year which is 258tCO_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 516 tCO_2e/year x 19.5 years = 10,062 tCO_2e.

3) NON-ELECTRICITY RELATED ENERGY EFFICIENCY SAVINGS

For energy efficiency projects not related to electricity, emissions savings are calculated from net changes in fossil fuel consumption relative to the baseline. 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.

[10] if an Implementing Partner decides to sell or transfer part or all of their emissions reductions, after, or separate from HMG's legitimate project impact, these emissions reductions should NOT be deducted from HMG share of impact

Non-electricity related energy efficiency savings mainly relates to industrial energy efficiency includes the following examples: 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 provides 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 x Emission factor (defined by fuel)]

3.1 Determine the baseline 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 (E.g. it could be judged that 80% of the intervention is additional). If you are not able to estimate what the counterfactual 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. A lower 'adjustment factor' (e.g. 50%) should be used if you have a lot of uncertainty and there are other partners in the area undertaking similar activities.

3.2 Estimate the change in fuel consumption due to ICF activity relative to the baseline 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 additionality factor (e.g. 120,000 x 0.8 = 96,000l/year).

3.3 Estimate the net change in GHG emissions through the application of an emissions intensity factor to the fuel savings data

An emissions factor should be used to calculate the net change in GHG emissions.

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.

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 Table 1 below[11]. 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), not listed in the Table, use an emissions factor of 2.4 $kgCO_2e$/litre.

Table 2: Common Fuels and their emissions factors

Fuel Type	Fuel	Emissions Factor (kgCO2e / litre)	Emissions Factor (kgCO2e / cubic metres)	Emissions Factor (kgCO2e / tonne)
Gaseous Fuels	Liquefied Petroleum Gas (LPG)	1.51906	N/A	N/A
	Natural Gas	N/A	2.04652	N/A
Liquid Fuels	Diesel (100% mineral diesel)	2.68779	N/A	N/A
	Marine Fuel Oil (Heavy Fuel Oil)	3.10973	N/A	N/A
	Petrol (100% mineral petrol)	2.30531	N/A	N/A
Solid Fuels	Coal (industrial)	N/A	N/A	2452.29
	Coal (electricity generation)	N/A	N/A	2261.32

For the example industrial efficiency project in Nigeria, using the default Emissions Factor of 2.68779 $kgCO_2e$/litre from the Table above:
96,000 litres diesel saved per year x 2.68779 $kgCO_2e/l$ = 258,028$kgCO_2e$ saved/year
= 258tCO_2e/year.

3.4 Account for the rebound effect

See above for introduction to 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

[11] These emissions factors are based on 2018 UK conversion rates https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2018. 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.

reductions claims. Where no rebound information is available, a default of 10%[12] 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 x 0.90 = 232tCO_2e/year.

3.5 Take into account carbon market interactions

State whether tonnes of reduced or avoided CO_2e has been sold on the carbon market. This amount must be deducted from total emissions reductions to avoid double-counting[13].

3.6 Calculate pro-rata share where HMG only funded part of a project/programme (attribution)

See attribution section below.

3.7 Calculate annual net change in GHG emissions and total expected emissions reductions over the installation's 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.

4) FORESTRY

For forest and Land Use Change (LUC) related emissions savings: the net change in GHG emissions is calculated from net changes in land use relative to the baseline. Land use is converted into a corresponding amount of CO_2e by multiplying land use (in hectares) by a specific emission factor.

To calculate emissions savings from forestry 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 afforestation project:
Emissions avoided (tCO_2e) = [Δ forest land area x 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 x emission factor x Δ degradation multiplier]

4.1 Determination of the baseline 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 (E.g. it could be judged that 80% of the intervention is additional). 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 and there are other partners in the area undertaking similar activities.

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

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[12] 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.

[13] if an Implementing Partner decides to sell or transfer part or all of their emissions reductions, after, or separate from HMG's legitimate project impact, these emissions reductions should NOT be deducted from HMG share of impact

Obtain data on the change in land use area due to ICF activity from individual project level reporting (e.g. 10,000 hectares of deforestation avoided). Multiply this by the additionality factor (e.g. 10,000 x 0.8 = 8,000).

4.3 Estimate the net change in GHG emissions through the application of an emissions intensity factor to the activity level data

Land 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. See step 7 below.

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 use change should be taken into account. For example, deforestation through fire releases more GHGs than deforestation 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. Thus, the practical range is 0.9 to 0.2. See also the worked example.

4.5 Take into account carbon market interactions

State whether tonnes of reduced or avoided CO_2e has been sold on the carbon market. This amount must be deducted from total emissions reductions to avoid double-counting[14].

4.6 Calculate pro-rata share where HMG only funded part of a project/programme (attribution)

See attribution section below.

4.7 Calculate annual net change in GHG emissions and total expected emissions reductions

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

FAO EX-ACT Tool

The UN maintains a spreadsheet tool that may be used for these calculations. It is freely available online at: http://www.fao.org/tc/exact/ex-act-tool/en/. The tool is based on IPCC tier 1 'emissions factors' and can be used to complete step 3 of the above methodology.

The process is explained within the spreadsheet[15], and requires input on Tab 1 of:

- **Continent**

[14] if an Implementing Partner decides to sell or transfer part or all of their emissions reductions, after, or separate from HMG's legitimate project impact, these emissions reductions should NOT be deducted from HMG share of impact

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

- **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 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 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. For a first estimate, tabs 1 and 2 only are needed. Where more accurate estimates are required, it is recommended that external support (consultants, or implementing partners) are engaged.

5) TRANSPORT

Transport projects can be complex and multifaceted, making the estimation of emissions reductions difficult. Currently the ICF portfolio has very few transport projects but given the transport sector's prominence (around 15% of global emissions), transport projects may be undertaken in future.

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[16];
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.

Most successful projects[17] combine these approaches to at least some extent, for example by providing efficient buses (A), with prioritised routes and upgraded bus stations (C), along with awareness raising and incentives for public transport use (B).

[16] Such as is done in the EU: https://ec.europa.eu/growth/sectors/automotive/environment-protection/emissions_en

[17] Such as the highly successful TransMilenio project in Bogata, https://cdm.unfccc.int/Projects/DB/DNV-CUK1159192623.07/view

This guidance note does not provide simplified emissions reductions calculations in transport projects but 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, emissions reductions calculation can be straightforward and a simplified approach used.

For example, a replacement or upgrade of a city bus fleet from diesel to CNG, the baseline (diesel) and project (CNG) are directly comparable – assuming the same bus routes, frequency, etc. In such a case, the simplified approach of Section 3 (non-electricity related energy efficiency savings) above can be used. That is, determine the fuel use emissions in the baseline (litres of diesel per year x emissions factor) and the fuel use emissions in the project (litres (or m^3) of CNG per year x emissions factor). The difference between these numbers is the annual emissions reductions, after addressing additionality.

The difficulty arises in assessing additionality. Since fuel efficiency improvements rarely justify the early retirement of transport stock (i.e. buses, cars, trucks etc), there early replacements *are* additional. 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 baseline 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 baseline (i.e. assume all buses would be replaced by new diesel rather than CNG) and a high additionality factor (i.e. 0.9, if CNG use is not yet common in the local context); or
- use a sufficiently conservative additionality factor, such as 0.5, 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 (i.e. (B) modal shift). This simplified efficiency calculation would not include any emissions reductions benefits from the modal shift.

If more detailed calculation of transport efficiency improvements are sought (see note in the introduction of 'Methodology' Section above) for specific vehicle fleets (e.g. a bus company) or jurisdictions (e.g. public transport in a state), relevant approaches and data can be found in [CDM methodologies in Annex 6](#) (for example AMS-III.AK, and AMS-III-AY for vehicle fleet improvements).

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 from 70% to more than 90%[18].

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)[19]. The challenge is in obtaining sufficient data on service rates in the baseline and project. It can be

[18] See for example, European modal shift emissions: https://www.eea.europa.eu/data-and-maps/daviz/specific-co2-emissions-per-passenger-3#tab-chart_1

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

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 baseline 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?

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 baseline conditions.

A more narrowly defined intervention may be possible, for example a Bus Rapid Transit (BRT) system[20] that aims to directly reduce traffic congestion on a particular route. In this case, a baseline 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 HMG[21] 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 – noting that some aspects such as project boundary and additionality may not be required. Transport CDM methodologies are listed in Annex 6.

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.

This is, of course, rare globally, and virtually unheard of in the development context. Nonetheless, ICF projects seeking transformational change (see 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 baseline 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 baseline conditions, and draw on elements of CDM methodologies as needed (such as AM0031: Bus rapid transit projects, see Annex 6).

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[20] 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.

[21] See for example the 19th tab 'Business travel - land' for data on kgCO2e/passenger km on the excel sheet at: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2018

Attribution

If HMG is the sole investor in a project or programme, it should assume all responsibility for any results (where the results are assessed to be additional and where HMG has a causal role).

In many instances HMG may be acting alongside one or more other development partners or multilateral bodies that also provide funding or support for projects or programmes – and where each partner has played a role towards the results. In these cases, HMG should only claim responsibility for the portion of results that can be attributed to its support.

If HMG is only funding part of a project/programme, reporters should calculate results as a pro-rata attributable share based on the value of all public co-financing towards the project.
In instances where ICF programmes leverage (public or private) finance that helps to deliver programme results, please contact your central ICF teams on how to address attribution of results delivered. See methodology notes for KPI 11 and 12 for definitions (of public, private, and leveraged finance and co-finance).

If HMG is contributing to a fund

'First best' approach: use project/programme level attribution (as above)
In this approach, reporters calculate results attributable to the UK for each project/programme implemented by the fund using the project/programme level attribution approach, and then sum results across all projects/programmes in the fund to reach total UK attributable results.

This approach allows for recognition of other co-finance contributions at the project/programme level. However, this approach may be complicated or not always possible in practice as it relies on (i) full information about project/programme level inputs, (ii) additional work to calculate results at the project/programme level.

'Second best' approach: use fund-level attribution

Reporters apply fund-level attribution (i.e. at point of UK investment) for reporting results. I.e. results should be shared across all donors that contribute to a fund. All results are attributable to the relevant fund (e.g. CIFs, CP3, GAP) regardless of whether these funds blend with other sources of finance in implementing projects at levels below the point of UK investment. This approach assumes that any further finance towards the project is counted as leveraged. Where this is known to not be the case, a more conservative approach to attribution may be appropriate, please contact your central ICF teams on further guidance.

While this is the less preferred approach as it does not recognise additional contributions at the project/programme level, it may be more practical to implement where full data on project/programme level inputs is not available.

Note: The distinction between attribution at the project/programme level and at the fund level (or at point of UK investment) is only an issue where the UK is investing in funds where there are multiple investment levels.

Worked Example

Worked example 1: Increase in uptake of energy efficient appliances[22]

Based on fictious programme where HMG funds an energy efficient lighting project in Kenya replaces 15,000 incandescent globes with LEDs

Step 1: Determine baseline counterfactual:

The baseline is incandescent globes used for a default of 3.5 hours per day of use[23] (a higher number of hours can be used if justified). The replaced lamps are 60W incandescents. This is the predominant lighting on-grid in Kenya, and the adjustment/adjustment factor is taken as 90%.

Step 2: Estimate change in electricity consumption

The electricity use of the 60W baseline incandescent lamps is then 3.5 hours/day x 365 days x 60W = 76,650Wh/year = 76.7kWh/year. The replacement LED lamp uses 8.5W to provide equivalent (or better) lighting. Annual use is then: 3.5hours x 365 x 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 x 65.8kWh/year = 987,000 kWh of electricity through energy efficient lighting per year. Multiply this by the additionality factor, for a lighting project, taken as 10%: 987,000 x 0.9 = 888,300kWh saved/year).

Step 3: Net change in emissions through emissions intensity factor

Emissions avoided (tCO_2e) = [MWh or kWh of electricity generation avoided x Emissions factor]

Using the default Emissions Factor of 0.603tCO_2e/MWh for Kenya from Annex 5:

888,300kWh saved per year x 0.603tCO_2e/MWh = 888.3MWh x 0.603tCO_2e/MWh

= 536tCO_2e/year.

Step 4: Account for rebound effect

For Kenya, the rebound effect is taken as 20%. Thus emissions reductions = 536tCO_2e/year x 0.80

= 429tCO_2e/year.

Step 5: Take into account carbon market

No carbon credits were sold from the project, thus: = 429tCO_2e/year.

Step 6: pro-rata HMG attribution

The project is 100% IFC funded, thus = 429tCO_2e/year.

Step 7: Calculate annual net change in GHG emissions and total expected emissions reductions over the installation's lifetime

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 = 429tCO_2e/year, except the first year which is 215tCO_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 429 tCO_2e/year x 19.5 years = 8,366 tCO_2e.

[22] Worked examples for New Power generation & Forestry can be found in Annex 1.

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

Data Management

Data Sources
Some data will be available directly from programmes, for example from project-level M&E. Ideally, the duty to collect data should be the responsibility of recipients of ICF funding, or a third-party auditing entity. This information will need to be kept up to date by liaising with programme managers.

Most Recent Baseline
The baseline should reflect the situation prior to ICF funding being provided, and anticipated projections of what would happen without the ICF. For long running programmes, the baseline should be taken as 2015 unless otherwise stated. The baseline should align with the economic appraisal in the project/programme design.

Data Issues / Risks and Challenges
There may be varying degrees of quality of data, from data generated by large DFID projects with good quality, to that produced by multilateral partners with their origin in government partners' data systems, which may be of lower quality.

For forest projects, the high cost of monitoring can pose a constraint on data collection. Satellites and remote sensing technologies are not always available, and forest surveying is highly labour intensive. As a result, detailed data may be unavailable for projects covering large or hard-to-access areas. It may also be difficult to assess and capture the full extent of spill over effects and leakage of emissions outside the scope of a project or country boundaries.

Quality Assurance
All results estimates should be quality assured before they are submitted during the annual ICF results return, ideally at each stage data is received or manipulated. For example, if data is provided by partners, this data should be interrogated by the ICF programme team for accuracy, or are the very least data should be sense checked for plausibility. When converting any provided data into KPI results data, quality assurance should be undertaken by someone suitable and not directly involved in the reporting programme. Suitable persons vary by department; this could be an analyst, a results / stats / climate and environment adviser / economist.

Central ICF analysts will quality assure results that are submitted and this may lead to follow up requests during this stage.

To avoid inherent reporting biases, it is strongly recommended that, where possible, data collection is undertaken by a third party that is not directly involved with implementing the project. Where not possible, consider using independent evaluations or alternative means to periodically check the validity of results claims.

Any concerns about data quality or other concerns should be raised with your departmental ICF analysts and recorded in documentation related to your results return.

Data Disaggregation

Results will be disaggregated by each sector, allocated by source and defined by the UNFCCC Inventory Categories, as follows:

UNFCC Categories:

1) Energy supply
2) Industrial processes
3) Business
4) Public
5) Residential
6) Transport

7) Agriculture
8) Waste Management
9) Land Use, Land Use Change and Forestry (LULUCF)

For the *Low Carbon Development* theme, results will predominately be reported under the energy supply sector from: changes in power generation and electrical energy efficiency improvements; or from emission savings from energy efficiency measures in the industrial, business, and residential or transport sectors.

For the *Forestry* theme, results will be reported under the LULUCF and Agriculture sector and will capture changes in emissions from deforestation and forest degradation, forest conservation, sustainable management of forests and enhancement of forest carbon stocks (REDD+).

Please report if carbon credits have been obtained or not, and if these have been sold.

Annex 1: Further Worked Examples

Worked Example 2: New Power Generation

Based on fictitious programme where HMG 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 x Emission factor]

Step 1: Determination of the baseline 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 can be confident of it's additionality, take a factor of 95%.

Step 2: Estimate the change in fuel consumption due to ICF activity relative to the baseline 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 additionality factor: = 17,520 x 0.95 = 16,644MWh.

Step 3: Estimate the net positive change in GHG emissions using an *emissions intensity factor* to the activity level data

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 5 should be used. For Ghana, this is 0.479tCO_2e/MWh.

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

Step 4: 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 pro-rata share where HMG only funded part of a project/programme (attribution)

The project is 60% funded by ICF, and 40% by host government. Thus, the HMG attribution is 60%. Thus: 7,972tCO_2e/year x 0.6 = 4,783tCO_2e/year.

Step 6: Calculate annual net change in GHG emissions and total expected emissions reductions over the installation's 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 x 22 years = 105,225tCO_2e of emissions reductions is expected over the installation life.

Worked Example 3: Forestry

Based on fictitious programme where HMG funds reducing forest degradation in the Congo Basin. The programme reduces degradation on 10,000 hectares of forestland. It is assumed that the project has a permanent effect.

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

Step 2: Estimate the change in land use due to ICF activity relative to the baseline counterfactual
10,000 ha x 0.95 = 9,500 ha

Step 3: Calculate net change in GHG emissions through the application of an emissions intensity factor to the activity level and
In this example, the project is working with type I forest, in a tropical humid climate in Africa, with High Activity Clay (HAC) soils. The emission factors are:

- biomass (below and above ground) - 745tCO_2/hectare
- soils - 240tCO_2e/hectare
- total -985tCO_2e/hectare

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

Δ Emissions = [forest land area x emission factor]
Δ Emissions = 9,500ha x (- 985tCO_2/ha)
Δ Emissions = -9,357,500tCO_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.

Δ Emissions = [forest land area x emission factor x Δ degradation multiplier]
Δ Emissions = 9,500 ha x (- 985tCO_2/ha) x (0.9-0.2)
Δ Emissions = -6,550,250tCO_2e/year

Step 5: Take into account carbon market interactions
No carbon credits sold.

Step 6: Calculate pro-rata share where HMG only funded part of a project / programme (attribution)

The project is 100% IFC funded, thus = -6,550,250tCO_2e/year

Step 7: Calculate annual net change in GHG emissions and total expected emissions reductions.

Annual net change in GHG emissions = -6,550,250tCO_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. -6,8950,000tCO_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.

Annex 2: Comparability and synergies with other external indicators

The KPI 6 unit - tCO_2e - is a global standardised unit, and is consistent with the UNFCCC and Paris Agreements on GHG emissions reductions. This unit is assessed scientifically through an exhaustive peer-review process within the IPCC. ICF uses this base unit, as do the MDBs and all key players within the low-carbon development community.

Annex 3: Definitions of key methodological terms used across Methodology Notes

As different HMG departments may use the same terminology to refer to different concepts, this section sets out definitions for key terms used across Methodology Notes for ICF KPIs. The terms used in these notes refer to the concepts as defined below, rather than to alternative, department-specific usages of these terms.

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.

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.

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.

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 KPI 11 and KPI 12).

Annex 4: Renewable Energy Capacity Factors

The Table below *[Renewable Energy Capacity Factors (RE Technology by Country/Region)]* shows capacity factors[24] across a range of renewable energy technologies, including: bioenergy for power, geothermal, hydro, solar photovoltaic (PV), Concentrating Solar Power (CSP), onshore wind and offshore wind. These capacity factor figures are the most current (2017), and are sourced from the International Renewable Energy Association[25] (IRENA) *Renewables 2017: Global Status Report.*[26]

All data comes from IRENA's robust Renewable Cost Database of 15,000 utility-scale renewable power generation projects, and 1 million small-scale solar PV systems. Where project level capacity factors are available, these should be used rather than the regional and country-level defaults given here. 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. The Capacity Factor figures in the following Table serve as a first order estimate to provide a reasonable assessment of project outcomes:

Table 3: Renewable Energy Capacity Factors

Technology	Country	Capacity factors	Minimum	Maximum
Bioenergy for power	Africa	0.62	0.46	0.9
	Asia	0.71	0.14	0.93
	Central America and the Caribbean	0.6	0.27	0.8
	Eurasia	0.83	No data	Not available
	Europe	0.84	0.18	0.98
	Middle East	0.64	0.46	0.92
	North America	0.84	0.16	0.96
	Oceania	No data	No data	Not available
	South America	0.64	0.2	0.96
	China	0.64	0.33	0.93
	India	0.73	0.63	0.9
	United States	0.94	0.93	0.96
Geothermal	Africa	0.87	0.8	0.92
	Asia	0.85	0.41	0.9
	Central America and the Caribbean	0.57	No data	Not available

[24] Capacity Factor: 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.
[25] International Renewable Energy Association (IRENA) is an intergovernmental organisation supporting countries in their transition to a sustainable energy future. IRENA is the premiere global organization 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 153 states and the European Union (with a further 26 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.
[26] REN 21: *Renewables 2018 Global Status Report*: http://www.ren21.net/status-of-renewables/global-status-report/
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. Moreover, specific methodologies are individually modified based on emerging technologies. Nonetheless, to maintain methodological relevancy 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). Note this information on capacity is the most up to date (from 2017), with all data coming from IRENA's Renewable Cost Database of 15,000 utility-scale renewable power generation projects and 1 million small-scale solar PV systems.

Technology	Country	Capacity factors	Minimum	Maximum
	Eurasia	0.8	No data	Not available
	Europe	0.66	0.6	0.8
	Middle East	No data	No data	Not available
	North America	0.87	0.8	0.924
	Oceania	0.8	0.8	0.8
	South America	0.83	0.8	0.95
	China	No data	No data	Not available
	India	No data	No data	Not available
	United States	0.8	0.8	0.8
Hydro Power	Africa	0.59	0.3	0.86
	Asia	0.46	0.16	0.82
	Central America and the Caribbean	0.53	0.32	0.55
	Eurasia	0.5	0.32	0.72
	Europe	0.29	0.16	0.58
	Middle East	0.34	0.31	0.53
	North America	0.49	0.31	0.68
	Oceania	0.45	0.31	0.5
	South America	0.61	0.34	0.81
	China	0.51	0.42	0.53
	India	0.41	0.16	0.75
	United States	0.37	0.31	0.5
Solar Photovoltaic	Africa	0.18	0.14	0.28
	Asia	0.17	0.1	0.23
	Central America and the Caribbean	0.17	0.16	0.19
	Eurasia	0.14	0.1	0.18
	Europe	0.12	0.11	0.18
	Middle East	0.22	0.18	0.35
	North America	0.2	0.2	0.32
	Oceania	0.22	0.2	0.26
	South America	0.2	0.12	0.34
	China	0.17	0.1	0.19
	India	0.19	0.15	0.22
	United States	0.2	0.14	0.32
Concentrating Solar Power	Africa	0.39	0.36	0.53
	Asia	0.28	0.21	0.54
	Central America and the Caribbean	No data	No data	Not available
	Eurasia	No data	No data	Not available
	Europe	0.32	0.23	0.41
	Middle East	0.29	0.24	0.39
	North America	0.35	0.27	0.39
	Oceania	0.12	0.11	0.12
	South America	No data	No data	No data
	China	0.28	0.28	0.29
	India	0.28	0.21	0.54
	United States	0.35	0.27	0.52
Onshore Wind	Africa	0.37	0.19	0.48
	Asia	0.25	0.18	0.46

Technology	Country	Capacity factors	Minimum	Maximum
	Central America and the Caribbean	0.33	0.24	0.54
	Eurasia	0.37	0.24	0.49
	Europe	0.29	0.14	0.51
	Middle East	0.2	0.14	0.29
	North America	0.4	0.22	0.51
	Oceania	0.33	0.23	0.43
	South America	0.4	0.26	0.55
	China	0.25	0.23	0.29
	India	0.24	0.19	0.33
	United States	0.41	0.23	0.44
Offshore Wind Power	Africa	No data	No data	No data
	Asia	0.28	0.23	0.29
	Central America and the Caribbean	No data	No data	No data
	Eurasia	No data	No data	No data
	Europe	0.38	0.27	0.55
	Middle East	No data	No data	No data
	North America	0.48	No data	No data
	Oceania	No data	No data	No data
	South America	No data	No data	No data
	China	0.28	0.23	0.29
	India	No data	No data	No data
	United States	0.48	No data	No data

Annex 5: Grid Emissions Factors

The table below shows grid emissions factors[27] for countries in Asia, Latin America, Africa and the Middle East. Data is sourced from IGES (Institute of Global Environmental Strategies),[28] based on publicly available sources on the UNFCCC website.[29] Where more recent or more accurate emission factors are available, they should be used[30].

When using Operating, Build and/or Combined Margins, refer to the CDM Executive Board *Tool to Calculate Emission Factors for Electricity Systems*:

https://cdm.unfccc.int/Reference/tools/ls/meth_tool07_v01_1.pdf – for guidance on how to establish the emission factor;

and to: https://cdm.unfccc.int/Panels/meth/meeting/05/Meth18_repan8_OMBM.pdf[31] – on how it is applied to the most common CDM methodologies.

[27] CO_2 emission factor (tCO_2e/MWh) associated with each unit of electricity provided by an electricity system.
[28] IGES is an internationally recognized public interest foundation, with: an IPCC Inventory Task Force Technical Support Unit (TSU); holds United Nations Economic and Social Council (UN / ECOSOC) special consultative status; and, houses the Asia-Pacific Global Change Research Network (APN) Secretariat.
[29] Individual data sources available in country tabs of IGES Grid Emissions Factors spreadsheet (available at https://pub.iges.or.jp/pub/iges-list-grid-emission-factors), April 2018 update. Note that CDM Executive Board figures are not used on a per project basis.
[30] Data from April 2018. Emissions factors should be updated annually.
[31] UNFCCC CDM Meth Panel: *Annex 8 Preliminary Guidance For Om/Bm Weighting In ACM0002 & Other Approved Methodologies That Use The Combined Margin Approach.*

Table 4: Grid Emissions Factors (50/50 OM/BM)

Country	Combined Margin EF (average)(tCO_2e/MWh)	Operating Margin (average) (tCO_2e/MWh)	Built Margin (average) (tCO_2e/MWh)
Asia			
Bangladesh	0.644	0.641	0.647
Bhutan	0.892	1.080	0.702
Cambodia	0.665	0.628	0.702
China	0.874	1.044	0.626
Democratic People's Republic of Korea	0.912	0.912	0.000
India	0.903	0.993	0.751
Indonesia	0.761	0.817	0.692
Lao People's Democratic Republic	0.565	0.560	0.298
Malaysia	0.668	0.618	0.697
Mongolia	1.061	1.121	0.885
Pakistan	0.543	0.685	0.302
Panama	0.461	0.677	0.244
Philippines	0.508	0.630	0.380
Republic of Korea	0.631	0.701	0.499
Singapore	0.486	0.516	0.456
Sri Lanka	0.674	0.699	0.646
Thailand	0.547	0.572	0.508
Vietnam	0.564	0.636	0.491
Latin America			
Argentina	0.518	0.598	0.407
Bahamas	0.723	0.749	0.697
Belize	0.152	0.304	0.000
Bolivia	0.589	0.630	0.575
Brazil	0.298	0.433	0.141
Chile	0.614	0.721	0.480
Colombia	0.335	0.446	0.218
Costa Rica	0.274	0.341	0.139
Cuba	0.874	0.871	0.877
Dominican Republic	0.654	0.727	0.492
Ecuador	0.576	0.735	0.423
El Salvador	0.682	0.716	0.662
Guatemala	0.587	0.764	0.447
Guyana	0.948	0.948	
Honduras	0.643	0.655	0.640
Jamaica	0.732	0.772	0.613
Mexico	0.528	0.647	0.378

Country	Combined Margin EF (average)(tCO_2e/MWh)	Operating Margin (average) (tCO_2e/MWh)	Built Margin (average) (tCO_2e/MWh)
Nicaragua	0.679	0.738	0.585
Panama	0.591	0.733	0.460
Peru	0.598	0.700	0.487
Uruguay	0.574	0.585	0.499
Africa			
Angola	0.841	0.794	0.887
Burkina Faso	0.368	0.279	0.637
Cote d Ivoire	0.649	0.687	0.611
Egypt	0.533	0.583	0.470
Ethiopia	0.000	0.000	0.000
Ghana	0.479	0.248	0.866
Kenya	0.603	0.657	0.516
Libya	0.794	0.823	0.730
Madagascar	0.552	0.498	0.607
Mali	0.614	0.581	0.639
Mauritius	0.972	0.990	0.892
Morocco	0.652	0.693	0.533
Mozambique	0.964	0.996	0.934
Namibia	0.920	0.950	0.870
Nigeria	0.573	0.601	0.543
Rwanda	0.654	0.661	0.647
Senegal	0.681	0.690	0.663
Sierra Leone	0.402	0.402	0.000
South Africa	0.953	0.949	0.922
Sudan	0.305	0.231	0.529
Tunisia	0.554	0.571	0.521
Uganda	0.532	0.506	0.529
United Republic of Tanzania	0.529	0.539	0.519
Zambia	0.964	0.996	0.933
Middle East			
Iran (Islamic Republic of)	0.669	0.692	0.646
Israel	0.705	0.792	0.564
Jordan	0.584	0.646	0.522
Kuwait	0.780	0.750	0.810
Lebanon	0.650	0.672	0.628
Saudi Arabia	0.654	0.654	0.000
United Arab Emirates	0.676	0.639	0.530

Others

Albania	0.393	0.056	0.506
Armenia	0.436	0.514	0.397
Azerbaijan	0.590	0.637	0.531
Bosnia and Herzegovina	0.973	1.081	0.865
Cyprus	0.798	0.827	0.711
Fiji	0.567	0.448	0.686
Georgia	0.402	0.459	0.501
Montenegro	0.984	0.880	1.226
Papua New Guinea	0.679	0.722	0.636
Serbia	1.099	1.128	1.001
The former Yugoslav Republic of Macedonia	0.861	0.819	0.903
Uzbekistan	0.593	0.584	0.602

Annex 6: Applicable CDM Methodologies

CDM Methodologies are needed to calculate total emissions reductions from clean energy/clean technology projects towards carbon credit eligibility. The United Nations Framework Convention on Climate Change (UNFCCC) 2017 Methodology Booklet states: *The Clean Development Mechanism (CDM) requires the application of a baseline and monitoring methodology … 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] These referenced clean energy technologies cover 80%[34] of CDM methodologies from ICF programmes reporting against KPI 6 – where CDM methodologies exist (i.e. not REDD & Transport).[35]

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.
Step 2: Select the applicable CDM Methodology hyperlink associated with that project's renewable energy technology. Ensure you select the appropriate CDM Methodology version (e.g. grid-connected or mini-grid).
Step 3: A typical CDM Methodology is 25-30 pages, most of which is irrelevant and can be ignored by going to the pages set-out in Column 4 of the Table. Proceed to the pages referenced for "Applicability," to check that this Methodology is applicable to your specific Project/Programme.
Step 4: Proceed to the pages referenced for "Baseline Methodology (identified in Column 4)," to calculate emissions avoided due to the RE Project/Programme.
Step 5: Establish the "Project Boundary" in accordance with the CDM Baseline Methodology.
Step 6: For most RE CDM Project's supported by ICF (eg. solar, wind & biogas), leakage is immaterial and Project emissions are insignificant.[36] Where these emissions factors are not calculated according to the CDM methodology, we use a 5% reduction in reported emissions to ensure a conservative outcome.

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[32] UNFCCC CDM Methodology Booklet, Ninth Edition (updated as of EB 97 November 2017)
[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] Calculated by dividing the sum of ICF programmes with GHG reducing interventions with a CDM Methodology (e.g. solar) by the total number of programmes reporting against KPI 6.
[35] Transport and energy efficiency interventions are not included, as they only cover a small proportion of ICF programmes reporting against KPI 6 (3 out of 31; and 5 out of 31 respectively). CDM methodologies not included in this document can be found here https://cdm.unfccc.int/methodologies/PAmethodologies/approved.
[36] *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.

Note: If the Methodology process cannot be practically followed, a simplified estimate of project outcomes can be obtained by multiplying the annual RE production from the Project in MWh by the Emissions Factor (given per country in Annex 5 above).

Table 5: Applicable CDM Methodologies

ICF Intervention Type	Applicable CDM Methodologies	Notes on Which to Select	Most Relevant Sections
Hydro (large scale)	ACM0002: Grid-connected electricity generation from renewable sources --- Version 17.0 https://cdm.unfccc.int/methodologies/DB/8W400U6E7LFHHYH2C4JR1RJWWO4PVN	Only one choice	P4: Applicability P9-25: Baseline Methodology
Hydro (small scale)	(1) AMS-I.D.: Grid connected renewable electricity generation --- Version 18.0 https://cdm.unfccc.int/methodologies/DB/W3TINZ7KKWCK7L8WTXFQQOFQQH4SBK	(1) Grid connected	P3: Applicability P6-12: Baseline Methodology
	(2) AMS-I.F.: Renewable electricity generation for captive use and mini-grid --- Version 3.0 https://cdm.unfccc.int/methodologies/DB/9KJWQ1G0WEG6LKHX21MLPS8BQR7242	(2) Mini grid	P3: Applicability P5-8: Baseline Methodology
Wind (large scale)	ACM0002: Grid-connected electricity generation from renewable sources --- Version 17.0 https://cdm.unfccc.int/methodologies/DB/8W400U6E7LFHHYH2C4JR1RJWWO4PVN	Only one choice	P4: Applicability P9-25: Baseline Methodology
Wind (small scale)	AMS-I.A.: Electricity generation by the user --- Version 16.0 https://cdm.unfccc.int/methodologies/DB/8FKZFJ7SG551TS2C4MPK78G12LSTW3	Only one choice	P: Applicability P: Baseline Methodology
Geothermal (large scale)	ACM0002: Grid-connected electricity generation from renewable sources --- Version 17.0 https://cdm.unfccc.int/methodologies/DB/8W400U6E7LFHHYH2C4JR1RJWWO4PVN	Only one choice	P4: Applicability P9-25: Baseline Methodology
Geothermal (small scale)	(1) AMS-I.D.: Grid connected renewable electricity generation --- Version 18.0 https://cdm.unfccc.int/methodologies/DB/W3TINZ7KKWCK7L8WTXFQQOFQQH4SBK	(1) Grid connected	P3: Applicability P6-12: Baseline Methodology
	(2) AMS-I.F.: Renewable electricity generation for captive use and mini-grid --- Version 3.0 https://cdm.unfccc.int/methodologies/DB/9KJWQ1G0WEG6LKHX21MLPS8BQR7242	(2) Mini grid	P3: Applicability P5-8: Baseline Methodology
Solar Power Plant (large scale)	ACM0002: Grid-connected electricity generation from renewable sources --- Version 17.0	Only one choice	P4: Applicability P9-25: Baseline Methodology

ICF Intervention Type	Applicable CDM Methodologies	Notes on Which to Select	Most Relevant Sections
	https://cdm.unfccc.int/methodologies/DB/8W400U6E7LFHHYH2C4JR1RJWWO4PVN		
Solar PV (small scale)	(1) AMS-I.D.: Grid connected renewable electricity generation --- Version 18.0 https://cdm.unfccc.int/methodologies/DB/W3TINZ7KKWCK7L8WTXFQQOFQQH4SBK	(1) Grid connected	P3: Applicability P6-12: Baseline Methodology
	(2) AMS-I.F.: Renewable electricity generation for captive use and mini-grid --- Version 3.0 https://cdm.unfccc.int/methodologies/DB/9KJWQ1G0WEG6LKHX21MLPS8BQR7242	(2) Mini grid	P3: Applicability P5-8: Baseline Methodology
	(3) AMS-I.L.: Electrification of rural communities using renewable energy --- Version 3.0 https://cdm.unfccc.int/methodologies/DB/CCZKY3FSL1T28BNEGDRSCKS0CY0WVA	(3) Mini grid and household level	P3: Applicability P6-12: Baseline Methodology
	(4) AMS-I.A.: Electricity generation by the user --- Version 16.0 https://cdm.unfccc.int/methodologies/DB/8FKZFJ7SG551TS2C4MPK78G12LSTW3	(4) Household	P1: Technology / measure P2-6: Boundary, Baseline, Project Emissions and Leakage
	(5) AMS-I.J.: Solar water heating systems (SWH) --- Version 1.0 https://cdm.unfccc.int/methodologies/DB/GX9DV8QFP9X8BNR5GI1UUJD55EJ03A	(5) Solar water heating	P1-2: Technology / measure P2-6: Boundary, Baseline, Emissions Reductions and Leakage
Wave/Tidal (large scale)	ACM0002: Grid-connected electricity generation from renewable sources --- Version 17.0 https://cdm.unfccc.int/methodologies/DB/8W400U6E7LFHHYH2C4JR1RJWWO4PVN	Only one choice	P4: Applicability P9-25: Baseline Methodology
Wave/Tidal (small scale)	(1) AMS-I.D.: Grid connected renewable electricity generation --- Version 18.0 https://cdm.unfccc.int/methodologies/DB/W3TINZ7KKWCK7L8WTXFQQOFQQH4SBK	(1) grid connected	P3: Applicability P6-12: Baseline Methodology
	(2) AMS-I.F.: Renewable electricity generation for captive use and mini-grid --- Version 3.0 https://cdm.unfccc.int/methodologies/DB/9KJWQ1G0WEG6LKHX21MLPS8BQR7242	(2) Mini grid	P3: Applicability P5-8: Baseline Methodology
Biomass (large scale)	(1) ACM0006: Electricity and heat generation from biomass --- Version 13.1 https://cdm.unfccc.int/methodologies/DB/SZBV79HP36KDU7RQI5HFCZJB6OC597	(1) See if directly relevant from project title	P4: Applicability P9-57: Baseline Methodology

ICF Intervention Type	Applicable CDM Methodologies	Notes on Which to Select	Most Relevant Sections
	(2) ACM0018: Electricity generation from biomass residues in power-only plants --- Version 4.0 https://cdm.unfccc.int/methodologies/DB/XCP9MV7PKIEXYW7WCT8U5UYNRK7IJR	(2) See if directly relevant from project title	P3-5: Applicability P8-47: Baseline Methodology
	(3) ACM0020: Co-firing of biomass residues for heat generation and/or electricity generation in grid connected power plants --- Version 1.0.0 https://cdm.unfccc.int/methodologies/DB/EPA4CIV61YIQ7EHB8C1T41SRJ5NMGK	(3) See if directly relevant from project title	P3-4: Applicability P4-16: Baseline Methodology
Biomass (small scale)	(1) AMS-I.D.: Grid connected renewable electricity generation --- Version 18.0 https://cdm.unfccc.int/methodologies/DB/W3TINZ7KKWCK7L8WTXFQQOFQQH4SBK	(1) Grid connected	P3: Applicability P6-12: Baseline Methodology
	(2) AMS-I.F.: Renewable electricity generation for captive use and mini-grid --- Version 3.0 https://cdm.unfccc.int/methodologies/DB/9KJWQ1G0WEG6LKHX21MLPS8BQR7242	(2) Mini grid	P3: Applicability P5-8: Baseline Methodology
	(3) AMS-I.A.: Electricity generation by the user --- Version 16.0 https://cdm.unfccc.int/methodologies/DB/8FKZFJ7SG551TS2C4MPK78G12LSTW3	(3) Household level	P1: Technology / measure P2-6: Boundary, Baseline, Project Emissions and Leakage
Biofuels (large scale)	ACM0017: Production of biofuel --- Version 3.1 https://cdm.unfccc.int/methodologies/DB/ZNCG27VU8E0ABXO6GHGKTR75U0MIWL	Only one choice	P4: Applicability P9-25: Baseline Methodology
Biofuels (small scale)	AMS-I.I.: Biogas/biomass thermal applications for households/small users --- Version 4.0 https://cdm.unfccc.int/methodologies/DB/3WJ6C7R0JFA62VYA2Z2K6WE1RK1PXI	Only one choice	P1-2: Technology / measure P2-6: Boundary, baseline emissions, emissions reductions, leakage
Cookstoves (small scale)	(1) AMS-I.C.: Thermal energy production with or without electricity --- Version 20.0 https://cdm.unfccc.int/methodologies/DB/JSEM51TG3UVKADPA25IPUHXJ85HE8A	(1) E.g. solar thermal water heaters and dryers, solar cookers, energy derived from renewable biomass[37].	P4: Applicability P8-24: Baseline Methodology
	(2) AMS-II.G.: Energy efficiency measures in thermal applications of non-renewable biomass --- Version 9.0 https://cdm.unfccc.int/methodologies/DB/DP2BYDIV6RTMZPEZ2EDLYGLJDPSSU3	(2) E.g. replacement of existing biomass fired cookstoves or ovens or dryers with	P3: Applicability P5-11: Baseline Methodology

[37] http://carbonfinanceforcookstoves.org/implementation/certification-process/carbon-methodologies/

ICF Intervention Type	Applicable CDM Methodologies	Notes on Which to Select	Most Relevant Sections
		more efficient devices[38].	
	(3) AMS-I.I.: Biogas/biomass thermal applications for households/small users --- Version 4.0 https://cdm.unfccc.int/methodologies/DB/3WJ6C7R0JFA62VYA2Z2K6WE1RK1PXI	(3) E.g. biogas cookstoves, biomass briquette cookstoves, small scale baking and drying systems, water heating, or space heating systems[39]	P1-2: Technology / measure P2-6: Boundary, baseline emissions, emissions reductions, leakage
	(4) AMS-I.E.: Switch from non-renewable biomass for thermal applications by the user --- Version 8.0 https://cdm.unfccc.int/methodologies/DB/SO8OOGYGWHMXM287RBNKEYAMN9EUN0	(4) E.g. biogas cookstoves, solar cookers, and water boiling using renewable biomass[40]	P3: Applicability P4-9: Baseline Methodology
	(5) AMS-I.K.: Solar cookers for households --- Version 1.0 https://cdm.unfccc.int/methodologies/DB/5EUY1AEXAX0RKWNJ6INHVROP71DD8R	(5) Solar cookers	P1-2: Technology / measure P2-5: Boundary, baseline emissions, emissions reductions, leakage
Waste to Energy (large scale)	ACM0012: Waste energy recovery --- Version 6.0 https://cdm.unfccc.int/methodologies/DB/FXBXLVGFF4DLI5WC1PKFW7KBRW62QB	Only one choice	P4: Applicability P10-57: Baseline Methodology
Waste to Energy (small scale)	AMS-III.Q.: Waste energy recovery --- Version 6.1 https://cdm.unfccc.int/methodologies/DB/RGPW18XV4FJH1FTTGS2LSD3BWNKNAA	Only one choice	P3: Applicability P7-16: Baseline Methodology
Low Carbon Agriculture (large scale)	(1) AM0073: GHG emission reductions through multi-site manure collection and treatment in a central plant --- Version 1.0 https://cdm.unfccc.int/methodologies/DB/2N19WQ6DCXNYRNJVZQQOHG7TK0Q2D8	(1) See if directly relevant from project title	P1-2: Applicability P2-30: Baseline Methodology
	(2) ACM0010: GHG emission reductions from manure management systems --- Version 8.0 https://cdm.unfccc.int/methodologies/DB/99QRTE6N5QJEBOV2XP374B25SSIXBB	(2) See if directly relevant from project title	P4: Applicability P6-31: Baseline Methodology

[38] http://carbonfinanceforcookstoves.org/implementation/certification-process/carbon-methodologies/
[39] http://carbonfinanceforcookstoves.org/implementation/certification-process/carbon-methodologies/
[40] http://carbonfinanceforcookstoves.org/implementation/certification-process/carbon-methodologies/

ICF Intervention Type	Applicable CDM Methodologies	Notes on Which to Select	Most Relevant Sections
Low Carbon Agriculture (small scale)	(1) AMS-III.D.: Methane recovery in animal manure management systems --- Version 21.0 https://cdm.unfccc.int/methodologies/DB/H9DVSB24O7GEZQYLYNWUX23YS6G4RC	(1) See if directly relevant from project title	P3-5: Applicability P6-14: Baseline Methodology
	(2) AMS-III.R.: Methane recovery in agricultural activities at household/small farm level --- Version 3.0 https://cdm.unfccc.int/methodologies/DB/JQHRMGL23TWZ081T6G7G1RZ63GM1BZ	(2) See if directly relevant from project title	P1: Technology / measure P1-3: Boundary, baseline emissions, emissions reductions, leakage
	(3) AMS-III.A.: Offsetting of synthetic nitrogen fertilizers by inoculant application in legumes-grass rotations on acidic soils on existing cropland --- Version 3.0 https://cdm.unfccc.int/methodologies/DB/5G3VVUHIXHA0OYIBYJKX7JV02LEUHH	(3) See if directly relevant from project title	P3: Applicability P6-9: Baseline Methodology
	(4) AMS-III.AU.: Methane emission reduction by adjusted water management practice in rice cultivation --- Version 4.0 https://cdm.unfccc.int/methodologies/DB/D14KAKRJEW4OTHEA4YJICOHM26M6BM	(4) See if directly relevant from project title	P3: Applicability P6-13: Baseline Methodology
	(5) AMS-III.BE.: Avoidance of methane and nitrous oxide emissions from sugarcane pre-harvest open burning through mulching --- Version 1.0 https://cdm.unfccc.int/methodologies/DB/EO0133GH79SZ4W9DNZK3E34ZTABRRD	(5) See if directly relevant from project title	P3: Applicability P5-8: Baseline Methodology
	(6) AMS-III.BF.: Reduction of N2O emissions from use of Nitrogen Use Efficient (NUE) seeds that require less fertilizer application --- Version 2.0 https://cdm.unfccc.int/methodologies/DB/OTVXR8XN35SRHTBO426YXJ140MTKXZ	(6) See if directly relevant from project title	P3: Applicability P5-12: Baseline Methodology
	(7) AMS-III.BK: Strategic feed supplementation in smallholder dairy sector to increase productivity --- Version 1.0 https://cdm.unfccc.int/methodologies/DB/XI8MS5YYSGRSISWLADHND28QPJN6YA	(7) See if directly relevant from project title	P3: Applicability P5-13: Baseline Methodology
Afforestation and Reforestation (large scale)	(1) AR-AM0014: Afforestation and reforestation of degraded mangrove habitats --- Version 3.0 https://cdm.unfccc.int/methodologies/DB/KMH6O8T6RL3P5XKNBQE2N359QG7KOE	(1) Afforestation and reforestation on mangrove	P3: Applicability P5-9: Baseline Methodology
	(2) AR-ACM0003: Afforestation and reforestation of lands except wetlands --- Version 2.0	(2) Afforestation and reforestation on dry land	P3: Applicability P3-8: Baseline Methodology

ICF Intervention Type	Applicable CDM Methodologies	Notes on Which to Select	Most Relevant Sections
	https://cdm.unfccc.int/methodologies/DB/C9QS5G3CS8FW04MYYXDFOQDPXWM4OE		
Afforestation and Reforestation (small scale)	(1) AR-AMS0003: Afforestation and reforestation project activities implemented on wetlands --- Version 3.0 https://cdm.unfccc.int/methodologies/DB/808WOYH6FWAXP3CQR4PXOLORGZBVRG	(1) Afforestation and reforestation on wetlands	P3: Applicability P5-9: Baseline Methodology
	(2) AR-AMS0007: Afforestation and reforestation project activities implemented on lands other than wetlands --- Version 3.1 https://cdm.unfccc.int/methodologies/DB/J6ZHLX1C3AEMSZ52PWIII6D2AOJZUB	(2) Afforestation and reforestation on dry land	P3-4: Applicability P5-9: Baseline Methodology
Energy Efficiency (large scale)	(1) AM0017: Steam system efficiency improvements by replacing steam traps and returning condensate --- Version 2.0 https://cdm.unfccc.int/methodologies/DB/E8B6YV4LXC0UFS254Q070PF37XPTNG	(1) See if directly relevant from project title	P1: Applicability P2-11: Baseline Methodology
	(2) AM0018: Baseline methodology for steam optimization systems --- Version 4.0 https://cdm.unfccc.int/methodologies/DB/7JODLE9VO380HKU4MYXUJ6D4TMG746	(2) See if directly relevant from project title	P4: Applicability P5-17: Baseline Methodology
	(3) AM0020: Baseline methodology for water pumping efficiency improvements --- Version 2.0 https://cdm.unfccc.int/methodologies/DB/TH0MTJC0KYJYYMQLL9B71Q9QJHOPZ9	(3) See if directly relevant from project title	P1: Applicability P2-4: Baseline Methodology
	(4) AM0038: Methodology for improved electrical energy efficiency of an existing submerged electric arc furnace used for the production of silicon and ferro alloys --- Version 3.0.0 https://cdm.unfccc.int/methodologies/DB/0BTZ9QTVHLGOI61SIJ3ESTZVOSWJLO	(4) See if directly relevant from project title	P1-2: Applicability P2-23: Baseline Methodology
	(5) AM0044: Energy efficiency improvement projects - boiler rehabilitation or replacement in industrial and district heating sectors --- Version 2.0.0 https://cdm.unfccc.int/methodologies/DB/3HZ4USHZ2W449HMAXZN420E5PJB1QF	(5) See if directly relevant from project title	P4-5: Applicability P6-15: Methodology
	(6) AM0046: Distribution of efficient light bulbs to households --- Version 2.0 https://cdm.unfccc.int/methodologies/DB/5SI1XDIZBL6OAKIB3JFUFAQ86MBEE	(6) See if directly relevant from project title	P3-4: Applicability P4-23: Baseline Methodology
	(7) AM0056: Efficiency improvement by boiler replacement or rehabilitation and optional fuel switch in fossil fuel-fired steam boiler systems --- Version 1.0	(7) See if directly relevant from project title	P1-2: Applicability P2-18: Baseline Methodology

ICF Intervention Type	Applicable CDM Methodologies	Notes on Which to Select	Most Relevant Sections
	https://cdm.unfccc.int/methodologies/DB/YB7UE3UB2II2INU9Y1CBJYRANZRXER		
	(8) AM0058: Introduction of a district heating system --- Version 5.0 https://cdm.unfccc.int/methodologies/DB/QEI1HZXZDIUXMM1JQDY1P9RVSOQ2Q3	(8) See if directly relevant from project title	P4-5: Applicability P6-14: Baseline Methodology
	(9) AM0060: Power saving through replacement by energy efficient chillers --- Version 2.0 https://cdm.unfccc.int/methodologies/DB/VL1F8D744ZJO9R1DGM2K0S4CRTRMEF	(9) See if directly relevant from project title	P3-4: Applicability P8-15: Baseline Methodology
	(10) AM0061: Methodology for rehabilitation and/or energy efficiency improvement in existing power plants --- Version 2.1 https://cdm.unfccc.int/methodologies/DB/U5APNKUZPGKRON461OMSR9PZU613GA	(10) See if directly relevant from project title	P2: Applicability P3-13: Methodology
	(11) AM0062: Energy efficiency improvements of a power plant through retrofitting turbines --- Version 2.0 https://cdm.unfccc.int/methodologies/DB/YB7UE3UB2II2INU9Y1CBJYRANZRXER	(11) See if directly relevant from project title	P2: Applicability P3-13: Methodology
	(12): AM0067: Methodology for installation of energy efficient transformers in a power distribution grid --- Version 2.0 https://cdm.unfccc.int/methodologies/DB/3P4KSNGR9R7JBH49M2WF9QJUBZ0ZM9	(12) See if directly relevant from project title	P2-3: Applicability P4-9: Baseline Methodology
	(13) AM0068: Methodology for improved energy efficiency by modifying ferroalloy production facility --- Version 1.0 https://cdm.unfccc.int/methodologies/DB/VUJ7B2WM7G0VJADXC5G9QMAE9QW1Q8	(13) See if directly relevant from project title	P1-2: Applicability P3-18: Baseline Methodology
	(14) AM0070: Manufacturing of energy efficient domestic refrigerators --- Version 3.1.0 https://cdm.unfccc.int/methodologies/DB/R66P8LFQUC30O9F2GX9Z9CTMN9B8W5	(14) See if directly relevant from project title	P2-3: Applicability P3-28: Baseline Methodology
	(15) AM0084: Installation of cogeneration system supplying electricity and chilled water to new and existing consumers --- Version 3.0 https://cdm.unfccc.int/methodologies/DB/AHSSRS41KEYKYZREKDOVBINMR0NEQC	(15) See if directly relevant from project title	P4-5: Applicability P7-29: Baseline Methodology
	(16) AM0086: Distribution of zero energy water purification systems for safe drinking water --- Version 4.0	(16) See if directly relevant from project title	P3-4: Applicability P5-10: Baseline Methodology

ICF Intervention Type	Applicable CDM Methodologies	Notes on Which to Select	Most Relevant Sections
	https://cdm.unfccc.int/methodologies/DB/RWE3YCC2OXI2Z1O2BK9CRPNX0YZRU5		
	(17) AM0091: Energy efficiency technologies and fuel switching in new and existing buildings --- Version 3.0 https://cdm.unfccc.int/methodologies/DB/32WXA1F47YA70KZTNCXN88W1UUFQTZ	(17) See if directly relevant from project title	P4: Applicability P9-69: Baseline Methodology
	(18) AM0104: Interconnection of electricity grids in countries with economic merit order dispatch --- Version 2.0.0 https://cdm.unfccc.int/methodologies/DB/OEZDV2912B4QUOOC5W7RC2JDP9BQTD	(18) See if directly relevant from project title	P4: Applicability P6-21: Baseline Methodology
	(19) AM0105: Energy efficiency in data centres through dynamic power management --- Version 1.0.0 https://cdm.unfccc.int/methodologies/DB/OW112TO5AHFG51U75LG7ZT1C3BHD7P	(19) See if directly relevant from project title	P2-3: Applicability P3-8: Baseline Methodology
	(20) AM0106: Energy efficiency improvements of a lime production facility through installation of new kilns --- Version 2.0.0 https://cdm.unfccc.int/methodologies/DB/PGRZYPRG0A4MOLYYFV8632P1KUALC9	(20) See if directly relevant from project title	P2-3: Applicability P3-12: Baseline Methodology
	(21) AM0113: Distribution of compact fluorescent lamps (CFL) and light-emitting diode (LED) lamps to households --- Version 1.0 https://cdm.unfccc.int/methodologies/DB/MW18NEOFU1PBMYXECFT1RBYPS0VWVL	(21) See if directly relevant from project title	P4: Applicability P6-11: Baseline Methodology
	(22) AM0114: Shift from electrolytic to catalytic process for recycling of chlorine from hydrogen chloride gas in isocyanate plants --- Version 1.0 https://cdm.unfccc.int/methodologies/DB/2OB1K4PY36P8EE0DN0CKLQXRFDZT2U	(22) See if directly relevant from project title	P4: Applicability P6-18: Baseline Methodology
	(23) AM0116: Electric taxiing systems for airplanes --- Version 2.0 https://cdm.unfccc.int/methodologies/DB/DH4MT0YS5TCNEZIO1UO61M0Q5OLHU2	(23) See if directly relevant from project title	P3: Applicability P5-9: Baseline Methodology
	(24) AM0118: Introduction of low resistivity power transmission line --- Version 2.0 https://cdm.unfccc.int/methodologies/DB/N9E22N1BAGRH3Y3KQY26F3JBXAKRIS	(24) See if directly relevant from project title	P4: Applicability P6-14: Baseline Methodology

ICF Intervention Type	Applicable CDM Methodologies	Notes on Which to Select	Most Relevant Sections
	(25) AM0120: Energy-efficient refrigerators and air-conditioners --- Version 1.0 https://cdm.unfccc.int/methodologies/DB/3USXGBI5RRLI5FXVG90SIYCOD9W9P1	(25) See if directly relevant from project title	P4: Applicability P5-11: Baseline Methodology
	(26) ACM0023: Introduction of an efficiency improvement technology in a boiler --- Version 1.0 https://cdm.unfccc.int/methodologies/DB/JW18PCU5MLZGRQB5QYE6JOM2EUOUDR	(26) See if directly relevant from project title	P3: Applicability P5-11: Baseline Methodology
Energy efficiency (small scale)	(1) AMS-II.A.: Supply side energy efficiency improvements – transmission and distribution --- Version 10.0 https://cdm.unfccc.int/methodologies/DB/1UOYHYF4NZL03NMG817XUSTLK88HKM	(1) See if directly relevant from project title	P1: Applicability P1-3: Baseline Methodology
	(2) AMS-II.B.: Supply side energy efficiency improvements – generation --- Version 9.0 https://cdm.unfccc.int/methodologies/DB/69MEFLV8HH6LBRAFQRAZ3XEF2BYTMG	(2) See if directly relevant from project title	P1: Applicability P1: Baseline Methodology
	(3) AMS-II.C.: Demand-side energy efficiency activities for specific technologies --- Version 15 https://cdm.unfccc.int/methodologies/DB/7Y44EN2RTD02AJ78JVWCGARE8W64KP	(3) See if directly relevant from project title	P3: Applicability P5-12: Baseline Methodology
	(4) AMS-II.D.: Energy efficiency and fuel switching measures for industrial facilities --- Version 13.0 https://cdm.unfccc.int/methodologies/DB/M4LINVAO7Y1OZBCUWFBVZBXT3546LM	(4) See if directly relevant from project title	P4: Applicability P7-17: Baseline Methodology
	(5) AMS-II.E.: Energy efficiency and fuel switching measures for buildings --- Version 10.0 https://cdm.unfccc.int/methodologies/DB/9QDGY435JDVTB8HN3VMI61K9XBWY30	(5) See if directly relevant from project title	P1: Applicability P1: Baseline Methodology
	(6) AMS-II.F.: Energy efficiency and fuel switching measures for agricultural facilities and activities --- Version 10.0 https://cdm.unfccc.int/methodologies/DB/JBIGP7UXNB82DGLWTKENW64LZ5D8HD	(6) See if directly relevant from project title	P1: Applicability P1-2: Baseline Methodology
	(7) AMS-II.G.: Energy efficiency measures in thermal applications of non-renewable biomass --- Version 9.0 https://cdm.unfccc.int/methodologies/DB/DP2BYDIV6RTMZPEZ2EDLYGLJDPSSU3	(7) See if directly relevant from project title	P3: Applicability P5-12: Baseline Methodology
	(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	P1-3: Applicability P3-12: Baseline Methodology

ICF Intervention Type	Applicable CDM Methodologies	Notes on Which to Select	Most Relevant Sections
	https://cdm.unfccc.int/methodologies/DB/LM7W0MFKXMP1F31EWWVUQMGZ73MNKN		
	(9) AMS-II.I.: Efficient utilization of waste energy in industrial facilities --- Version 1.0 https://cdm.unfccc.int/methodologies/DB/OBBCTATQZSQA6UUSYIVAVJ3GZY8W2Y	(9) See if directly relevant from project title	P1-2: Applicability P2-4: Baseline Methodology
	(10) AMS-II.J.: Demand-side activities for efficient lighting technologies --- Version 7.0 https://cdm.unfccc.int/methodologies/DB/GIIF3094709KR4YEEJXX72UY39L6Y4	(10) See if directly relevant from project title	P3: Applicability P6-11: Baseline Methodology
	This methodology is complemented by AMS-III.AR: Substituting fossil-fuel based lighting with LED/CFL lighting systems Version 06.0 https://cdm.unfccc.int/filestorage/O/2/H/O2HGLE9V8CFPA07I6YT3XZNSUK1BDM/EB100_repan13_AMS-III.AR.pdf?t=c3R8cGZlbHkzfDACPR5PRL38XihdiBPZeXfq	Kerosene replacement with clean energy lighting.	Section 5.3, pg 10-11.
	(11) AMS-II.K.: Installation of co-generation or tri-generation systems supplying energy to commercial building --- Version 2.0 https://cdm.unfccc.int/methodologies/DB/B5PBIP57SKC8VG133CZ3JG7B6J4WHY	(11) See if directly relevant from project title	P1-2: Applicability P2-10: Baseline Methodology
	(12) AMS-II.L.: Demand-side activities for efficient outdoor and street lighting technologies --- Version 2.0 https://cdm.unfccc.int/methodologies/DB/JXH8OI21V4PIQTL2WJLG6KJP5BTY3H	(12) See if directly relevant from project title	P3: Applicability P9-13: Baseline Methodology
	(13) AMS-II.M.: Demand-side energy efficiency activities for installation of low-flow hot water savings devices --- Version 2.0 https://cdm.unfccc.int/methodologies/DB/748XBKQYSN13E836NPOU9IS4BHOSSJ	(13) See if directly relevant from project title	P3: Applicability P5-7: Baseline Methodology
	(14) AMS-II.N. Demand-side energy efficiency activities for installation of energy efficient lighting and/or controls in buildings --- Version 2.0 https://cdm.unfccc.int/methodologies/DB/5Z3FA8WFAPJFEXH9X0TDO8EL93W9Y0	(14) See if directly relevant from project title	P3: Applicability P6-11: Baseline Methodology
	(15) AMS-II.O. Dissemination of energy efficient household appliances --- Version 1.0 https://cdm.unfccc.int/methodologies/DB/OE502PQ0NA9ETZ5IB6HL0ZT2BBKZ35	(15) See if directly relevant from project title	P1-2: Applicability P2-4: Baseline Methodology

ICF Intervention Type	Applicable CDM Methodologies	Notes on Which to Select	Most Relevant Sections
	(16) AMS-II.P. Energy efficient pump-set for agriculture use --- Version 1.0 https://cdm.unfccc.int/methodologies/DB/RHKFUJR4R2RPM0ZI9K6K01GUTZ9XAK	(16) See if directly relevant from project title	P1-3: Applicability P3-7: Baseline Methodology
	(17) AMS-II.Q. Energy efficiency and/or energy supply projects in commercial buildings --- Version 1.0 https://cdm.unfccc.int/methodologies/DB/YCL1T3NURPHKSHBSR8TIHC2T543HTQ	(17) See if directly relevant from project title	P1: Applicability P4-11: Baseline Methodology
	(18) AMS-II.R. Energy efficiency space heating measures for residential buildings --- Version 1.0 https://cdm.unfccc.int/methodologies/DB/9SD9B6O4446YU1PEV624CYUO5RF3QU	(18) See if directly relevant from project title	P3: Applicability P4-8: Baseline Methodology
	(19) AMS-II.S. Energy efficiency in motor systems --- Version 1.0 https://cdm.unfccc.int/methodologies/DB/F5Z29X6OE65C3D2QWXDZ5AYCCBQ8UL	(19) See if directly relevant from project title	P5: Applicability P6-17: Baseline Methodology
	(20) AMS-III.X. Energy Efficiency and HFC-134a Recovery in Residential Refrigerators --- Version 2.0 https://cdm.unfccc.int/methodologies/DB/983EQY2RSIYT5Q1KN4FIWHU2FL3MHP	(20) See if directly relevant from project title	P1-3: Applicability P4-7: Baseline Methodology
	(21) AMS-III.Z. Fuel Switch, process improvement and energy efficiency in brick manufacture --- Version 6.0 https://cdm.unfccc.int/methodologies/DB/VLZZ1DVT1QI3KHZKSM6QECOAKNSCXZ	(21) See if directly relevant from project title	P3: Applicability P7-11: Baseline Methodology
	(22) AMS-III.AA.: Transportation Energy Efficiency Activities using Retrofit Technologies --- Version 1.0 https://cdm.unfccc.int/methodologies/DB/4N6Q5WI36PVIUDBJT6M7DBM4I6R5D6	(22) See if directly relevant from project title	P1: Applicability P2-4: Baseline Methodology
	(23) AMS-III.AE. Energy efficiency and renewable energy measures in new residential buildings --- Version 1.0 https://cdm.unfccc.int/methodologies/DB/AWRS1U9S13QBGT2FX236Z2CVTMH44A	(23) See if directly relevant from project title	P1-2: Applicability P2-6: Baseline Methodology
Transport (large scale)	(1) AM0031: Bus rapid transit projects --- Version 6.0 https://cdm.unfccc.int/methodologies/DB/V9E3KQAI5433N8ZF5N7SNKIXE79JTL	(1) See if directly relevant from project title	P4: Applicability P7-29: Baseline Methodology
	(2) AM0090: Modal shift in transportation of cargo from road transportation to water or rail transportation --- Version 1.1.0 https://cdm.unfccc.int/methodologies/DB/4DOIK2WYP8P3AGAVJKT0CHY1NXJ4QP	(2) See if directly relevant from project title	P1-3: Applicability P3-16: Baseline Methodology

ICF Intervention Type	Applicable CDM Methodologies	Notes on Which to Select	Most Relevant Sections
	(3) AM0101: High speed passenger rail systems --- Version 2.0 https://cdm.unfccc.int/methodologies/DB/0U42CLZRFTEERYLAB4SZ87ERW84ZUT	(3) See if directly relevant from project title	P4: Applicability P6-30: Baseline Methodology
	(4) AM0110: Modal shift in transportation of liquid fuels --- Version 2.0 https://cdm.unfccc.int/methodologies/DB/0LZLK5MAYJGJO4DWV531WVV59GDK53	(4) See if directly relevant from project title	P4: Applicability P7-20: Baseline Methodology
Transport (small scale)	(1) AMS-III.U. Cable Cars for Mass Rapid Transit System (MRTS) --- Version 2.0 https://cdm.unfccc.int/methodologies/DB/I7O8EX3R0PA22GNGBJMH2FHCOIL03L	(1) See if directly relevant from project title	P3: Applicability P3-12: Baseline Methodology
	(2) AMS-III.AK.: Biodiesel production and use for transport applications --- Version 3.0 https://cdm.unfccc.int/methodologies/DB/LNFDO5DUYAJHKH8DJCRNHTZB9E7P1C	(2) See if directly relevant from project title	P3: Applicability P6-12: Baseline Methodology
	(3) AMS-III.AY. Introduction of LNG buses to existing and new bus routes --- Version 1.0 https://cdm.unfccc.int/methodologies/DB/LNSTE8UK3HYYUUZRRHK4JXOAJZCY31	(3) See if directly relevant from project title	P1-2: Applicability P2-5: Baseline Methodology
	(4) AMS-III.BC. Emission reductions through improved efficiency of vehicle fleets --- Version 2.0 https://cdm.unfccc.int/methodologies/DB/13LQNV5A5EKORXUG3607N7ROBX6J6K	(4) See if directly relevant from project title	P4: Applicability P7-11: Baseline Methodology
	(5) AMS-III.BM. Lightweight two and three wheeled personal transportation --- Version 1.0 https://cdm.unfccc.int/methodologies/DB/TL5P7I2HGUB6O14AZUJC7S341Q34P5	(5) See if directly relevant from project title	P3: Applicability P6-13: Baseline Methodology
Transport / Energy Efficiency (small scale)	(1) AMS-III.AP.: Transport energy efficiency activities using post - fit Idling Stop device --- Version 2.0 https://cdm.unfccc.int/methodologies/DB/O9M70WPT45KZ55V39IW0BLMGE1ZEP T	(1) See if directly relevant from project title	P1-2: Applicability P3-5: Baseline Methodology
	(2) AMS-III.AT.: Transportation energy efficiency activities installing digital tachograph systems to commercial freight transport fleets --- Version 2.0 https://cdm.unfccc.int/methodologies/DB/I7N1Y6OK4U68VD89IPLPXT8WEBTAFH	(2) See if directly relevant from project title	P1-3: Applicability P3-6: Baseline Methodology

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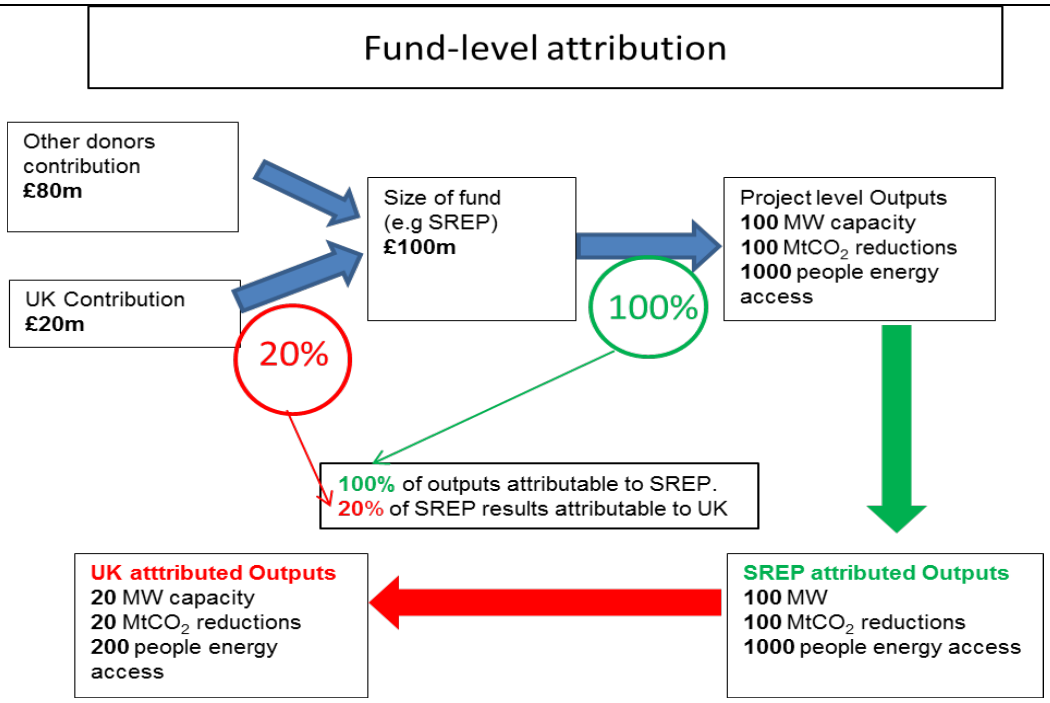
Short title	**ICF KPI 7: Level of installed capacity (MW) of clean energy generated as a result of ICF support**
Type of indicator	**Cumulative (individual years summed to total):** report annual in-year totals only against each milestone. These annual in-year totals should then be summed at the end of the results template to give a cumulative total for the current spending review period (2011/15), the life of the programme and where results will occur outside the life of the programme for total programme benefits.
Key reporting requirements	Below is a list of key reporting requirements to keep in mind when making your returns. Further details are available in the text below: **Requirement** — **Summary** Is this a DRF indicator? — No Available for reporting? — Yes Methodology changes? — No – however clarification on attribution Units — MW Attribution — Pro-rata share of public funding Disaggregation to be reported in results templates — • On grid vs. Off grid
Technical Definition / Methodological summary	This indicator measures total installed capacity (MW) of clean energy generated (by technology) by ICF projects and programmes (grid-connected, off-grid). The proposed definition includes: '**Clean energy'** which refers to low and zero carbon energy generation sources, including but not limited to the following technologies: wind power, sola, fuel cells, tidal systems, hydropower, carbon capture and storage (CCS), second generation biofuels, gasification technologies, clean cookstoves, biomass and boilers and kilns for process heating/drying. It does not include nuclear. **'Installed capacity (MW)**' refers to the rated power output when operational in megawatts (MW) of the clean energy technology, either in the output of electrical power (MWe) or thermal power (MWt). Power outputs must be operational to be included. **'Grid-connected'** refers to clean energy generation projects that are feeding into a national grid. These projects will typically be utility-scale, in the order of tens or hundreds of MW. **'Off-grid'** refers to clean energy generation projects that do not feed into a national grid but may feed into localised energy grids if that localised energy grid is not connected to the national grid. Examples may include a district heat network within an industrial estate or solar PV projects with battery storage serving a small number of buildings. The level of total installed capacity will be reported by those implementing the project.
Rationale	The intended result of greater investment in low carbon development is that energy is supplied from clean sources. This indicator measures the increased clean energy capacity. It is usually assumed that low carbon energy generation partially displaces fossil fuel energy generation – the extent is case specific. This indicator therefore measures demonstrated progress towards a transformed energy supply. It should be noted that there is a distinction between observed generation and capacity. To align with AsDB, we have chosen to monitor installed capacity of clean energy. Projects should consider looking at realistic generation in their evaluations

	and reviews. This will help to distinguish between high quality and low quality instances of technology.
Country office role	For each of their climate change programmes, country offices will need to assess the total installed capacity of clean energy and supply this information to the Climate and Environment Department.
Data sources	Project level data can only be obtained from the M&E of projects supported by the ICF and, when collected, should be disaggregated by technology type, on-grid/off-grid, and rural/urban where possible. Country level data can be used for quality assurance purposes (see later box). At a country level, the main data source is: • **IEA World Energy Outlook.** This is an annual publication providing data disaggregated by energy generation technology, including renewables and by country. It is considered the authoritative publication on international energy supply and demand. Data is reported in terms of installed capacity as well as energy supplied. Country offices may choose to comment on the source of the underlying IEA data (if known) and its reliability.
Reporting organisation	DFID – Internal Indicator (for project level)
Data included	Installed capacity of low carbon energy generation reflects generation that occurs at all scales from ICF projects; from single user to utility scale grid connections.
Formula/Data calculation (including attribution rule)	The sum of the total installed capacity (MW) of clean energy in ICF projects. Where HMG are only funding part of the project, benefits (MW) should be calculated as a pro-rata share of public funding. For example, if we are funding 10% of a 100MW installation, we should claim 10MW as attributable to DFID. **Fund-level attribution** (i.e. at point of UK investment) should be applied for reporting expected and actual results and headline results/figures used in Business Cases (to ensure all projects can report on a consistent basis). This method involves sharing results across all donors that contribute to a fund. All results are attributable to the relevant fund (e.g. CIFs, CP3, GAP) regardless of whether these funds blend with other sources of finance in implementing projects at levels below the point of UK investment. For example, if the UK invests £25m into a fund that totals £100m of public money, the UK would claim 25% of the results from that investment. This applies to all results. The long term ambition is to develop the data availability to enable all projects to use the lowest/most direct level of attribution possible in the future (i.e. project level). Therefore, advisers should be working to develop sufficient data to calculate project level results reports, and where possible, provide this information now alongside headline Fund level results. To note, the distinction between attribution at the project level and at the Fund level (or at point of UK investment) is only an issue where the UK is investing in funds where there are multiple investment levels.



Worked example	The project will invest in large-scale renewable energy generation in sub-Saharan Africa. The M&E team will need to ask the project implementer what level of clean energy has been installed. For example, what is the installed capacity in MW of the new solar power station. Results are attributed at the point of UK investment (Fund level) and shared across all donors that contribute to a fund.
Most recent baseline	The baseline should reflect the situation prior to ICF funding being provided and anticipated projections of what would happen without the ICF. For long running programmes the baseline should be taken as 2010 unless otherwise stated. The baseline should align with the economic appraisal in the project design.
Good performance	Higher installed capacities demonstrate that demand and investment in clean energy are growing. For an improvement, we would therefore expect installed capacities to increase. The indicator measures demonstrated progress towards a transformed energy supply.
Return format	Installed capacity of clean energy (MW) generated by ICF programmes in current year.
Data dis-aggregation	<u>Data to be disaggregated and reported in the ICF results template:</u> - on-grid or off-grid installed capacity <u>Data to be disaggregated as part of workings and Quest number provided:</u> Disaggregation of the following variables will not be collected as part of the ICF results template. Please include disaggregated data in your working documents and record the Quest number for these documents in the ICF results template. - technology type including: solar, fuel cell, tidal systems, hydropower, CCS, second generation biofuels, gasification technologies, clean cookstoves, process heating/drying or other. - urban or rural - source of funding
Data	Technology implementers/contractors should have access to data on the installed

availability	capacity of clean energy.
Time period/ lag	Depending on the technology, installation may take time to deliver. Country offices should aim to report annually on this indicator where possible.
Quality assurance measures	Where possible a third party, such as an independent evaluator should be asked to verify the capacity installed. Project implementers may have an incentive to give optimistic figures. IEA country data could be used to assess whether the share of clean energy generated is in the right proportion. For example, if we estimate that the new energy generation is 10% of the country's energy, we would expect this to match up with 10% of the IEA's energy generation figure. If reporting officers have any concerns about the quality of data or any points that they think CED should be made aware of, then please note this in the ICF results templates. Any comments can usually be added into the free text columns on the far right of each ICF results template. Further guidance should be available in the commissioning note.
Data issues	If the person installing capacity is asked for the data, there maybe incentives to overstate the installed capacity. Country offices are encouraged to make use of any opportunities for independent verification of installed capacity through project review or evaluation. Consideration was given to whether this indicator should measure the amount of clean energy generated, rather than installed . To align with AsDB (as they are a key partner on CP3, a major ICF programme) we chose the total installed capacity of clean energy. In evaluations and reviews, projects should consider looking at achievable realistic generation and what generation (if any) is being displaced. This will differentiate between high quality and low quality instances of technology. It is also difficult to know whether to capture energy savings at the end use level or supply level. If the latter it is difficult to determine whether the energy is clean.
Additional comments	Reference: PWC Low Carbon Development Indicators Report AsDB use this indicator to monitor projects.
Lead	Statistical advisor: Alex Feuchtwanger (DFID) a-feuchtwanger@dfid.gsx.gov.uk Subject matter leads: Simon Ratcliffe (DFID): s-ratcliffe@dfid.gov.uk

<table>
<tr><td>Short title</td><td>ICK KPI 8: Number of hectares where deforestation has been avoided through ICF support</td></tr>
<tr><td>Rationale</td><td>The aims of the UK’s forest finance are to reduce greenhouse gas emissions from the forest sector, preserve bio-diversity and reduce poverty by reducing deforestation and forest degradation. This indicator will provide a broad measure of success against the headline forestry outcome of reduced deforestation of the world’s forest land.</td></tr>
<tr><td>Indicator Type</td><td>Annual change year on year in Hectares.</td></tr>
<tr><td>Key reporting requirements</td><td>Below is a list of key reporting requirements to keep in mind when making your returns. Further details are available in the text below:

<table>
<tr><th>Requirement</th><th>Summary</th></tr>
<tr><td>Available for reporting?</td><td>Yes</td></tr>
<tr><td>Methodology changes?</td><td>Yes</td></tr>
<tr><td>Units</td><td>Hectares</td></tr>
<tr><td>Attribution</td><td>Pro-rata share of public funding</td></tr>
<tr><td>Disaggregation to be reported in results templates</td><td>• NA</td></tr>
</table>
</td></tr>
<tr><td>Technical definition/ methodology</td><td>This indicator seeks to measure the change in forest area resulting from the ICF project relative to the counterfactual of what would have happened in the absence of the intervention. It will aggregate:

a. the number of hectares where deforestation has been avoided;
b. the number of hectares where afforestation or reforestation has taken place

Since there are no readily available methods for calculating forest degradation, i.e. the reduction in forest quality, we do not expect projects to report degradation at present.

Programme managers should in the first instance identify: (i) the geographical scope of programme (size and location of the area/ jurisdiction which the project will affect) where possible and (ii) the time-frame over which they expect the programme to have an impact (which may well extend beyond the delivery period).

ICF analysts have identified a number of approaches which project managers can choose according to the type of project they are operating:

1) Risk based method (developed by Ecometrica)
2) Historic baseline
3) Modelled baseline
4) Control area

All these methods have in common the following three steps:

Step 1: Establish the counterfactual: what land use would have occurred in the absence of the intervention? (this is the hardest part, more guidance below)</td></tr>
</table>

Step 2: Estimate the change in land use occurring in the intervention area/ target jurisdiction since the start of the intervention.

Step 3: Calculate the difference between counterfactual and intervention.

Step 1: Establish counterfactual or reference level

In practice **steps two and three are common to risk based, historic, or modelled baselines; it is only the approach to the counterfactual which differs.** The following paragraphs will briefly set out the three approaches and how they can be employed.

1. *Risk based approach*

Ecometrica have developed a risk based mapping tool which can be applied to calculate KPI 8 for geographically specific ICF projects. The method defines the counterfactual or reference level by dividing the intervention area into 30m by 30m squares and allocating each to one of the following risk levels:

Risk Category	Brief Description	Expected loss within 20 years
V. High	At immediate risk of loss - attractive and accessible with no effective protection	>80%
High	Accessible and attractive second choice land for cultivation and extraction, limited protection	60%-80%
Med	Some access, moderately attractive for cultivation or extraction or partially protected	40%-60%
Low	Difficult to access and not attractive for cultivation or extraction and/or fairly well protected	20%-40%
V. Low	Very difficult to access, little potential for cultivation or extraction and/or very well protected	Under 20%

Source: Ecometrica, *The Hectares Method,* table 2. Available here.

The risk categories are based on a model that predicts deforestation is highest for areas which are Accessible, Cultivable, have Extractable value and are Unprotected. The model is therefore known as ACEU.

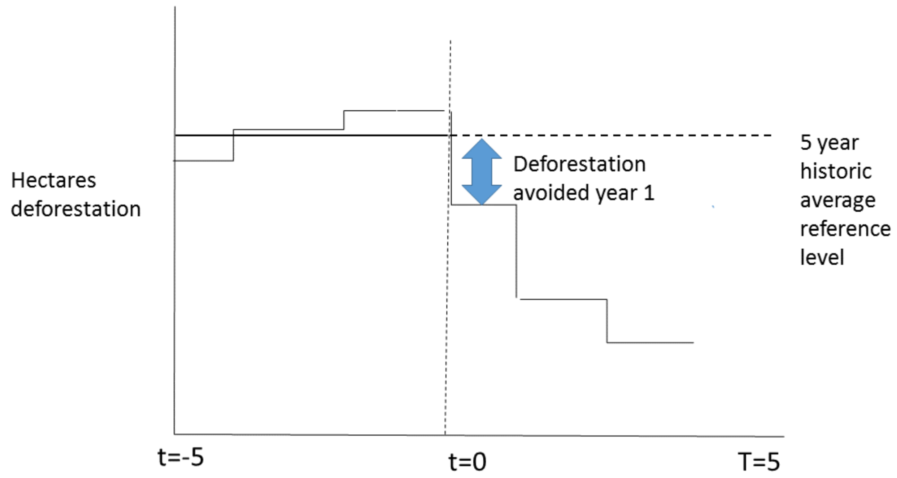
An example KPI 8 report delivered by Ecometrica and Embrapa in the Cerrado region of Brazil is set out in the Annex.

2. *Historic baseline:*

This method assumes the future will be like the past: the average deforestation for a number of years preceding the intervention is used to compare deforestation during/ after the intervention (see figure 1). For some programmes a historic reference level is mandated due to the nature of the programme. More specifically, REDD+ programmes have an established precedent of reporting land use changes against a 10-year historic baseline.

Other projects which have historic data of five years at a minimum or 10 years if available and more representative for the intervention area may also choose to report against a historic baseline if they so wish.

Figure 1: Example historic reference level



3. *Modelled projection baseline*

A **modelled baseline** seeks to predict future deforestation in the project area/ jurisdiction by modelling the key drivers of land use change, for example population, economic growth, commodity prices and making predictions about what land use change will occur against which observed forest change can be recorded. We would not expect projects to use a modelled/ projected baseline for KPI 8 reporting but in exceptional circumstances, e.g. where project staff have particularly strong modelling/ analytical skills, it could be agreed in discussion with ICF project managers and analysts. As an example this is currently the case with Defra's Blue Forests Programme.

4. *Control area*

Another approach which could be considered is to have a **comparison or control area**: in this approach an area similar in characteristics (or different only through random variation) to the intervention area is compared over time to the intervention area[1]. This type of approach is typical in robust impact evaluation, but due to the extent of data collection and analysis required we would not expect it as standard for KPI 8 reporting **unless a project has designed in a quantitative Impact Evaluation at the inception of the project,** an approach which is highly desirable from a learning and evaluation perspective. A third party would normally be contracted to carry out the calculation as part of their evaluation and monitoring of the programme.

Choice of approach

The choice of counterfactual approach between options *1-4* for step 1 should be made considering analytical and practical considerations. ICF analysts can be consulted. All of the above approaches assume a project which has a spatially explicit target area where they expect to reduce deforestation. However this may not always be the case (e.g. for a green investment fund operating across multiple countries or even continents), in which case it may not be possible to report on KPI 8 at the aggregate level. Notwithstanding this, some projects may wish to report on spatial aspects of their programme using KPI 8, acknowledging that this may not capture the full breadth of their impact on deforestation.

Step 2: Estimating deforestation during/ after the intervention

This step requires data on forest change. Readily available satellite maps showing forest extent exist which vary in historic depth, regularity and granularity. An example is Global Forest Watch's online data tool which allows policy makers to analyse forest loss using a web-based tool[2]. Ecometrica have developed an online tool which draws on University of Maryland data to compare forest change. This tool can also be used to compare forest change using alternative map sources.

Step 3: Difference between counterfactual and actual

This is simply calculated by subtracting the change in forest area observed (step 2) from the reference level (step 1).

For multilateral programmes (e.g. the Forests Investment Programme, or Integrated Sustainable Forest Landscapes project) it will also be necessary to adjust the total number of hectares saved on a pro-rata basis and account for the UK/ ICF's contribution to the programme.

Leakage

This indicator as set out here does not actively measure or analyse leakage. For example, shutting down illegal logging in one region or country could simply

[1] As an example, see Jayachandran et al (2017) 'Cash for carbon: A randomized trial of payments for ecosystem services to reduce deforestation' *Science* Jul 21;357(6348): 267-273

[2] http://www.globalforestwatch.org/map/3/15.00/27.00/ALL/grayscale/loss,forestgain,forest2000?tab=analysis-tab&begin=2001-01-01&end=2017-01-01&threshold=30&dont_analyze=true

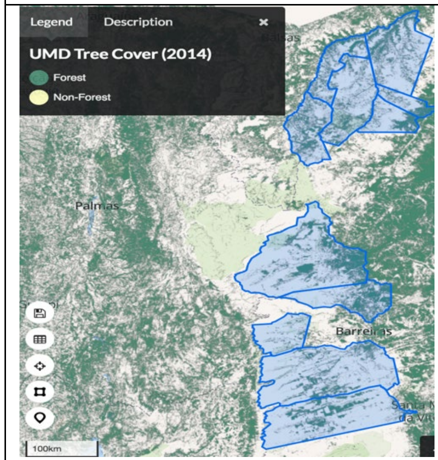
	displace companies to another area with weaker governance structures in place. For conservativeness, ICF appraisal guidance suggests that a 25% reduction can be made to account for the possibility of leakage. This can be flexed where for example the project is making specific efforts in this regard, such as the retiring mechanisms used in REDD+ programmes. **Additionality** In principle, establishing a robust counterfactual should enable identification of what would have taken place in absence of the programme. However given that it is never possible to know this for sure (in the absence of time travel) and the possibility of multiple programmes operating in the target area it may be considered that an additional discount should be applied. Where the 'control areas' approach is used, an additional discount is unlikely to be necessary due to the robustness of this approach. However the final judgment on any level of additionality discount to apply should take into account the degree to which the counterfactual used appears to adequately reflect subsequent changes in the programme area and other interventions in the area. ICF appraisal guidance suggests a standard conservative figure of 50%, but this can be flexed in either direction.
Country office role	As part of annual programme reporting, country offices and/or ICF analysts will be required to quality assure information provided.
Data source	The data required depends on the method used: • For the Ecometrica risk based method, satellite data maps and risk analysis are provided by Ecometrica. • For a historic baseline, forest cover data for the target area for at least the last five years (and preferably 10) is needed. • For modelled options, demographic and/or socioeconomic data is required and will need to be obtained by/ through project partners. Ecometrica's forest mapping is based on the freely available University of Maryland dataset[3]. Another useful source of spatial information about forest cover and loss, also based on this dataset, is the Global Forest Watch monitoring tool which is user friendly and accessible; available here. Country deforestation data is available from the FAO's Forest Resource Assessment datasets, which are released every five years[4].
Attribution	Where HMG are only funding part of the project, benefits (hectares) should be calculated as a pro-rata share of total project/ programme funding. For example, if we are funding 10% of a 1000 Ha conservation project, we should claim 100 Ha are attributable to HMG.
Return format	Hectares - total i.e. not abbreviated by thousands or millions
Data availability	Annual monitoring and evaluation reporting from relevant programmes (at a minimum the six identified above). See data issues section below.
Time period/lag	Programme managers should report the number of hectares where deforestation and degradation were avoided in the preceding year where possible. Alternatively best available data should be provided.

[3] http://glcf.umd.edu/data/landsatFCC/
[4] http://www.fao.org/forest-resources-assessment/en/

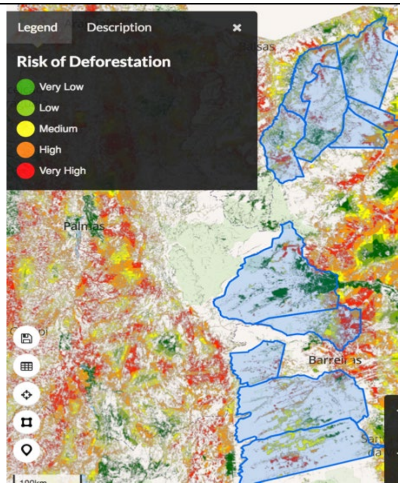
Quality assurance measures	We anticipate three layers of QA in DFID: country offices, CED and FCPD. Within country offices there may need to be consultation with other donors working in the forestry sector. Country offices are not involved in all DFID programmes. If reporting officers have any concerns about the quality of data or any points that they think CED should be made aware of, then please note this in the ICF (and DRF) results templates. Any comments can usually be added into the free text columns on the far right of each template. Further guidance should be available in the commissioning note. BEIS and Defra analysts will carry out QA on this indicator before data is passed on to DFID for aggregation.
Data issues	Some countries have better land use monitoring systems and forestry inventories in place than others (for example, Brazil is likely to be fairly sophisticated whereas the Democratic Republic of Congo will have relatively basic systems). **Data quality will therefore be variable**. However the use of satellite data can to some extent overcome these issues. All countries report to the FAO Global Forests Resources Assessment[5] in a standardised format. Data on the number of hectares classed as 'forest land' (FAO definition) should therefore be obtainable from national government sources. Again, data quality will vary from country to country.
Additional comments	This guidance was developed by Defra with review from BEIS and DFID analysts, and expert review from the Forestry commission. An additional indicator is being developed indicating the number of hectares of forest managed under a programme. KPI 6 (greenhouse gas savings) and KPI 10 (value of ecosystem services) will be calculated using output from KPI 8. **In the future, we would like to improve this indicator by:** • Working with international experts such as the FAO, World Bank Forests Investment Programme staff, World Resources Institute, and the Government of Norway to develop more sophisticated methodologies and improved national forestry inventories.
Lead official	Subject matter lead: Jonathan Stern (Defra) jonathan.stern@defra.gsi.gov.uk Statistical advisor: Sehr Syed (DFID) Sehr-Syed@dfid.gsx.gov.uk

[5] http://www.fao.org/forestry/fra/en/

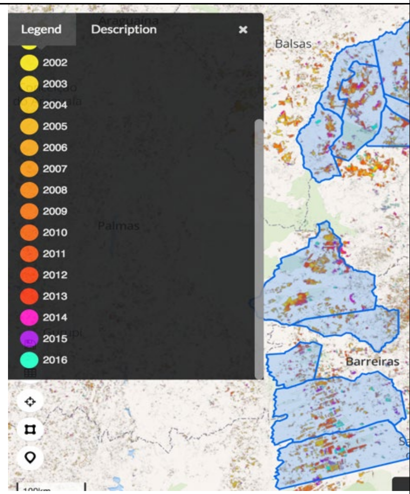
Annex: Example KPI 8 report for Defra Cerrado Project (Brazil) using Ecometrica Risk-Based Method.

<table>
<tr>
<td>Forest in impact area:
1,678,415ha</td>
<td>Forest at Risk 2016: 'without policy scenario'
Expected loss: 43,471 ha</td>
<td>Forest Loss 2016: 'actual outturn'
Actual forest lost: 39,651 ha</td>
<td>Avoided forest loss 2016: 3,820 ha
=Expected – Actual deforestation.</td>
</tr>
<tr>
<td>

Description of forest types: transition between savanna (cerrado) and dry forest (caatinga).

Source: UMD Canopy Tree Cover, for 2000 Hansen et al. with of forest loss between 2001 and 2012 removed to update vegetation extent to 2012. Areas with a minimum canopy cover of 30% and minimum area of 1 ha according to Brazil definition of forests were extracted to give 2012 extent.</td>
<td>

Main drivers / risks: conversion to agriculture, mainly mechanised, large scale.

Sources: Morel et al (2015). Risk of deforestation map for cerrado areas in Bahia, Tocantins, Goias and Piaui; based on protection status of lands, threat of access to forests by road, cultivability and proximity to previous deforestation.</td>
<td>

Cause of loss: conversion to agriculture

Source: Hansen et al (2013), V1.4. Forest loss accuracy assessment was carried out by Mitchard et al (2015) and found to be of high accuracy for this area.</td>
<td>Actual forest loss for 2016 was approximately 4,000 ha lower than the risk-based reference level. The amount of forest loss decreased in 2016 compared to 2015. The amount of avoided forest loss has increased between 2014 -2016, from -263 ha in 2014 (assessment only covered the municipalities in Bahia, report available here) to 3,820 ha in 2016.

ICF intervention in this area enabled registration of over 14,000 small farms onto the CAR, which should encourage their compliance with the national forest code. The small areas of forest within these farms limits the potential impact of the programme at landscape level. Small farmers may still convert areas of forest to agriculture if they are above the 20% threshold, but should reforest if they are below. This is the first post-implementation reporting period, so some impact is expected.

Contribution Score: low (given working with a subset of population)
Percentage Attribution to ICF: 20%</td>
</tr>
<tr>
<td>The impact area comprises the 2012 extent of cerrado and caatinga vegetation within 6 municipalities of western Bahia. Much of the natural vegetation was cleared for agriculture between 1980 and 2000 (Batistella and Valladares, 2009). The largest patches of remaining forest are officially protected.</td>
<td>The main drivers of forest loss are the expansion of large to medium scale farms growing soybeans, wheat, cotton and coffee. There has also been expansion of some urban areas. The areas at high or v. high risk are suitable for agriculture (rainfall >1000 mm, moderate slope, and not formally protected). The areas at v. low risk were mostly within protected areas or on steep slopes.</td>
<td>Forest loss within the impact areas reduced slightly although there were some unexpectedly high losses of forest in the municipalities of Correntina (for both 2015 and 2016), Formosa de Rio Prieto (for both 2015 and 2016), São Desidério (for both 2015 and 2016), Baixa Grande do Ribeiro (only in 2016) and Luís Eduardo Magalhães (only in 2016).</td>
<td>To increase hectares of avoided forest loss in this region ICF investment should consider:
> targeting areas and actors with influence over larger areas of forest at risk;
> incentives or measures to encourage retaining areas of forest above the minimum legal threshold.</td>
</tr>
</table>

<table>
<tr><td>Short title</td><td>ICF KPI 9: Number of low carbon technologies supported (absolute number of units installed) through ICF support</td></tr>
<tr><td>Type of indicator</td><td>Cumulative (individual years summed to total): report annual in-year totals <u>only</u> against each milestone. These annual in-year totals should then be summed at the end of the results template to give a cumulative total for the current spending review period (2011/16), the life of the programme and where results will occur outside the life of the programme for total programme benefits.</td></tr>
<tr><td>Key reporting requirements</td><td>Below is a list of key reporting requirements to keep in mind when making your returns. Further details are available in the text below:

<table>
<tr><th>Requirement</th><th>Summary</th></tr>
<tr><td>Is this a DRF indicator?</td><td>No</td></tr>
<tr><td>Available for reporting?</td><td>Yes</td></tr>
<tr><td>Methodology changes?</td><td>No – however clarification on attribution</td></tr>
<tr><td>Units</td><td>Absolute number of units installed. Not the number of different technologies supported.</td></tr>
<tr><td>Attribution</td><td>Pro-rata share of public funding</td></tr>
<tr><td>Disaggregation to be reported in results templates</td><td>• N/A</td></tr>
</table>
</td></tr>
<tr><td>Technical definition/ Methodological summary</td><td>This indicator is intended to capture progress in demonstrating the viability of LCD and measure reaching ‘commercial scale’ at the project level. The intended result of greater investment is building local capacity to innovate and scale up development. Greater commercial delivery of low carbon domestic technologies results in development and private sector growth. This measures demonstrated progress towards the building of local capacity to deliver LCD and adaptation services and investments.

It will be measured at the project level - it will track the number of domestic low carbon technologies supported – tracking those brought to market (< 100,000 units) and number of technologies scaled beyond 100,000 units, drawing on data from project level M&E report through the results framework. This will be a proxy measure for reaching commercial scale.

<u>Definition of Support:</u>
‘Support’ will be defined as that which is financed or incentivised from the International Climate Fund or wider HMG ODA budget. It will cover both bilateral, and multilateral spend.

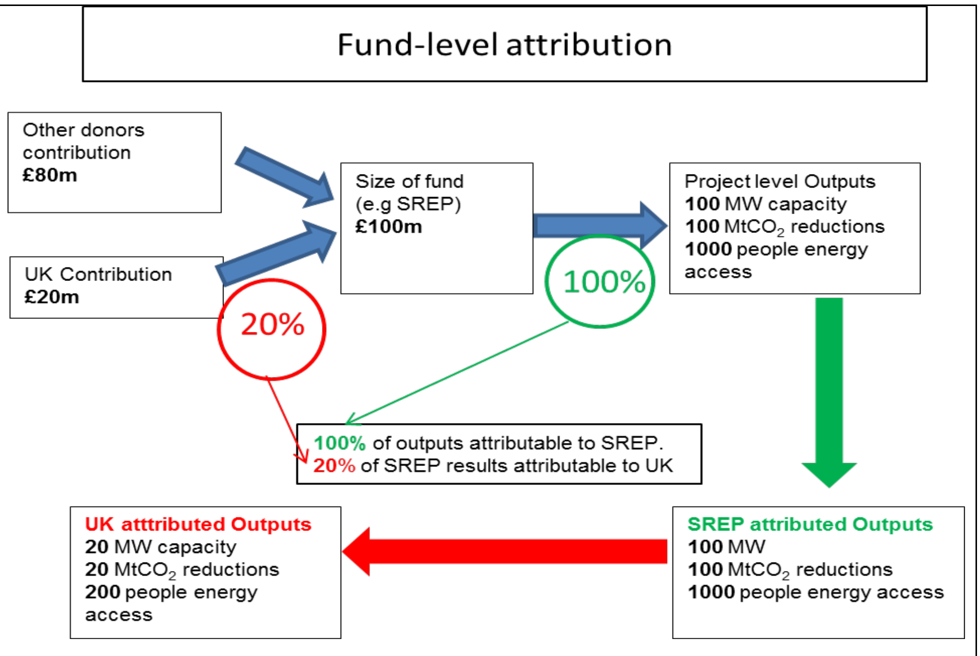
<u>Definition of Low carbon technologies:</u>
• Technologies improving energy efficiency, at least 15% improvement from baseline[1].
• Technologies based on renewable power or which lead to a switch from fossil fuel to clean energy

<u>Thresholds for Market Scale:</u>
The current threshold proposed is to disaggregate the indicator between</td></tr>
</table>

[11] This is based on the IFC and ADB thresholds.

	projects installing units above and below 100,000 units. This benchmark for market scale can be easily revisited, and it may be appropriate to have different levels for different regions and technologies. This can be informed through top down/global level detail on the commercialisation and penetration of technologies. **<u>Calculation Methodology:</u>** The target results for the indicator will be based on expected results from the business case project appraisal. The indicator will report the absolute number of low carbon technology units installed, reporting progress for each year of the project – this is an absolute measure and so no calculations are required. In some instances, where data available is based on household surveys, simplifying assumption made that 1 unit of domestic low carbon technology is adequate for one family dwelling.
Rational	The ICF is also focused on achieving transformation – supporting new and innovative technologies and accelerating technology learning and driving down technology costs through development, deployment and commercialisation. Monitoring the level of commercial innovation will provide an estimate of the influence of the ICF in supporting transformative technologies – as well as an indicator on technology uptake providing a direct measure of project success.
Reporting Organisation	HMG Project Managers
Country office role	**For Bilateral projects** - country offices will be required to report throughout programme implementation. This information ought to be generated in any case as part of their corporate compliance responsibilities. DFID CED will also seek support from EvD in quality assuring the data received. **For projects delivered through MDBs and others** – aims are to align M&E systems.
Data source	Individual project data.
Data included	Absolute number of low carbon technology units installed. If this is not available numbers of households with technology installed may be used as proxy (if assumption that one household = one unit is deemed suitable). If the number of households with low carbon technology installed is used as a proxy please note this in the ICF results template. Any comments can usually be added into the free text columns on the far right of each ICF results template.
Formula/Data calculation (including attribution rule)	**<u>Accounting for the project level indicator:</u>** The indicator will report on the uptake of low carbon technologies measured as an absolute number of units installed volume. Where this information is not known suitable proxies may be developed (i.e. if detail on number of households targeted, assume number of households is a suitable proxy for number of units installed).

	If the number of households with low carbon technology installed is used as a proxy please note this in the ICF results template. Any comments can usually be added into the free text columns on the far right of each ICF results template. The target results for the indicator will be based on expected results from the business case project appraisal. **<u>Attribution:</u>** Where HMG are only funding part of the project, benefits (units installed) should be calculated as a pro-rata share of public funding. For example, if we are funding 10% of a programme that installs 100 units of a low carbon technology, we should claim that 10 of these are attributable to DFID. For an individual project there may be a rational to deviate from this rule – for example if UK funds have with certainty leveraged in more benefits. Any attribution methodologies that diverge from the simple pro-rata rule above need to be approved in the business case for an individual project and flagged in the ICF results templates when reporting. **Fund-level attribution** (i.e. at point of UK investment) should be applied for reporting expected and actual results and headline results/figures used in Business Cases (to ensure all projects can report on a consistent basis). This method involves sharing results across all donors that contribute to a fund. All results are attributable to the relevant fund (e.g. CIFs, CP3, GAP) regardless of whether these funds blend with other sources of finance in implementing projects at levels below the point of UK investment. For example, if the UK invests £25m into a fund that totals £100m of public money, the UK would claim 25% of the results from that investment. This applies to all results. The long term ambition is to develop the data availability to enable all projects to use the lowest/most direct level of attribution possible in the future (i.e. project level). Therefore, advisers should be working to develop sufficient data to calculate project level results reports, and where possible, provide this information now alongside headline Fund level results. To note, the distinction between attribution at the project level and at the Fund level (or at point of UK investment) is only an issue where the UK is investing in funds where there are multiple investment levels.

	
Worked Example	**<u>Increase in uptake of energy efficient appliances Example;</u>** **Energy Efficient light bulbs replacing inefficient light bulbs** Project aims to install 10,000 energy efficient light bulbs. Expected results = 12,000 units In year 1, 3,000 units are installed. Year 1 results = 3,000 units In year 2 an additional 4,000 units are installed. Year 2 results = 4,000 units. In year 3 an additional 5,000 units are installed. Year 3 results = 5,000 units. Total (cumulative) units installed = 12,000 units Results are attributed at the point of UK investment (Fund level) and shared across all donors that contribute to a fund.
Most recent baseline	The baseline should reflect the situation prior to ICF funding being provided and anticipated projections of what would happen without the ICF. For long running programmes the baseline should be taken as 2010 unless otherwise stated. The baseline should align with the economic appraisal in the project design.
Good performance	Increase in numbers of technologies supported in line with expected results.
Return format	Absolute number of individual low carbon units installed.
Data dis-aggregation	<u>Data to be disaggregated as part of workings and Quest number provided:</u>

	Disaggregation of the following variables will not be collected as part of the ICF results template. Please include disaggregated data in your working documents and record the Quest number for these documents in the ICF results template. - Technology type - Scale i.e. those brought to market (<100,000 units) or number of technologies scaled beyond 100,000 units
Data availability	It should be possible for country offices and multilateral partners to report at least annually (to inform Annual Output to Purpose Reviews). CED will collate this information annually.
Time period/ lag	This will have to be worked through with country offices and multilateral partners. A time lag may be necessary to receive realise results, but in the interim expected results should be used.
Quality assurance measures	Methodologies will be scrutinised in the economic appraisal of projects at the Business case stage. We anticipate that there will be 3 layers of QA: country offices, CED, and EvD. If reporting officers have any concerns about the quality of data or any points that they think CED should be made aware of, then please note this in the ICF results templates. Any comments can usually be added into the free text columns on the far right of each ICF results template. Further guidance should be available in the commissioning note.
Data issues	There may be varying degrees of quality of data, from data generated by large DFID projects with good quality, to that produced by multilateral partners with their origin in government partners' data systems, which is likely to be lower quality.
Additional comments	n/a
Lead	Statistical advisor: Alex Feuchtwanger (DFID) a-feuchtwanger@dfid.gsx.gov.uk Subject matter leads: Isabel van de Sand (DFID): I-Vandesand@DFID.gov.uk

<table>
<tr><td>Short title</td><td>ICF KPI 10: Value of ecosystem services generated / protected as a result of ICF support.</td></tr>
<tr><td>Type of indicator</td><td>Annual, £/year (flow of services from hectares protected in any given year):

Reporting of this KPI relies on a figure being produced for KPI 8.</td></tr>
<tr><td>Key reporting requirements</td><td>Below is a list of key reporting requirements to keep in mind when making your returns. Further details are available in the text below:

<table>
<tr><th>Requirement</th><th>Summary</th></tr>
<tr><td>Available for reporting?</td><td>Yes</td></tr>
<tr><td>Methodology changes?</td><td>Yes</td></tr>
<tr><td>Units</td><td>£/year</td></tr>
<tr><td>Attribution</td><td>Pro rata share of public funding</td></tr>
<tr><td>Disaggregation to be reported in results templates</td><td>Projects operating across multiple locations should disaggregate the value of benefits by location.</td></tr>
</table></td></tr>
<tr><td>Rationale</td><td>The TEEB study (2009)[1] presented estimates that humanity globally loses ecosystem services with a capital value of $2tr-$4.5tr each year as a result of deforestation alone. As the benefits of the natural environment tend to be delivered for free, they are often neglected in decisions, especially where the parties who benefit from the environmental services are not those who benefit from the action which removes them e.g. deforestation by non-local companies – they will take the benefit from the sale of timber and future use of the land, but do not compensate populations living locally for reduced access to products from the forest, or increased flood risk.

The TEEB study also highlights the role of forests in the income of rural poor, suggesting that (based on analysis across India, Indonesia and Brazil) between 47% and 89% of the effective income of the rural poor is delivered for free by nature, implying significant real losses are likely for such groups when deforestation occurs without work on alternative livelihoods. While we are looking to update this dataset with new valuation figures for ecosystem services in different habitats and biomes, we have no reason to believe that the role of forests has changed substantially for the rural poor in the developing world.

Whilst the “Forest Dependent People” indicator (ICF KPI 3) focuses on this livelihood issue specifically, valuing ecosystem services attempts to capture more broadly the value of the range of benefits (forest) ecosystem provide to society for free. It will not ascribe these to particular population, where the benefit falls will depend on local topography, climate, land ownership etc. KPI 10’s main aim is to identify the wider benefits. Many non-carbon ecosystem services have a more local benefit than reduced CO_2 emissions. It will also reveal the wider benefit of protecting biodiversity and natural habitats, as global public goods which support the generation of ecosystem services.</td></tr>
<tr><td>Technical Definition / Methodological summary</td><td>Ecosystem services are the benefits we derive from the natural environment, as assessed through the framework established in the Millennium Ecosystem Assessment (2005). They are grouped into 4 categories: provisioning (e.g. providing a source of food, fuel and fibre), regulating (e.g. influencing the flow or quality of water, regulating the climate), cultural (e.g. aesthetic benefits) and supporting services (e.g. nutrient cycling). See the ‘additional comments’ section for a full explanation of ecosystem service categories.

A high-level indicator measuring the value of ecosystem services generated or preserved by investments on the ICF has been developed based on the</td></tr>
</table>

[1] http://doc.teebweb.org/wp-content/uploads/Study%20and%20Reports/Reports/Synthesis%20report/TEEB%20Synthesis%20Report%202010.pdf

	measurement and location of hectares of forest / habitat where deforestation has been avoided **(therefore using as inputs data already generated for KPI 8 – the hectares indicator).** This is combined with data on the per-hectare value of each service provided on a hectare of habitat – eg. the value of air quality maintenance offered by a hectare of rainforest in Costa Rica. Going through this process for as many ecosystem services as possible using the data available will provide a wider indicative estimate of the value protected and/or delivered, which provides benefits on a local, national, and global level. The broad methodology below disaggregates between the value of carbon and non-carbon ecosystem services, and outlines separate methods for reaching each figure. The reason for this is that HMG has a robust existing methodology for valuing carbon through the use of the BEIS International Carbon Price Series. This methodological approach does not exist for non-carbon ecosystem services. **For both approaches, lower-bound values are recommended for use at this point. This is applied to properly capture the level of uncertainty attached to figures, in an area where existing data on £/ha ecosystem service values for habitats is scarce.** **<u>A: Carbon Ecosystem Services</u>** For carbon ecosystem services, the method used depends on whether the hectares in question have been protected versus restored – protecting an existing carbon stock will entail a different level of carbon from the restoration of carbon in degraded or new forest. **For carbon stock through forest protection:** **Step A1a:** Derive an estimate for per-hectare carbon stock for the project area – if data is not available from the project, generic figures are provided by IPCC[2], though this will increase the uncertainty around the value. **Step A2a:** Convert carbon stock protected/ conserved to an annualised flow. The method recommended for this is to divide the carbon stock protected equally across 20 years, the assumed lifetime of benefits. **Step A3a:** Multiply the carbon stock protected in the given year by the <u>lower-bound</u> carbon price for that year, using the BEIS International Carbon Price Series, ensure values are appropriately discounted at the global discount rate. **Step A4a:** Multiply £/Ha value by number of hectares where deforestation or conversion has been avoided. **For carbon sequestration through restoration:** **Step A1b:** Derive an estimate for £/Ha carbon sequestration based on project data. If project-level data is not available, use IPCC values for the relevant forest type/biome. [Put in link]. **Step A2b:** Multiply the carbon sequestration levels by the lower-bound carbon price for that year, using the BEIS International Carbon Price Series. **Step A3b:** Multiply £/Ha value by number of hectares restored. **<u>B: Non-Carbon Ecosystem Services</u>**

[2] IPCC, (2006), *IPCC guidelines for national greenhouse gas inventories*. Chapter 4: Forest Land.

For non-carbon ecosystem services, the following outlines the 5 steps to take to transform hectare data into the value of ecosystem services protected/generated, recognising that this is a high-level approach that is primarily suitable for order-of-magnitude estimates at a more aggregate level.

Step B1: Form an estimate of the proportion of habitat types within the area under consideration (the area where deforestation has been avoided as determined by KPI 8). This can be drawn from ecological literature or estimated using program knowledge of the local area. For an example of this, see the Worked Example section.

Step B2: Use value transfer based on the Economics of Ecosystems and Biodiversity (TEEB) Ecosystem Services Value (ESV) database (developed in 2010) to form an order-of-magnitude estimate of the value of services per hectare per year provided by an ecosystem broadly representative of the area under consideration.
The ESV database holds 1,310 data points on the value of 22 different ecosystem services across 10 habitat types. Some 582 have been peer-reviewed as being of sufficiently robust to use in value transfer from one location to another. An accompanying document [attached] provides lower-bound values for specific ecosystem service values of different biome types. [The values have been updated

de Groot 2012 Evidence Appendice

to 2018 £ figures, and will be updated annually to reflect inflation].

Step B3 (Optional): Derive values for ecosystem services specific to the location under consideration, if available.

- <u>This is the most resource-intensive step of the process, and the level of time committed to this step will be dependent on the analytical capacity of ICF programme teams.</u>
- We are looking to significantly reduce the analytical resource necessary for this step through an update to the ESV database – this will ensure that all robust location-specific ecosystem service values are available to ICF analysts in a single searchable database. The update is expected to be completed by April 2020.

Step B4: Derive a monetary value for the ecosystem services generated by the likely alternative land use without the ICF to ensure additional benefits are captured.

  - This step assumes that the non-monetised/able ecosystem benefits generated by the alternative land-use are negligible.

Step B5: Multiply the per-Ha value by hectare figures provided by KPI 8 to reach an overall order-of-magnitude estimate for KPI 10.

The values of carbon and non-carbon ecosystem services are then added together to give a total value for the flow of ecosystem services from hectares protected or restored through ICF support.

We envisage this method being used by HMG ICF analysts, with input (most likely on Steps B1 and B4) from project partners and country offices. Further information on how to approach the reporting of this indicator is provided through in the Worked Example section.

	As mentioned above, it is likely that after an update to the ESV database currently underway, Step B3 will be a much less resource-intensive undertaking, as it would simply involve a search of the ESV database for values specific to the location under consideration. The ESV database will also be updated on an annual basis with new peer-reviewed location-specific estimates for ecosystem service values – this will allow reporting of the KPI to potentially be undertaken by project leads. **Until the ESV database update is completed in March 2020, Step 3 should be skipped unless analytical capacity allows.** This indicator will be generated based on the data already requested of programme managers e.g. annual estimate of the number of hectares maintained at their baseline level and/or any improvements in the quality of forests in the intervention countries as a direct result of the programme under review etc. As with other indicators programmes will be encouraged to report against indicators over time so this indicator would be updated with this reporting over time. As this method relies on KPI 8 data as an input, the risks of leakage and non-permanence (where impacts are not sustained beyond the program lifetime) will have already been accounted for. As such, leakage and non-permanence <u>should not be considered</u> when deriving a value for the total ecosystem services generated or protected.
Country office role	To be agreed but it could involve validation of the results reported by project managers. Country offices could also assist with assumptions for the business as usual scenario i.e. in the absence of the ICF
Data sources	TEEB Ecosystem Services Valuation (ESV) Database – 1310 data points on the value of ecosystem services across the world, disaggregated across 10 biomes and 45 ecosystems. 582 of these have been cleared for use in value transfer by peer review. An overview of biome-level ecosystem service values for 10 biomes is available at https://www.sciencedirect.com/science/article/pii/S2212041612000101 Further location-specific data not captured by the TEEB database is available in caches such as the Environmental Valuation Reference Inventory, the WAVES Knowledge Center and peer-reviewed journals. This data, when resources allow, would be derived and utilised by ICF analysts until a point where the TEEB database is updated to a high-quality standard.
Reporting organisation	Indicator reported by HMG
Data included	The results would estimate the value of ecosystem services generated by ICF spend. From year to year, it is likely that the ecosystem service valuation data on which the method relies is likely to improve, as more study results are added to the TEEB valuation database. As such, lower-bound values for each service, as well as the total economic value of a hectare of protected or restored habitat, should be re-appraised during each reporting year. This is not expected to be a capacity-intensive exercise, as lower-bound values for each service in each habitat will be easily convertible from the database.
Formula/Data calculation (including attribution rule)	Attribution rates will already have been applied to the figure reported for KPI 8. As such, no further attribution rates would be applied.

	Reported value = (Lower-bound per-hectare value of service) x (number of hectares of forest protected or generated through ICF support)
Worked example	A case study of the method in practice has been undertaken on the Cerrado biome, an area in Brazil where two ICF projects are currently in operation. This habitat encompasses 204.5m hectares, covering 21.3% of Brazil's territory. It is the 2nd largest biome in South America and is acknowledged as one of the world's biodiversity hotspots, with over 4400 endemic plant species. The biome is vital for Brazil's long-term sustainability in areas as diverse as agriculture, energy, water security and climate regulation. Despite this, it has been heavily affected by the spread of agriculture across the region since the 1960s, with just 47% of the biome retaining its natural vegetation in 2010. Habitat loss in in the region continues at 0.6% a year. **Method** **Step A – Carbon Ecosystem Services** This case study assumes that the counterfactual would be that the natural habitat would be converted to agriculture, with an assumed minimal carbon stock. Step A1 Estimates for the carbon sequestered annually by Cerrado natural habitat range from 1.2TC/ha[3] to 6.2TC/ha[4], with a median of 3.7TC/h – this converts to 13.55TCO_2e/ha. Step A2 Using the lower-bound BEIS International carbon Price for 2018 of £26 produces a per-hectare median estimate for carbon sequestration by Cerrado natural habitat of £352 (13.55T x £26). **Step B – Non-carbon Ecosystem Services** Step B1 To apply the data held in the ESV database to the Cerrado, first we estimate the habitat composition of an **average** hectare of Cerrado in its natural state. Based on relevant ecological literature[5], we make the assumption that this composition is 72% grassland, 24% grassland/forest transition (with the assumption of a 50/50 split), and 4% tropical forest. • We used tropical forest as the ESV forest indicator as it was most relevant to the tropical *dry* forest found in the Cerrado biome. However, there is not enough data available in the ESV database to differentiate between dry and moist tropical forest at this time, though they are likely to generate a sizably different set of ecosystem services. Step B2

[3] Abreu, R. C. R. et al. (2017) "The biodiversity cost of carbon sequestration in tropical savanna"
[4] Teixiera do Vale, A. and Felfili, J. M. (2005) "Dry Biomass Distribution in Cerrado *Sensu Stricto* Site in Central Brazil"
[5] Cardoso Da Silva, Bates (2002) - "Biogeographic Patterns and Conservation in the South American Cerrado: A Tropical Savanna Hotspot"

To calculate an estimated figure for the value of each ecosystem service within our generic habitat, we use the median values provided by the TEEB database[6]. Median is used to increase robustness, as the effect of outliers does not skew the results. A simple formula is used in the case of the Cerrado:

$$0.72(\alpha) + 0.24((\alpha + \beta)/2) + 0.04\ (\beta),$$

where α represents the grassland ecosystem service median value and β represents the tropical forest ecosystem service median value. This formula enables us to create an indicative baseline estimate of ecosystem service values for a hectare of the Cerrado.

<u>Step B3</u>

To increase the accuracy of our ES value estimate, we find a number of location-specific figures for the value of individual ecosystem services provided by the Cerrado and aggregate them. This is the most time-intensive step in the process. As such, the time committed to Step 3 will be dependent on the analytical capacity available. Results are shown in Column 2 of the table below.
Cerrado-specific metrics are available for the following services:

- Food – the per-ha value of pequi (*caryocar brasiliense*) harvest[7, 5].
- Climate regulation – the value of carbon sequestered annually on average by a hectare of Cerrado[8,9].
- Water flow regulation – the evapotranspiration services offered by Cerrado vegetation[5]
- Natural hazard regulation – erosion prevention values for Cerrado soils[10]
- Genetic diversity – the value of plant diversity in an area of the Cerrado[11]

<u>Step B4:</u>

The value of the standing forest is now compared to the counterfactual, ie the economic value obtained from deforesting the land for an alternative land-use. The most financially valuable alternative land-use is double-cropping soybean/corn agriculture – one crop is harvested after six months and immediately replaced with another crop, so the land is productive on a year-round basis. Analysis of the ecosystem services provided are sourced through relevant literature[12].

<u>Step B5</u>
This step is dependent on estimates being produced for KPI 8. Ecometrica's analysis of an ICF project in the Cerrado estimated 784 hectares have so far been protected from deforestation through ICF support. This is the figure we combine with a per-hectare value to produce an estimate of KPI 10.

<u>**Results**</u>

Table 1 shows the resulting values using this method. The groups and subgroups of services reflect the approach proposed in the UK National Ecosystem

[6] TEEB: Ecosystem Service Value Database; https://www.es-partnership.org/services/data-knowledge-sharing/ecosystem-service-valuation-database/
[7] Zardo, R. N. and Henriques, R. P. B. "Growth and fruit production of the tree *Caryocar brasiliense* in the Cerrado of central Brazil", 2011.
[8] Abreu, R. C. R. et al. (2017) "The biodiversity cost of carbon sequestration in tropical savanna"
[9] Teixiera do Vale, A. and Felfili, J. M. (2005) "Dry Biomass Distribution in Cerrado *Sensu Stricto* Site in Central Brazil"
[10] TEEB for Business Brazil, Final Report (2014)
[11] Resende, F. M., Fernandes, G.W and Coelho, M. S. - "Economic valuation of plant diversity storage service provided by rupestrian grassland ecosystems", 2013.
[12] TEEB for Business Brazil, Final Report (2014)

	Assessment[13]. The dashes in the table reflect areas where data is not currently available.

Table 1: Value of Ecosystem Services in the Cerrado Biome, Lower-Bound
(All figures are in £/Ha/year at 2016 price levels)

Ecosystem Services	Generic Cerrado-type Habitat	Cerrado-Specific	Final Generic/Specific Cerrado
Provisioning services	267	-	**267**
Food	59	-	**59**
Resources*	207	-	**207**
Freshwater	1	-	**1**
Regulating and Habitat Services	1147	729	**742**
Climate regulation	226	352	**352**
Air quality	2	-	**2**
Water flow regulation	7	7	**7**
Natural hazard regulation	2	45	**45**
Waste treatment	9	-	**9**
Genetic diversity**	899	325	**325**
Disease & pest regulation	2	-	**2**
Social & Cultural Services	3	-	**3**
Aesthetic	1	-	**1**
Recreation & Tourism	2	-	**2**
Cognitive benefits***		-	
Total Economic Value	1417	729	**1012**

** Resources includes TEEB sub-groups of raw materials, genetic resources, medicinal resources and ornamental resources*
***Genetic diversity figure includes TEEB sub-groups of nursery services, genetic diversity and biological control*
**** Cognitive benefits figure includes TEEB sub-groups of inspiration, spiritual experience and cognitive development*

We have used location-specific figures for ecosystem services where available. In the 'Final Generic/Specific Cerrado' column:

[blue box] = Generic Cerrado-type habitat figure used
[yellow box] = Cerrado-Specific figure used

As Table 1 highlights, the climate regulation and genetic diversity services provided by the Cerrado are particularly valuable. However, we remain unable to value services such as air quality which potentially have a high value.
The sizable discrepancy between generic habitat and specific Cerrado estimates for the value of climate regulation are likely to be linked to the different methodologies utilised by different researchers and nations in the valuation of a tonne of C02. Another issue is the use of differing time frames and discount rates when converting a stock of carbon to a flow.

[13] UK National Ecosystem Assessment (2011) UNEP-WCMC, Cambridge.

Our lower-bound estimate of the total value of an average hectare of natural Cerrado vegetation is estimated at being in the region of £1010.

Value of conservation/ restoration

In order to estimate the net benefit of conserving or restoring Cerrado land we need to subtract the value of the next best alternative (the opportunity cost). In this case, the most valuable alternative land-use is double-cropping soybean/corn agriculture – one crop is harvested after six months and immediately replaced with another crop, so the land is productive on a year-round basis. The figures given capture, as much as possible, estimated per-hectare values for the ecosystem services provided by each of the two land-uses:

Table 3: Ecosystem Service Value of Cerrado Land-Use Options

Land-Use Designation	Value (2016 £ prices/ha/year)
Natural Cerrado Habitat	1012
Soybean/Corn Double Cropping	515

Soybean/corn double cropping creates an estimated £427/ha/year in value from food production. In addition to this, it offers other ecosystem services, some of which are captured here:

- water regulation - £17/ha/year
- natural hazard regulation - £107/ha/year

However, it is also responsible for a number of adverse agricultural impacts, which lower the value of the services provided by £36/ha/year. Cumulatively, these supplementary ecosystem services are valued by the TEEB for Business Brazil report at £88/ha/year[15]. Full sources, methods and assumptions for these figures are detailed in Annex IV. It is worth noting that double-cropping operations are only feasible in areas where the land is flat and water sources are plentiful.

Given the above figures, we estimate the economic value of ecosystem services provided by conserving or restoring an average hectare of natural Cerrado habitat at £497/ha/year. This is highly conservative, as uses the lower bound estimate of a large number of peer-reviewed international studies.

Sensitivity Analysis

As the lower bound is being utilised as the central estimate, the analysis set out below details median and high values for the hectare type under consideration, to estimate a range for the value.

Table 2: Sensitivity Analysis of Ecosystem Service Values for the Cerrado Biome
(All figures are in £/Ha/year at 2016 price levels)

	Median value	Lower bound	Upper bound	Number of Sources
Provisioning services	**418.0**	**267.9**	**666.7**	**-**

Food	129.0	59.2	198.8	-
Resources	247.7	207.3	336.9	24
Freshwater	41.3	1.4	131.0	6
Regulating & Habitat Services	**1506.8**	**742.1**	**2393.7**	-
Climate Regulation	704.5	352.3	1182.1	2
Air Quality	1.6	1.6	1.6	1
Water flow regulation	17	7.4	22.3	-
Hazard Regulation	79	45.1	112.9	-
Waste treatment	54.2	9.2	99.3	6
Genetic Diversity	649.0	325.0	974.0	-
Disease & Pest Regulation	1.5	1.5	1.5	1
Social & Cultural Services	**51.5**	**2.4**	**1739.5**	-
Aesthetic	31.2	0.7	419.6	5
Recreation & Tourism	20.3	1.4	1096.4	24
Cognitive Benefits	0	0	0	-
Total Economic Value	**1976.3**	**1012.4**	**4576.4**	**-**

The above table shows an overall range for TEV of a hectare of natural Cerrado habitat of -95% to +132%. This sizable range reflects the small amount of data currently available.

To produce a total estimate of KPI 10 for the Cerrado project, our per hectare economic value of ecosystem services protected or generated (£497/ha) is multiplied the number of hectares where deforestation has been avoided by the project in the reporting year (764ha in 2016 according to Defra's ICF monitoring data). This produces a KPI 10 value for the Cerrado project for the year 2016 in the region of £380,000
These findings reflect the basis of the economic case for conservation, and provide us with a simple and robust monitoring metric for KPI 10 in the Cerrado biome.

Most recent baseline	There is no current baseline (this would be calculated within the indicator – i.e. the value of ecosystem services in the absence of the ICF as the counterfactual). However the TEEB interim report did highlight the global magnitude of the ecosystem service losses associated with current levels of deforestation at $2tr - $4.5tr p.a. (capital value).
Good performance	Protecting forests of high value to people should highlight the benefits of natural capital protection at the local as well as the global level, a high number could help show the benefits of the ICF (and forest protection more generally) to country partners.
Return format	Monetary value of ecosystem services generated or protected
Data dis-aggregation	Data will be disaggregated by: - Country

	- Habitat type
Data availability	Will be assessed as the transfer function is developed, however we know the approach is feasible as it has been done before for the TEEB study.
Time period/ lag	Assuming applied offsite, the value of the indicator could be updated as and when update to the input data (specifically KPI 8) are available (eg. studies are undertaken to value ecosystem services in the specific area under consideration).
Quality assurance measures	The work by researchers in this area will need to be well peer reviewed, as value transfer remains to an extent on the academic frontier. If reporting officers have any concerns about the quality of data or any points that they think ICF analysts should be made aware of, then please note this in the ICF (and DRF) results templates. Any comments can usually be added into the free text columns on the far right of each template. Further guidance should be available in the commissioning note.
Data issues	Valuation of ecosystem services is a complex field (especially at large geographical scales due to the differences in £/Ha service provision across a landscape), therefore it is likely that this indicator will only be able to provide information on the order of magnitude of ecosystem service benefits provided at the level of the ICF as a whole. A discussion of the issues around large scale assessments of ecosystem service values will be published in the TEEB Quantitative Assessment (forthcoming). A key issue is that having a single transfer function, assumes we can identify the variables which will affect both the ecological functioning of an ecosystem and the value of the services it provides and use these to adjust and transfer values from existing studies. This of course relies on the both the quality and quantity of studies available, and implies as more work is carried out, the way in which such assessments are carried out may develop and evolve. **In future, we would like to improve this indicator by:** A clear next step for improving the rigour of our estimates is to update the TEEB ESV database to include location-specific ecosystem service values published more recently than 2008 (when the database was first published). This will increase both the ability of ICF analysts to find robust ES values for a specific location and also the accuracy of estimates for a generic habitat. This is especially pertinent when we account for the huge number of valuation studies that have been published between 2008 and the present. Currently this method does not account for differences in the value of ecosystem services generated based on surrounding land-use, proximity / density of human population / infrastructure, relative wealth of population, habitat quality. This is an issue which we will be looking to address in due course. It also does not differentiate between different levels of degradation, and how this impacts the provision of services by an area of natural habitat. Further debate is recommended on the relationship between the condition of the natural stock and the level of ecosystem services provided by that stock - with a focus on whether the service/degradation relationship is linear or exponential.

Additional comments	**Ecosystem service categories**[14] *Provisioning* Food Water Resources (medicinal, raw materials) *Regulating* Air quality maintenance Climate regulation Natural hazard regulation Waste-water treatment Erosion prevention Disease and pest regulation *Supporting* Genetic diversity maintenance Pollination* *Cultural* Tourism Education and cognitive development Recreation Aesthetic appreciation *Not considered a *final* ecosystem service. Only final services are valued to avoid double-counting of benefits.
Leads	Statistical advisor: Cecilie Andersen (DFID) C-Andersen@dfid.gov.uk Subject matter leads: Moray Fraser (Defra): moray.fraser@defra.gov.uk

[14] http://www.teebweb.org/resources/ecosystem-services/

<table>
<tr><td>Short title</td><td>ICF KPI 11: Volume of public finance mobilised for climate change purposes as a result of ICF funding

Please note that this methodology had some minor changes made to it in August 2016. These are largely clarification points around definitions for commitments and climate-relevance, in line with the Technical Working Group (2015) common understanding of the scope of mobilised climate finance and developments at the OECD DAC and other international organisations.</td></tr>
<tr><td>Type of indicator</td><td>Cumulative (individual years summed to total): report annual in-year totals only i.e. the amount legally committed in that year, summed at the end of the results template (logframe) to give a cumulative total for the current spending review period, the life of the programme and where results will occur outside the life of the programme for total programme benefits.</td></tr>
<tr><td>Key reporting requirements</td><td>Below is a list of key reporting requirements to keep in mind when making your returns. Further details are available in the text below:

<table>
<tr><th>Requirement</th><th>Summary</th></tr>
<tr><td>Is this a DRF indicator?</td><td>No</td></tr>
<tr><td>Available for reporting?</td><td>Yes</td></tr>
<tr><td>Methodology changes?</td><td>Yes</td></tr>
<tr><td>Units</td><td>£ legally committed in the 12 month period</td></tr>
<tr><td>Attribution</td><td>Pro-rata share of public funding</td></tr>
<tr><td>Disaggregation to be reported in results templates</td><td>• Origin of finance (i.e. donor/multilateral/developed country finance, vs partner country/developing country finance)</td></tr>
</table></td></tr>
<tr><td>Technical Definition / Methodological summary</td><td><u>Definition of public finance?</u>

Public finance transactions are defined as those from official (i.e. government) sources outside of the UK. This could include finance from other donors and partner governments, UN agencies and multilateral or regional development banks and investment agencies such as CDC or DEG. It excludes Sovereign Wealth Funds, private banks and other private finance defined in the note on Mobilising Private Finance.

The exact classification should be based on the OECD DAC definition: Official transactions are those undertaken by central, state or local government agencies at their own risk and responsibility, regardless of whether these agencies have raised the funds through taxation or through borrowing from the private sector. This includes transactions by public corporations i.e. corporations over which the government secures control by owning more than half of the voting equity securities or otherwise controlling more than half of the equity holders’ voting power; or through special legislation empowering the government to determine corporate policy or to appoint directors. Private transactions are those undertaken by firms and individuals resident in the reporting country from their own private funds[1].</td></tr>
</table>

[1] OECD DAC (2013), “Converged Statistical Reporting Directives for the Creditor Reporting System (CRS) and the Annual DAC Questionnaire”, OECD. Paragraph 13.

	<u>Basis of measurement: When should finance be reported?</u> Public finance should be reported at the point at which it is **committed, in the calendar year**. This should be based on the OECD DAC definition of a commitment: *A commitment is a firm written obligation by a government or official agency, backed by the appropriation or availability of the necessary funds, to provide resources of a specified amount under specified financial terms and conditions and for specified purposes for the benefit of a recipient country or a multilateral agency. Commitments are considered to be made at the date a loan or grant agreement is signed or the obligation is otherwise made known to the recipient (e.g. in the case of budgetary allocations to overseas territories, the final vote of the budget should be taken as the date of commitment)*[2]. **<u>Origin of public climate finance?</u>** (i.e. definition of donor/multilateral/developed country finance, vs partner country/developing country finance). Public finance can be from both donor/ developed country organisations, multilateral organisations, and also partner/ developing country institutions. The UK government considers it important to mobilise all sources of climate finance, however it is also valuable to understand from which origin and to which recipient finance is flowing. For this reason, we request you disaggregate the information into the four classifications below (and also provide more disaggregated information, as noted in the section below). International reporting on development finance to the OECD DAC has clear definitions, which also apply for this KPI: • Donor finance = OECD DAC bilateral finance providers (based on OECD DAC membership[3]), • Multilateral finance = OECD DAC multilateral finance (based on ODA eligible international organisations[4]), • Developing country finance = ODA eligible countries (based on the OECD DAC list[5], which is periodically reviewed). • Non-DAC donors = other finance providers, excluded from the definitions above. **<u>Recipient of public climate finance?</u>**

www.oecd.org/dac/stats/documentupload/DCD-DAC(2013)15-FINAL-ENG.pdf

[2] OECD DAC (2013), "Converged Statistical Reporting Directives for the Creditor Reporting System (CRS) and the Annual DAC Questionnaire", OECD. Paragraph 90. www.oecd.org/dac/stats/documentupload/DCD-DAC(2013)15-FINAL-ENG.pdf

[3] OECD DAC members: http://www.oecd.org/dac/dacmembers.htm

[4] OECD DAC Annex 2 List of ODA-eligible international organisations: http://www.oecd.org/dac/stats/annex2.htm

[5] OECD DAC ODA eligible international organisations: http://www.oecd.org/dac/stats/annex2.htm

Developing country recipients of public fiannce are definied as ODA eligible countries (based on the OECD DAC list, which is periodically reviewed[5]). [6]

Climate definition: What do we mean by 'for climate change purposes'?

Finance is defined as climate change-related based on the OECD DAC Rio Markers definitions for climate change adaptation and mitigation. All ODA spend is qualitatively assessed and 'tagged' under these definitions for ODA reporting, and these headline definitions are internationally recognised and drawn on by many other organisations and parties in their reporting on climate finance.

- **OECD DAC definition of climate change mitigation:** An activity that… contributes to the objective of stabilisation of greenhouse gas (GHG) concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system by promoting efforts to reduce or limit GHG emissions or to enhance GHG sequestration.
- **OECD DAC definition of climate change adaptation:** An activity that… intends to reduce the vulnerability of human or natural systems to the impacts of climate change and climate-related risks, by maintaining or increasing adaptive capacity and resilience. This encompasses a range of activities from information and knowledge generation, to capacity development, planning and the implementation of climate change adaptation actions.

For further information on the OECD DAC definition, eligibility criteria and indicative guidance please see the references noted below. Definitions and eligibility criteria from other relevant international organisations (e.g. Joint MDB Typology of Mitigation Activities, and the Intergovernmental Panel on Climate Change (IPCC), may also be appropriate to apply.

In addition, climate finance should exclude finance for coal-related power generation, except if related to Carbon Capture and Storage and/or Carbon Capture and Use (based on TWG, 2015).

Quantification: How should public finance be quantified?

All financial instruments are accounted for at cash face value, i.e. the full cash value of a loan committed (based on TWG, 2015).

In terms of the amount of finance reported you should exclude any part of the project which is easy severable and not related to climate change e.g. if the project is working with SMEs around

[6] Note – whilst the classification of "developed" and "developing" countries is unclear in the context of the UNFCCC 100bn goal, however most donors, including the UK to date have for the prupose of their individual reporting to UNFCCC defined developing countries as ODA eligible countries.

	improving their practices generally to achieve cost-savings but some of that includes energy efficiency then you should include that part which relates to energy efficiency. In addition other finance from individual countries and organisation's may have their own approaches to quantifying the climate-specific volume of an activity, i.e. in line with individual party reporting to the UNFCCC and the joint MDBs' climate component approach, which should be followed. **<u>Definition of "mobilised"?</u>** Mobilised is often also referred to as leverage. It is 'the process which occurs when the use of specified resources for a given objective causes more financial resources to be applied for that objective than would otherwise have been the case'. This definition requires that mobilised funds are either **additional** funds or are existing **funds diverted from another (more fossil-fuel intensive) use** to this objective. Mobilised resources could be: • Upfront co-financing below the point of UK investment i.e. resources committed to the project from other donors or partner governments <u>at the time of project approval</u>. See attribution section for details. • <u>Subsequent co-financing</u> below the point of UK investment i.e. resources mobilised after the project has been operating e.g. where early success encourages others to contribute. **<u>What about projects which HMG has indirectly influenced e.g. replication projects?</u>** These are too remote to claim to have mobilised. They will be captured via other indicators e.g. the International Climate Fund "influence" indicator. **<u>Additionality: What do we mean by 'as a result of DFID/HMG funding'?</u>** We need to demonstrate that the public funding would not have been provided in the absence of HMG funding. This assessment of **additionality** will require the judgement of the project/programme officer. HMG will be more likely to be able to claim additionality if it designed and led the project. **<u>Which currency exchange rate to use?</u>** Most project financing plans and data sources currently report international finance flows in USD ($). Finance is to be reported in GBP (£) for this KPI. The appropriate exchange rate to apply depends on the

	information available. As such, we propose the following hierarchy: 1) Use the exchange rate for the specific transaction, converting the currency on the rate at the time the finance was committed, if formalised/known; or, 2) Use the OECD exchange rate: The basis of measurement in DAC statistics is the US dollar. Data reported to the OECD DAC in other currencies are converted to dollars by the Secretariat. The list of exchange rates is published[7] annually and represents an average of the yearly exchange rates. These are however only for donor currencies, therefore, for other currencies; 3) Use the HMRC Average Annual spot rates for the year[8].
Rationale	On its own, ICF/HMG public finance will be insufficient to deliver our climate change objectives. This will require substantial amounts of public and private finance from other sources. This indicator seeks to measure the amount of 'other' (i.e. non ICF/HMG) public money 'mobilised' or catalysed for climate change as a result of HMG funding. Mobilisation of *private* finance will be assessed using a separate indicator.
Country office role	This will need to be done by country offices and other central departments e.g. PSD department and Regional Department programmes.
Data sources	Some data will be available directly from DFID programme data e.g. other donor contributions to programmes. However, this data will need to come from DFID project/programme officers: ARIES allows us to record other donor finance for joint funded programmes but not whether this is public or private. ARIES may also fail to record any subsequent co-financing. This information will need to be kept up to date by liaising with programme managers. In addition, the project/programme officer will need to make an assessment of the extent to which DFID finance has encouraged others to contribute/increase their contributions. We cannot automatically assume that all other public finance contributions are mobilised by DFID money. Partner country expenditure can be sourced from government systems (e.g. ministry of finance, ministry of environment).
Reporting organisation	DFID.
Formula/Data calculation	1. Identify HMG finance contribution 2. Identify total committed public co-finance and its origin (i.e.

[7] http://www.oecd.org/dac/stats/data.htm (under Data Tables)

[8] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/518917/average_spot_rates_310316.csv/preview

(including attribution rule)	other DAC donor/multilateral/international organisation/non-DAC or partner government finance) 3. Identify proportion of total public co-finance that would have been provided in the absence of DFID funding. The remainder provides an estimate of mobilised public finance. Count only public finance if it is truly additional or diverted to climate from other sources. See example 3 below. Where HMG are only funding part of the project with other donors who also came on board initially then it needs to share the public sector leverage claim (see Worked example 4 below). **Fund-level attribution** (i.e. at point of UK investment) should be applied for reporting expected and actual results and headline results/figures used in Business Cases (to ensure all projects can report on a consistent basis). This method involves sharing results across all donors that contribute to a fund. All results are attributable to the relevant fund (e.g. CIFs, CP3, GAP) regardless of whether these funds blend with other sources of finance in implementing projects at levels below the point of UK investment. For example, if the UK invests £25m into a fund that totals £100m of public money, the UK would claim 25% of the results from that investment. This applies to all results. The long term ambition is to develop the data availability to enable all projects to use the lowest/most direct level of attribution possible in the future (i.e. project level). Therefore, advisers should be working to develop sufficient data to calculate project level results reports, and where possible, provide this information now alongside headline Fund level results. To note, the distinction between attribution at the project level and at the Fund level (or at point of UK investment) is only an issue where the UK is investing in funds where there are multiple investment levels.
Worked example	1. DFID agree to match partner government funding for a programme to distribute efficient lightbulbs. Without the DFID contribution, the programme would not go ahead (a key element here is whether DFID designed and led the programme). In this example, a £10m DFID contribution leverages £10m additional public funding from the partner government. 2. A solar power station costing \$550m is being considered as an alternative to a coal-fired power station costing \$200m which the Government would have co-financed providing the same amount of power. The remainder of the finance is from the private sector. The local Government is putting in \$100m to the solar power plant. In this example, a \$50m DFID grant mobilised \$100m of local Government finance as we can demonstrate that the extra \$100m would otherwise have been spent on a non-climate use and would not have occurred without DFID's \$50m.

Most recent baseline	The baseline should reflect the situation prior to ICF funding being provided. For long running programmes the baseline should be taken as 2010, unless otherwise stated.
Good performance	High quantities of mobilised public finance can demonstrate that an initial DFID contribution has encouraged others to contribute (e.g. by reducing risks and/or overcoming barriers or influence).
Return format	Quantity of public finance mobilised (£), with explanatory text justifying assessment of additionality. For further disaggregation information see below.
Data dis-aggregation	Data to be disaggregated and reported in the ICF results template: - Origin of finance i.e. DAC donor/multilateral/international organisation/non-DAC or partner government finance - Theme finance is supporting i.e. adaptation, mitigation or both Data to be disaggregated as part of workings and Quest number provided: Disaggregation of the following variables will not be collected as part of the ICF results template. Please include disaggregated data in your working documents and record the Quest number for these documents in the ICF results template. - Origin of finance, detailed breakdown of origin above i.e. which DAC donor/multilateral/international organisation/non-DAC or partner government finance came from - Type of finance e.g. concessional debt, non-concessional debt, grant funds, equity and guarantees, donor financed climate funds etc.
Data availability	Programme officers should be aware when other donor finance is added to DFID-funded programmes, either directly or via communication with programme managers. Data on partner government contributions should be available at least annually. Data should be reported to the centre when available, or at a minimum, annually but care needs to be taken about not reporting the same public finance more than once.
Time period/ lag	There may be a lag between other donors pledging finance, and finance being committed to the programme. Finance should only be counted as 'mobilised' once it is committed (see OECD DAC definition above).
Quality assurance measures	Programme officers are asked to report on definitions, sources of data and assumptions regarding additionality, to allow central QA to ensure all reporting is consistent with the methodology note. If reporting officers have any concerns about the quality of data or any points that they think CED should be made aware of, then please note this in the ICF (and DRF) results templates. Any comments can usually be added into the free text columns on the far right of each template. Further guidance should be available in the commissioning note.
Data issues	Assessment of **additionality** (i.e. the extent to which DFID money has encouraged others to contribute) will need to be done

	on a case-by-case basis and will require the judgement of the project/programme officer. Need to avoid double-counting, for example the UK should not claim leverage of German money if the Germans are likely to do the same or MDBs' claiming to have mobilised UK money. This may be best done by liaison between donors. This becomes important if these indicators are to be aggregated at EU, OECD DAC or UNFCCC level. It is important to check that two different HMG funded programmes are not claiming to have mobilised the same $ of public finance. If in doubt about this, just make a note in your report of the double reporting risk. ARIES allows us to record other donor finance for joint funded programmes but not whether this is public or private
Additional comments	Key references: OECD DAC (2013c), "Converged Statistical Reporting Directives for the Creditor Reporting System (CRS) and the Annual DAC Questionnaire – Addendum 2"[9], Annex 18 Rio markers. [NOTE THERE IS EXPECTED TO BE AN UPDATE.. – FOR DFID TO UPDATE] OECD DAC (2016), "Indicative table to guide rio marking by sector/sub-sector: Climate change adaptation and climate change mitigation"[10]. Joint-MDB (2015a), "Common Principles for Climate Mitigation Finance Tracking"[11] Joint-MDB (2015b), "Common Principles for Climate Change Adaptation Finance Tracking"[12] Technical Working Group (2015), "Accounting for mobilized private climate finance: input to the OECD-CPI Report", September 2015[13].
Leads	Statistical advisor: Alex Feuchtwanger (DFID) a-feuchtwanger@dfid.gsx.gov.uk Subject matter lead: Seb Meaney (DFID) S-Meaney@DFID.gov.uk

[9] www.oecd.org/dac/stats/documentupload/DCD-DAC(2013)15-ADD2-FINAL-ENG.pdf
[10] http://www.oecd.org/dac/environment-development/Indicative%20table%20to%20guide%20Rio%20marking%20by%20sector.pdf
[11]http://www.worldbank.org/content/dam/Worldbank/document/Climate/common-principles-forclimate-mitigation-finance-tracking.pdf
[12] http://www.eib.org/attachments/documents/mdb_idfc_adaptation_common_principles_en.pdf
[13] http://www.bafu.admin.ch/dokumentation/medieninformation/00962/index.html?lang=en&msg-id=58589

<table>
<tr><td>Short title</td><td>ICF KPI 14: Level of institutional knowledge of climate change issues as a result of ICF support

Please note that supporting evidence of subjective scores also needs to be reported. This should take the form of a qualitative/narrative report against the scorecard questions setting out the evidence for any change in scores over time.</td></tr>
<tr><td>Type or Indicator</td><td>Scorecard</td></tr>
<tr><td>Key reporting requirements</td><td>Below is a list of key reporting requirements to keep in mind when making your returns. Further details are available in the text below:

<table>
<tr><th>Requirement</th><th>Summary</th></tr>
<tr><td>Is this a DRF indicator?</td><td>No</td></tr>
<tr><td>Available for reporting?</td><td>Yes</td></tr>
<tr><td>Methodology changes?</td><td>No</td></tr>
<tr><td>Units</td><td>Scores per question i.e. 0, 1 or 2
Total of question scores i.e. 0 to 10</td></tr>
<tr><td>Attribution</td><td>NA</td></tr>
<tr><td>Disaggregation to be reported in results templates</td><td>• Individual question scores</td></tr>
</table></td></tr>
<tr><td>Technical definition/ Methodol-ogical summary</td><td>This indicator is designed to capture the extent to which climate change planning is informed by knowledge of climate change in general and specific knowledge relating to methodologies for integrating or mainstreaming climate change into planning, and the extent to which planning staff are trained in relevant areas.

The indicator can be used to assess the performance of an individual capacity building programme, through evaluation of the target system (e.g. ministry, sector, institution) at the beginning, during, and at the end of the programme.

The indicator may also be used to assess institutional knowledge in systems targeted by multiple programmes.

Assessments will need to be supported by evidence that any improvements are attributable to the programme(s) in question.

The indicator is viewed as an <u>outcome</u> indicator, based on DFID's Theory of Change for Adaptation, as it examines the outcomes at the level the target system resulting from the outputs of a programmes.

The indicator takes the form of a scorecard based on five criteria relating to the level of knowledge and training in climate change in general, and in mainstreaming methodologies in particular, among staff involved in planning. These criteria are expressed as questions that ask to what extent the criteria have been met: not at all ("NO"), partially ("PARTIAL"), or to a large extent/completely ("YES").

An overall score is calculated, as the number of "PARTIAL" answers plus the number of "YES" answers, with each of the former scoring 1 and each of the latter scoring 2, giving a maximum score of 10.

The indicator scorecard is set out in <u>the table below.</u></td></tr>
</table>

CRITERIA/QUESTIONS	NO (0)	PARTIAL (1)	YES (2)
1. Does planning involve individuals with some awareness of climate change?			
2. Does planning involve individuals with formal training in climate change issues?			
3. Does planning involve individuals who have attended accredited courses on climate change, development, planning and "mainstreaming" issues?			
4. Is integration of climate change into planning overseen by individuals with in-depth knowledge of integration/mainstreaming processes?			
5. Are numbers of people with required training involved in planning processes adequate?			
SCORE (No. of "YES" answers x 2, plus no. of "PARTIAL" answers x 1)			

Methodological points to note

1. This indicator has been constructed to be a "general" climate change indicator that may be applied to either adaptation or mitigation / low-carbon development. "Climate change issues" therefore may be issues related to adaptation and/or mitigation/LCD. It is not recommended that assessment of adaptation and mitigation is combined in a single assessment, as performance may be significantly different in these two areas, and the lack of specificity would make the indicator of limited use.
2. The indicator is used to **assess systems targeted by one or more programmes**, and is an outcome indicator, which will be assessed at the beginning, during, and at the end of a programme (where the outcomes resulting from a single programme are to be assessed), or at regular intervals (e.g. annually) where the cumulative results of multiple programmes are to be assessed. Where the indicator is applied to a targeted system, improvements in scores will need to be complemented by supporting qualitative evidence in order to demonstrate attribution (e.g. narratives, testimonials, other evidence of causal relationships).
3. Awareness of climate change [Question 1] refers to general awareness of the existence of climate change and its potential impacts at different scales.
4. Formal training in climate change [Question 2] includes graduate-level training or professional training that includes climate change components/content. Such training may focus on the scientific

	aspects of climate change without extending to the implications of climate change for development. 5. Accredited courses [Question 3] are courses that have been approved by DFID, and should address the links between climate change and development, with attention to adaptation and mitigation issues as relevant in the context of the ICF, as well as issues relating to the integration or mainstreaming of climate change into development planning and practice. 6. Integration or mainstreaming [Question 4] is an emerging field of practice and knowledge in its own right, and it is important that those responsible for ensuring that climate change is addressed in planning have sufficient knowledge of mainstreaming processes. Mainstreaming typically involves screening of initiatives for climate risks; commissioning an external climate risk assessment (CRA) for high-risk initiatives; evaluating the viability of high-risk initiatives; identifying, prioritising and implementing risk reduction (mitigation or adaptation) measures for initiatives that are viable but where risks have been identified; the development of monitoring and evaluation frameworks for tracking progress; and evaluation and learning. 7. Climate change mainstreaming and effective risk management will require that a sufficient number of planning staff, at a variety of levels, understand climate change contexts, risks and mainstreaming processes, and are able to address these in the development and implementation of planning processes [Question 5]. Guidance on answering the questions that make up the indicator is provided in the table below.

	Conditions necessary for answer of:		
Q	NO	PARTIAL	YES
1	There is little or no general awareness of climate change issues among planning staff.	Some staff are aware of climate change but awareness is limited, in terms of both numbers of staff and depth of knowledge. Climate change is still seen by some/many as an environmental issue.	There is a high level of awareness of climate change and (i) what it means in terms of potential risks to development, and/or (ii) mitigation issues including stabilisation targets (2°C) [depending on adaptation or mitigation assessment focus].
2	No staff have any formal training in climate change.	A few staff have training in general climate change issues (e.g. science, policy), but they are not in key roles and impact of their knowledge is limited.	Many and/or key staff have formal climate change training (e.g. science, policy, etc).
3	No staff have attended accredited courses.	A few staff have attended accredited courses, but impacts are limited due to their not being in key positions.	Key staff in positions of influence have attended accredited courses.
4	No staff have experience, knowledge or training in mainstreaming processes.	Some staff have experience, knowledge, or training in mainstreaming, but they do not have responsibility, or are not empowered, to promote mainstreaming.	Mainstreaming of climate change is overseen by staff with relevant experience, knowledge or training (see previous Qs), who are empowered to integrate climate change into planning.
5	The number of staff with relevant training in climate change issues is small (or zero), and these staff have very limited impact.	A proportion of staff have relevant training, but they are insufficient in number to ensure routine integration of climate change into planning.	Staff are generally familiar with climate change issues and comfortable with mainstreaming processes, with many having relevant training.

Rationale	For planning processes and mechanisms to be implemented effectively, planning staff need to have a grasp not only of climate change issues at large (scientific contexts, impacts, adaptation, mitigation, etc), but also of mainstreaming/integration processes and mechanisms. This includes familiarity with screening processes and climate risk assessments (CRAs) (e.g. the different ways of doing a CRA, how to prepare terms of reference for an external CRA, etc), as well as the identification, prioritisation, implementation and evaluation of risk reduction/ adaptation measures. These are areas of expertise in their own right, and the emerging nature of these areas means that significant capacity building specifically targeted at mainstreaming will be required for the effective integration of climate change into planning.
Country office role	The role of Country offices (COs) will depend on how the indicator is targeted (e.g. whether it is used to assess a specific programme or in a wider sectoral or national assessment). Several roles for CO staff can be envisaged: 1. Using the scorecard to assess a system (e.g. sector) targeted by one or more programmes. 2. Providing quality assurance for assessments performed by implementing partners. 3. Providing support for external consultants conducting screening of programmes or budget support.
Data source	Where assessments using planning indicators are carried out by external consultants, they will be based on consultations with CO staff and DFID development partners and national governments. Where assessments are carried out by COs themselves, they will be based on the judgment of key CO staff with responsibility for supporting the national processes and sectors in question, e.g. through sector budget support.
Data included and data aggregation	Where the indicator is used to report on a single programme, the data reported will be the score calculated across all criteria/questions that make up the indicator (up to a maximum of 10), applied to the system targeted by the programme. The scorecard should be completed at the beginning of the programme, during the programme (e.g. annually in the logframe), and at the end of the programme. Outcomes will be assessed on the basis of changes in the score over time, over the lifetime of the programme. To assess the outcomes of multiple programmes in a single country or sector, the data reported will be the score calculated across all 5 questions for the target system (e.g. country, sector). For such assessments, the scorecard should be completed on a regular basis. This might be done annually by the CO or its partners.
Most recent baseline	The baseline should reflect the situation prior to ICF funding being provided. Ideally baselines would be set at the start of a programme (for assesment of an individual programme) or during screening as part of a wider assessment (i.e. by country or sector). It is acceptable to produce retrospective baseline scores if able to use and produce documentation that supports these.

Good performance	The public should be looking to see countries receiving capacity building support (including GBS or SBS) improve their overall score over time (indicator scores calculated at the national level or for those sectors receiving support), and evidence that these improvements are due in whole or in part to DFID programmes.
Return format	1. Overall scores (0 to 10) broken down by scores for individual questions (0 to 2).
Data dis-aggregation	Data to be disaggregated and reported in the ICF results template: - Individual question scores i.e. for question 1 through 5 (score of 0, 1 or 2) Data to be disaggregated as part of workings and Quest number provided: Disaggregation of the following variables will not be collected as part of the ICF results template. Please include disaggregated data in your working documents and record the Quest number for these documents in the ICF results template. - Work to assess and moderate the quality of evidence used to support the scores for each of these questions will be carried out by CED during 2013. Please keep all evidence used in making your assessments and record the Quest number for these documents in the ICF results template. **Please note**: it is a mandatory requirement to list if each response is for an individual programme or multiple programmes in a single country or sector. There is a pull down box below the title of KPI 13 in the ICF results template where you can record this answer. This answer will be the same for KPI 14 so this only needs to be entered once.
Data availability	The indicator is based on the judgment of those assessing programmes/target systems (programme managers, other CO staff such as climate change advisers, implementing partners, or external consultants screening programmes or budget support). Guidance is provided on how to complete the scorecard, based on criteria for different answers for each question making up the indicator. Data are therefore based on one or more of the following: (i) the informed judgment of DFID CO staff, IP staff, or external consultants, (ii) knowledge of programmes and target systems (CO and IP staff), (iii) consultations with stakeholders (who will include CO and IP staff if the assessment is carried out externally). The availability of reliable data therefore will depend on the level of knowledge of CO and IP staff, and/or on the quality of consultations. However, there should be sufficient knowledge among CO and IP staff to ensure that the scorecard is completed realistically.
Time period/ lag	Where this indicator is applied in the context of individual programmes, it should be assessed annually in programme logframes, based on assessment of the target system(s). The indicator can also be applied to target systems (e.g. national systems, sectors, ministries, etc) on a regular (e.g. annual or biennial) basis, for example where these systems receive budget support.
Quality	Where this indicator is assessed by the CO, an independent

assurance measures	assessment might be performed during an SPR, by external experts. The answers to the 5 questions constituting the indicator should be justified by some explanation, e.g. describing the nature of the screening or mainstreaming processes, and giving examples of measures to address climate change. Work to assess and moderate the quality of evidence used to support the scores for each of these questions will be carried out by CED during 2013. So please keep all evidence used in making your assessments and record the Quest number for these documents in the ICF results template. If reporting officers have any concerns about the quality of data or any points that they think CED should be made aware of, then please note this in the ICF results templates. Any comments can usually be added into the free text columns on the far right of each ICF results template. Further guidance should be available in the commissioning note.
Data issues	It is recognised that some element of subjective judgment is required, although the questions have been designed to be quite specific and transparent, with supporting guidance on how to answer the questions. In some cases data may be based on implementing partners' own assessments.
Additional comments	This indicator will be piloted under the *Tracking Adaptation and Measuring Development* (TAMD) framework between mid-2012 and late 2014. This indicator might be complemented by quantitative indicators that can be applied directly to the programme itself (see annex of DFID *Rapid Scoping of Climate Change Indicator Methodologies* report, June 2012).
Lead	Statistical advisor: Alex Feuchtwanger (DFID) a-feuchtwanger@dfid.gsx.gov.uk Subject matter lead: Juliet Field (DFID) j-field@dfid.gov.uk

<table>
<tr><td>Short title</td><td>ICF KPI 15: Extent to which ICF intervention is likely to have a transformational impact</td></tr>
<tr><td>Type of indicator</td><td>Scorecard</td></tr>
<tr><td>Key reporting requirements</td><td>Below is a list of key reporting requirements to keep in mind when making your returns. Further details are available in the text below:

<table>
<tr><th>Requirement</th><th>Summary</th></tr>
<tr><td>Is this a DRF indicator?</td><td>No</td></tr>
<tr><td>Available for reporting?</td><td>Yes</td></tr>
<tr><td>Methodology changes?</td><td>No</td></tr>
<tr><td>Units</td><td>Box marking i.e. 0, 1, 2, 3 or 4</td></tr>
<tr><td>Attribution</td><td>NA</td></tr>
<tr><td>Disaggregation to be reported in results templates</td><td>NA</td></tr>
</table></td></tr>
<tr><td>Technical Definition / Methodological summary</td><td>Assessment of the extent to which ICF climate change activities are likely to have a transformational impact on developing countries

<u>Technical Definition</u>

Transformational change is complicated and multifaceted. At its core it is change which catalyses further changes, enabling either a shift from one state to another (e.g. from conventional to lower carbon or more climate-resilient patterns of development) or faster change (e.g. speeding progress on cutting the rate of deforestation). However, it entails a range of simultaneous transformations to political power, social relations, markets and technology.

Many of the transformations the ICF is seeking to bring about will only be evident with a lag. Though it will be necessary to monitor these longer-term changes, most are unlikely to materialise within the period of the ICF. <u>This indicator therefore tracks early signs of transformation, or the extent to which key ICF activities either are being, or have a good likelihood of being, transformational</u>. It does so by using proxies for drivers of transformation, to assess the extent to which ICF support can be linked, if not attributed, to likely transformational change.

These proxies (henceforth called the ‘criteria’, as set out in the ‘Formula/data calculation’ section) are based on a Theory of Change for transformation (set out in the ‘Rationale’ section).

<u>Summary of methodology</u>

This is a mainly qualitative process indicator. <u>The expectation is that it will normally be assessed at the level of a significant ICF programme, or country / thematic portfolio, rather than for individual projects</u>.

This KPI will be assessed through two approaches:

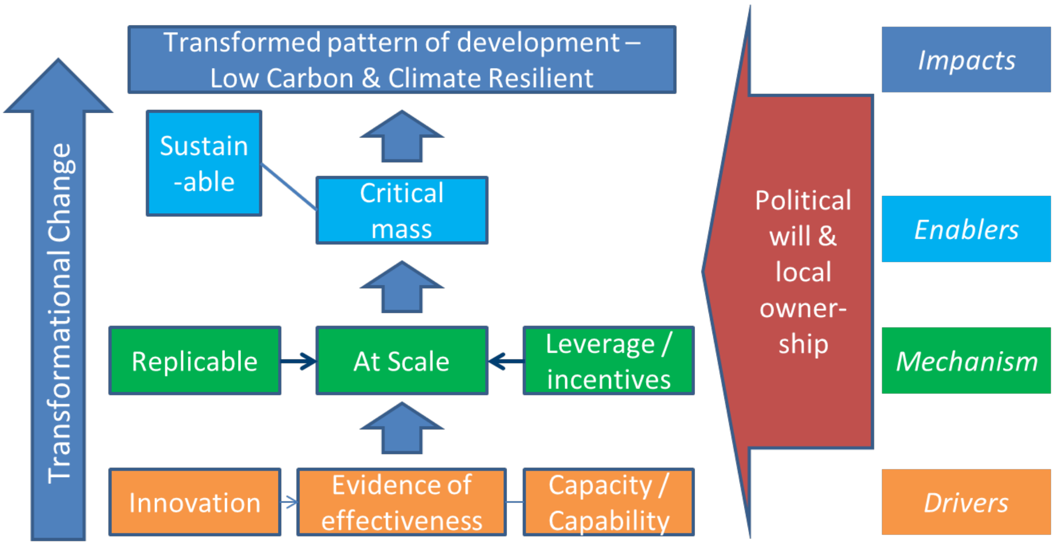
a. <u>At programme or portfolio level</u>

Expected results
<u>A qualitative assessment of the type and nature of expected transformational change should be provided at the start of the programme (or portfolio of programmes)</u>. This assessment should be guided by the criteria included in the ‘formula / data calculation’ section. It is not necessary to provide a box marking for the expected result at this stage, the assumption being that this would be ‘4 – transformation judged very likely’, since all ICF programmes are designed to be transformational.</td></tr>
</table>

	Actual results ICF programme / portfolio managers should provide at each results reporting: • An overall box marking giving an assessment of the likelihood that transformation linked to the ICF support will occur. Where there is more than one related ICF project in a country, regional or sector portfolio, the box marking should be presented at this more aggregate level, to reflect expected synergies (and reduce the risk of double-counting): 0 — Transformation judged unlikely 1 — No evidence yet available - too soon to revise assessment in business case 2 — Some early evidence suggests Transformation likely 3 — Tentative evidence of change – transformation judged likely 4 — Clear evidence of change - transformation judged very likely • A qualitative/narrative report against the relevant criteria of transformational change (see 'formula/data calculation' section below), with supporting evidence of change in those criteria, using programme (or portfolio)-specific sub-indicators. In many cases these will be drawn from the logframes of projects which comprise the portfolio. The box marking should flow from this review of the evidence. This requires ICF programme managers to: (i) define for their intervention what successful transformation would look like, and which of the criteria are relevant to report against (see 'Worked Example section' below); (ii) identify programme-specific sub-indicators (e.g. drawing on logframes) related to each of the relevant criteria for transformational change, which can be used to monitor the transformational effects of the programme / portfolio. Some possible approaches are suggested in the 'formula/data calculation' section below; (iii) provide a narrative assessment against each of the relevant criteria, using progress against the sub-indicators and any other supporting evidence; (iv) assess transformational change against the KPI scorecard – it is suggested that each relevant criterion is scored, and builds to an overall assessment. <u>*Consideration of contribution / attribution*</u> While it may be possible to *attribute* change in some of the TC criteria to ICF activities, it is expected that in many cases it will only be possible to track *contribution* to a wider effort. As far as possible, reporting should be at the level of a significant programme or country (or similar) portfolio, to help ensure that the links between different activities are understood, and an assessment made of the likelihood that a critical mass of support for change is emerging. The indicator seeks to track the transformational impact of HMG climate change "activities". Though the bulk of these will involve bilateral funding through the ICF, it will be important to recognise the role of wider influencing and policy support provided by HMG staff in ICF countries. The contributions of others to the likely transformational change - notably national governments, but also other donors and organisations - should also be recorded as part of expected and actual results.

	The methodology acknowledges that some ICF activities may inadvertently have an adverse effect on transformational change (pilots might go wrong and undermine the case/support for change; interventions may build capacity in one area by denuding it in another, etc.). It will be important that the evidence presented is balanced and also reported on any such negative influences. To the extent possible the evidence provided should draw on third party assessments and, ideally, be triangulated (i.e. come from multiple sources, viewpoints and types of data), to minimise the risk of self-assessment bias. *b. At level of the overall ICF* The central ICF M&E team will: • produce a report which draws on the project/programme box markings and supporting evidence to show what proportion of projects and spend are expecting to contribute to transformational change, and how likely this is judged to be; highlighting which parts of the overall ICF portfolio appear to be most likely to foster transformational change. • formally evaluate on an on-going basis a sample of the projects or programmes which expected at the time of approval to be associated with transformational change. This will be undertaken as part of the ICF fund level evaluation, which will utilise programme level monitoring and evaluation data. This formal evaluation will have two objectives: to allow a more in-depth assessment of the factors associated with the likelihood of transformational change; and, to provide an independent check on the projects' and programmes' self-reporting, and so assess – and hopefully moderate – possible optimism bias in the qualitative self-reporting. It is not proposed that transformational change evidence be aggregated at the overall ICF level in the same way as other ICF KPIs. Although the results will be synthesised, this will be to identify patterns and trends as a means of assessing overall progress (and to tease out lessons), rather than to form a view on the ICF's expected future global transformational impact. In aggregating the box markings, all programmes will be weighted equally. This KPI therefore adopts a qualitative approach to monitoring (not measuring) likelihood of transformation, relative to expected change.
Rationale	Background to this indicator ICF resources for climate change are but a very small part of the financing required to help developing countries build resilience and shift to lower carbon patterns of development. The ICF will have greater impact if it can be 'transformational' by, for example, encouraging others to replicate activities, and facilitating institutional and policy change. A challenge for this indicator is to capture these different, often country-specific, dimensions of transformational change, while remaining sufficiently simple so as to be unambiguous. The indicator recognises that transformation is multi-dimensional and that it will not be able to capture everything that, in time, may contribute to transformational change. Rather, the objective is to capture enough evidence to form a reasonable qualitative picture of ICF effectiveness in this area. The indicator is based on a number of premises and: • uses proxies (criteria) to assess the extent to which ICF support is linked to changes which are pre-conditions for subsequent transformational change; • links these criteria to the likelihood of transformational change using a simple theory of change;

	• accepts that it is neither possible nor necessarily desirable to try to attribute transformation to all ICF activities in all cases. Theory of change This note proposes that the ICF is likely to be more transformational in developing countries if several of the following criteria prevail (and at least one criterion for each different level of the theory of change – see diagram below for details): • ***Political will and local ownership****: need for the change is agreed locally and the process is locally owned*. For widespread changes, notably changes to the patterns of development, this will require high level political buy-in and broader support from across society; • ***Capacity and capability can be increased****: countries and communities have the capacities and capabilities necessary to bring the change about*; • ***Innovation****: innovative technologies are piloted, with the potential to demonstrate new ways of doing things, which could lead to wider and sustained change;* • ***Evidence of effectiveness is shared****: approaches which have proved successful in one location are made widely available and lessons on their usefulness are credible and shared widely*; • ***Leverage / create incentives for others to act****: the costs of climate action are reduced to the point that acting on climate is a sensible decision for commercial firms and private individuals*. These cost reductions may need to be steep enough to overcome behavioural inertia; • ***Replicable:*** *good ideas piloted by the ICF are replicated by others in the same country and more widely*; • ***At scale****: interventions (such as national, sectoral or regional programmes) that have sufficient reach to achieve institutional and policy reform, or drive down costs of technology deployment;* • ***Sustainable****: change is likely to be sustained once ICF support ends*. Ultimately, many truly transformational changes will require a ***critical mass***, to overcome political, market and other sources of inertia. Many of the points above relate to achieving this critical mass and the more of the above an intervention can promote, the greater the likelihood that it will lead to transformational change. In time, it will be necessary to complement this process indicator with outcome and impact indicators which track the extent to which there has been national transformational change in public and private action on climate change. However, these changes are unlikely to materialise within the period of the ICF and it will only be possible in exceptional circumstances to attribute this wider change to HMG/ICF efforts. The Theory of Change for Transformational Change is represented simply in the diagram below. This groups the TC criteria at three different levels (drivers, mechanism and enablers).

	Theory of Change for Transformational Change: 
Country office / programme manager role	The locally-specific conditions for transformational change mean there is a key role for country offices in leading, or at least contributing to, reporting against this indicator. Specifically, reporting at programme level is the responsibility of the programme manager. If the assessment is to be made at portfolio level, this should be undertaken by the country (or other) portfolio manager, and agreed between individual project leads where necessary. This indicator will rely in part on evidence and data collected in support of other KPIs and project / programme indicators (e.g. financial flows catalysed). However, because transformational change will be measured as impacts beyond individual projects, there is a need to go beyond routine project monitoring to understand, contextualise and interpret this information.
Data sources	There will be multiple in-country sources for the self-assessment: • <u>personal contacts</u>, e.g. with government officials, other donors seeking to replicate ICF-supported activities and with private investors; • <u>partner Government policy statements and budget</u> to track changes in political will and capacity to act; • <u>analysis of others' reports</u> for example World Bank reports on government policy and on the business environment; • <u>project monitoring reports</u> may contain relevant information on capacity development, policy implementation etc. Independent evaluation at programme and fund level will be able both to cross-check these sources with other information and go into more detail to assess the evidence on e.g. whether or not the costs of acting on climate change are falling in a country and, if they are, the extent to which this is attributable to measures in that country of part of a wider regional or global trend.
Reporting organisation	ICF Secretariat.
Data included	Qualitative self-assessment: box marking and supporting evidence.
Formula/ Data calculation	This is primarily a qualitative indicator. It will be assessed against a number of criteria of the likelihood of transformational change, which are drawn from the ICF transformational Theory of Change set out above (and consistent with the criteria used in ICF bidding round guidance).

Though the table also suggests the sorts of evidence which could be used to assess each criterion, programme managers should treat these as a guide and think carefully about what sorts of evidence are most relevant to their particular programme and local circumstances. This is important given that the barriers to systemic change are often local or specific to particular sectors.

What follows is intended both as a possible source to draw on, and as examples to stimulate programme managers to come up with better and programme / portfolio specific, locally-relevant measures. The categories are not intended to be of equal importance, and may not all be relevant in every case. However, an absence of some (notably ‘political will’ and ‘capability and capacity’) are likely to be major constraints on transformational change. ‘Replication’, though clearly important, is likely to be a later stage indicator. In turn, ‘sustainability’ is likely to rely on changes to many of the other criteria to be a truly transformational change.

Ideally, the sources of evidence by which the criteria will be assessed would be set out in the logframe in the initial Business Case. If not, then they should be formulated at the time a baseline is set for the intervention’s expected transformational change.

Criteria	**Approach and examples of indicators to assess by:**
Political will and local ownership Fostering political will to act on climate change	Partner government is acting on climate change, as evidenced by: • the tracking of influencing activities by HMG staff *[see note on evaluating influence by DFID evaluation dept]*; • the quality of any national climate change strategy or similar, including whether this has been costed and included in the national budget, whether any proposals it contains for regulatory changes are being or likely to be implemented, whether the Ministry of Finance and key line ministries are actively tracking indicators of national change (via nationally formulated KPIs or similar), etc.; • research provided through ICF activities informing debates on climate change in national parliament or similar; • stakeholder engagement events organised by national government on climate change issues • civil society efforts to foster informed debate on climate change [as measured by newspaper column inches, twitter tweets etc.] • other [defined by programme or project]
Capacity and capability increased ICF-supported activities enhance local capacity to act on climate change	Evidence from HMG ICF country offices and spending units of one or more of the following: • Number of Government Depts or agencies undertaking own analysis of climate action following HMG support; • number of sector and national plans under implementation that mitigate risks and ensure adaptation to climate change by poor people; • Institutions important for addressing the new challenges climate change will pose are supported by HMG either to evolve or emerge; • HMG support makes developing country negotiators more influential in international negotiations;

			• Relevant capacities developed in the private sector [e.g. creation of/ support for effective trade associations supporting low carbon firms, building the capacity of financial intermediaries better to understand/assess the risk-reward profile of new technologies or energy efficiency, etc.]; • Increase in number of peer reviewed climate change publications by UK-supported local research bodies; • other [defined by programme or project]
		Innovative HMG-supported activities are encouraging innovation and testing new approaches.	Could include: • Number of domestic low carbon technologies supported *[where evidence can be taken from the low carbon KPI of this name]* • Number of domestic adaptation technologies supported; • Number & potential scope of new policy approaches tested; • Number & potential scope of new business models being tested and adopted; • Number of new market mechanisms for achieving emissions reductions piloted
		Evidence of effectiveness Ideas and lessons shared widely.	• Number of activities (e.g. workshops, key publications) delivered to disseminate programme experience, with evidence of take-up • other [defined by programme or project]
		Leverage / create incentives for others to act HMG-supported activities are creating the incentives for others to act on climate change.	Could include: • Policy and regulatory reforms initiated through HMG-supported activities cut costs for private investors (e.g. where we've supported the removal of regulations that hindered investment (could be support to allow independent power providers to operate & sell to grid)); • Development and introduction of policies and regulations supported which provide positive incentives for new approaches (e.g. where we've supported the development and implementation of a FiT); • Evidence that public goods provision supported by UK ODA encourages investment by others (e.g. new investments behind strengthened flood defences, private investment decisions informed by publicly available UK-supported climate projections, etc.) • other [defined by programme or project]
		Replicable HMG-supported activities are being replicated by others.	• Number & value of UK-developed approaches being copied by others [tracked in initiating country or region?] • Value of co-financing attracted into UK-initiated interventions • Volume of public finance leveraged *[public finance leveraged indicator]**

<table>
<tr><td></td><td></td><td>• Volume of private finance leveraged [use private finance leveraged indicator]*
• other [defined by programme or project]
* These measures could equally fit under the ‘leverage/ incentives for others to act’ criterion. Which one the programme manager chooses to put them under will depend on what elements of the generic theory of change are most relevant to the portfolio in question</td></tr>
<tr><td></td><td>At Scale</td><td>Ideally this will be a quantitative assessment of resources mobilised relative to the magnitude assessed as necessary to effect the desired change. It will be location and context-specific.
Such measures may well draw on other criteria and could include:
• Proportion of population at risk who resilience is judged to have been markedly improved [drawing on other relevant KPIs]
• X% of infrastructure at risk built to higher standard [eg X% of roads constructed or up-graded to cope with a 1 in X years rain storm]
• A particular renewable technology accounts for X% of market share
• X% of potential farmers are able to access a particular improved seed variety, or Y% of farmers have been trained in new adaptive or lower carbon practices</td></tr>
<tr><td></td><td>Sustainable
Activities are likely to be sustained once HMG funding ends.</td><td>A view on the likely sustainability of ICF-funded activities could comprise a synthesis of the evidence presented on each of the indicators listed above (and should certainly draw on the other criteria).
Where relevant other evidence should be included in this assessment [defined by programme or project].</td></tr>
<tr><td>Worked example</td><td colspan="2">It is suggested that the format for this qualitative report be as follows:
Expected Results
<u>At the start of the programme</u>, define what successful transformation looks like for the programme / portfolio (including its Theory of Change) and the key stakeholders involved; which of the TC criteria are relevant to report against; and the programme /portfolio-specific sub-indicators (steps 1-5):
1. What interventions comprise the programme or country / thematic portfolio?
[This step should list and very briefly describe – at impact and outcome levels and noting £values – the projects or programmes comprising the portfolio. This may be wider than just ICF programmes and include other influencing activities.]
2. What is the baseline that transformational change is being assessed from?
[This should not really require any extra analysis further to the Strategic Cases of the main interventions comprising the portfolio, but may need amending if new projects are added to the portfolio, which address new issues.]
3. What is the theory of change that links the programme / portfolio activities and the expected transformational change?</td></tr>
</table>

<table>
<tr><td></td><td>

[Though this step will clearly draw heavily on the theories of change of the main interventions that make up the portfolio, it may require additional work given it should sit above those interventions. But if done right, the project ToCs should be nested within this overall one.]

4. Who else is crucial for ensuring this transformational change?

[This step contextualises the UK support and allows a political economy analysis of the change to be summarised. Other stakeholders could be considered in terms of a) those whose engagement is a necessary pre-condition for change; b) those who have been (or need to be) engaged during implementation; c) those who are not essential but whose engagement presents opportunities which can / have been made use of. This may need amending as additional key players are identified during programme / portfolio implementation.]

5. What will successful transformational change look like; when is it expected to occur; and how will it be assessed?

[This step has two purposes: (i) to set out what eventual impact is expected and when (drawing on impact statements of the interventions comprising the portfolio); (ii) to set out the criteria and sub-indicators to be used to assess the likelihood of TC, drawing on relevant indicators and KPIs from project / programme logframes.]

Actual Results

<u>At each reporting round</u>, provide a narrative and scorecard assessment of progress towards transformation (steps 6-7):

6. Narrative assessment of likelihood that the programme / portfolio will lead to the intended transformational change.

[This should report against the definition, criteria and sub-indicators of expected transformational change set out in steps 1-5. The evidence and sub-indicators should be grouped under the categories set out in the ToC diagram presented earlier. It may be helpful to score each individual criterion, to build up to the overall assessment. All assessments need to be evidenced and carefully referenced.]

7. Overall assessment of likelihood that programme / portfolio is transformational.

<table>
<tr><td>0</td><td>Transformation judged unlikely</td></tr>
<tr><td>1</td><td>No evidence yet available - too soon to revise assessment in business case</td></tr>
<tr><td>2</td><td>Some early evidence suggests Transformation judged likely</td></tr>
<tr><td>3</td><td>Tentative evidence of change – transformation judged likely</td></tr>
<tr><td>4</td><td>Clear evidence of change - transformation judged very likely</td></tr>
</table>

[The score should be based on an assessment of evidence assembled against relevant criteria of transformational change. Where there is evidence against criteria at more than one level of the TC theory of change (see 'Rationale' section), it will be possible to justify a rating of greater certainty. It is important that the likelihood of an ICF activity's potential negative impact on transformational change is also considered. If judged sufficiently large to offset any positive influences, this could justify the 'transformation judged unlikely' score. The quality/credibility of evidence should be taken into account when weighing up information from different, and possibly conflicting, sources.]

</td></tr>
<tr><td>Most recent baseline</td><td>The baseline should reflect the situation before the ICF project activities start. An assessment against the relevant criteria should ideally be included in the Business Case or, if not, one should be made at the start of the project. It is acceptable to produce retrospective baseline scores if there is documentation to support these.</td></tr>
</table>

Good performance	Where definitive, triangulated evidence is presented on more than one criterion, and against criteria at more than one level of the TC theory of change, it will be possible to justify a rating of greater certainty. Where there is credible evidence of change that is more directly attributable to ICF activities then this will also tend to strengthen the performance assessment. However, some of the impacts to be tracked will be in response to multiple stimuli; there will, therefore, be limits to the extent of change that any HMG-funded initiative could reasonably attribute to itself.
Return format	The self-assessment box marking (for each relevant criteria and an overall marking) with explanatory text presenting evidence of transformation against relevant criteria, both to justify the assessment and assess the reliability of the evidence.
Data dis-aggregation	Self-assessment box markings should be completed for each major stand-alone climate programme in a country/portfolio (i.e. for all projects comprising an adaptation or low carbon portfolio). Where all projects/programmes are considered as synergistic and contributing to a single form of transformation (i.e. where the intended transformational change is towards patterns of development which are simultaneously low carbon <u>and</u> climate resilient) then only one self-assessment should be completed. In either case, the explanatory text should present evidence on specific individual projects which have caused or contributed to the specific transformation(s).
Data availability	The self-assessment and qualitative reporting will rely on in-country HMG staff being well connected (with other donors and, ideally, private investors) and knowledgeable about how climate change policy is made in that country. This knowledge should routinely be held between HMG in-country climate advisers and FCO staff. This indicator will rely in part on evidence and data collected in support of other indicators in the logframe.
Time period/ lag	We can anticipate a lag between the start DFID-funded activities and evidence of transformation effects. This lag will differ by type of country and nature of the HMG activity. The qualitative criteria have been designed to capture changes which could be expected to start in the life of the ICF. Indeed, too short a lag may question the extent to which change can be attributed to HMG activities.
Quality assurance measures	<u>Risks and Challenges</u> (see also Data issues section below) Care will be needed to minimise the risk of undue subjectivity. Use of consistent criteria (though flexibility in the means of verifying these) and overall scoring is intended to help achieve this. The central ICF M&E team will review the KPI self-assessments received from country offices for comparability in the rankings, for example, to ensure consistency in the weight given to similar types of examples. Independent evaluation at programme and overall fund level will allow a more in-depth assessment of the factors associated with the likelihood of transformational change and related outcomes. It will also provide independent verification of project/programme self-reporting and help moderate possible optimism bias in the qualitative reporting. If reporting officers have any concerns about the quality of data or any points that they think CED should be made aware of, then please note this in the ICF (and

	DRF) results templates. Any comments can usually be added into the free text columns on the far right of each template. Further guidance should be available in the commissioning note.
Data issues	To minimise the risk of subjectivity in programmes' self-assessments, more weight should be given to examples of transformation where there are multiple sources of evidence to support the ranking and where the evidence for this is as far as possible factual rather than based on the opinions of a few people or on speculation.
Additional comments	The indicators of likely transformational change will draw on other indicators and KPIs, notably the public and private finance leveraged indicators. Though there may be cases where there are examples of progress towards transformational change, despite poor progress on these other indicators in an individual country, the reasons would need to be explained carefully. Care will also need to be taken not to attribute influence to HMG for the replication of activities which we in turn copied from other organisations.
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