Standard Indicator 1 - Mitigation

Estimating emission reductions from IKI project activites

Online Seminar 4 - Buildings

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Virtual, 12.10.2023

better climate the green werk.

perspectives climate group

ZUG Zukunft Umwelt Gesellschaft

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Agenda

1	Introduction
2	Common understanding of direct and indirect mitigation
3	Typical emission sources for emission reduction activities / measures in the buildings sector (incl. applicable methodologies)
4	Typical baseline and project scenario (incl. leakage)
5	Calculation of emission reductions (incl. example)
6	Relevant default values and reference sources
7	Conclusion

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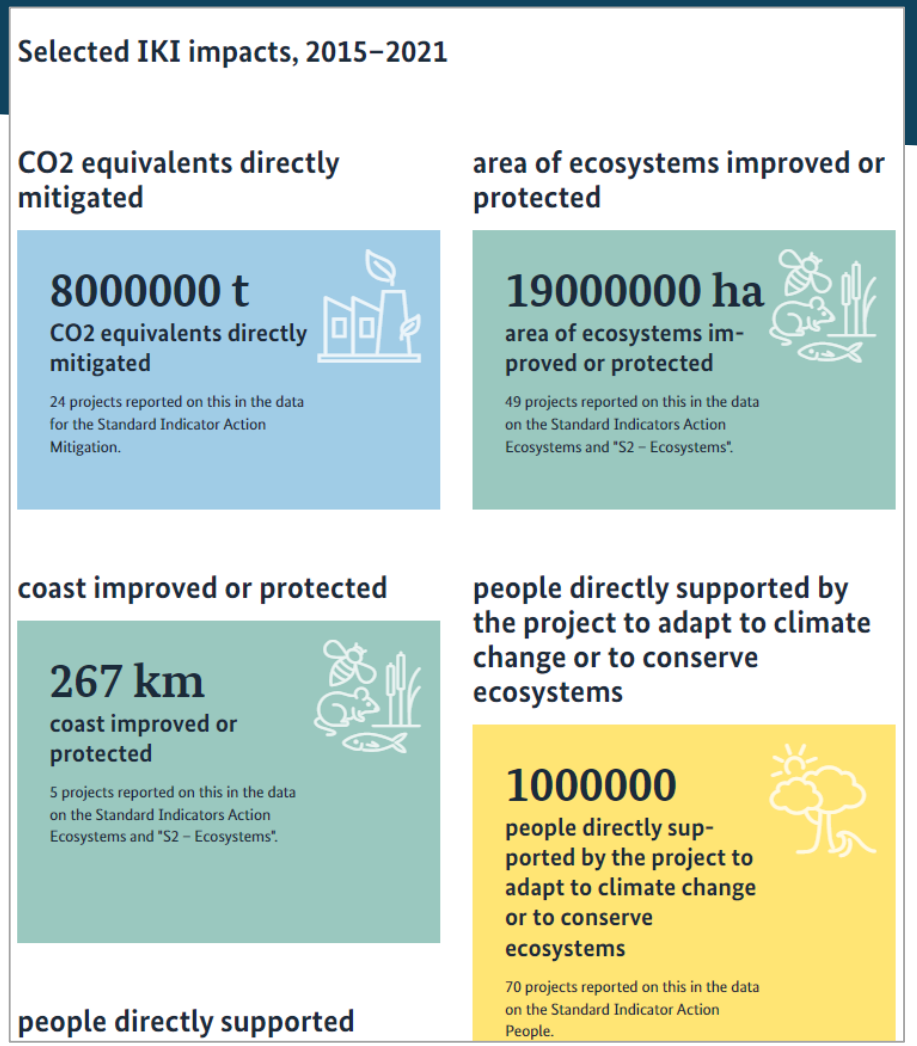
1 Introduction

Introduction to the IKI Standard Indicators (SI)

- First introduced in 2015 and revised in 2022
- SI enable the IKI to aggregate headline results across individual projects
- Data is used to communicate IKI‘s achievements to the public, German parliament and other stakeholders and as part of national and international reporting



Source: https://www.international-climate-initiative.com/en/about-iki/impact-and-learning/ .

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Overview of IKI Standard Indicators

SET A - Old SI

- Action Mitigation
- Action Ecosystems
- Action People

SET B – SI as of 2022

SI 1 - Mitigation	**GHG emissions reduced or carbon stocks enhanced directly or indirectly by IKI project measures.**
SI 2 - Ecosystems	Area of ecosystems with improved conservation and sustainable use due to IKI project measures.
SI 3 - Adaptation	Number of people directly and indirectly supported by IKI projects to better adapt to climate change.
SI 4 - Capacity People	Number of people directly supported by IKI projects through networking and training to address climate change and/or to conserve biodiversity.
SI 5 – Leveraged Finance	Volume of private and/or public finance leveraged for climate change and biodiversity purposes in EUR.

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Provisions for IKI projects in a nutshell

- Report **on new Standard Indicators (Set B),** if the project has submitted the first interim report in April 2022 or thereafter.
  - Older projects may be required to switch due to large amendment requests or can switch voluntarily
- Report **on all relevant Standard Indicators** (i.e. SI for which the project is producing results)
- Report in line with the respective Indicator Guidance Sheets in the **IKI Project Planning and Monitoring Guidelines**
- Report on new Standard Indicators (SET B) through the **IKI Standard Indicator Report** (Annex 7, Excel Tool)

Key guidance documents (click here)

- IKI Standard Indicator Report (Excel Tool)
- IKI Project Planning and Monitoring Guidelines (incl. Standard Indicator Guidance Sheets)

Please note that slight updates where made to both documents in July 2023 to improve clarity and useability.

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2 Common understanding of direct and indirect mitigation

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IKI differentiates between direct and indirect GHG mitigation

Estimating mitigation required for reporting of direct financed and technical support leading to immediate mitigation

Direct GHG emission reduction / carbon stock enhancement (in tCO_2e)	reduced or avoided immediately through mitigation measures (partly) ***financed by the IKI project or measures***	Estimating mitigation required for reporting
Indirect GHG emission reduction / carbon stock enhancement (in tCO_2e)	reduced or avoided by means of ***IKI-funded technical support*** for mitigation measures financed by a party other than the IKI, but the IKI plays a critical role in providing essential technical implementation support	
Long-term mitigation impact through enhanced policy frameworks	potential future / long-term emission reductions through ***enhanced policy frameworks***	Reference to existing target only

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Different pathways and causal chains of IKI projects

Direct financing, technical support and enhanced policy framework

FINANCE

Direct mitigation

Project (co-) finances implementation → Immediate mitigation measure is implemented with project (partly) funds (potentially in cooperation with others) → Emissions are reduced (DIRECT)

TECHNICAL ASSISTANCE

Indirect mitigation through technical support

Project provides TA on the implementation of mitigation measures → Partners or other funders provide financing of measures → Implementation of immediate mitigation measure (with project's technical support) → Emissions are reduced (INDIRECT)

Long-term mitigation impact through enhanced policy frameworks

Project provides TA on the development of policies and plans → Policy advice provided by other actors → New or enhanced mitigation-related policy is drafted and approved → Enhanced policy measures are enforced, and mitigation measures are implemented → Emissions are reduced (INDIRECT)

Calculation of mitigation required for reporting

Project

Other partners or actors

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Project activities lead to different impact and potential mitigation

Examples for the three categories of impact

Direct mitigation	Indirect mitigation through technical support	Enhanced policy frameworks
• On-the-ground piloting or demonstration components of IKI projects • Use of financial mechanisms • Development and financing of an app • Project activities resulting in lower-carbon intensity of services or products	• Technical capacity development for the scaling of pilots • Implementation of community forest management plans that translate into protected forest areas • Improved land or marine management status • Short-term removal of regulatory barriers	• Technical support on the development/ revision of NDCs or LT-LEDS • Development of sectoral policies / strategies • Development of subnational net-zero emissions action plans • Roadmaps for policies
Immediate GHG emission reductions	**Short-term / upscale GHG emission reductions**	**Long-term mitigation impact / potential for future GHG emission reductions**

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3 Typical emission sources and emission reduction activities

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Building sector accounts for over one third of global energy-related emissions

International Energy Agency's buildings emission in 2022 (see Buildings - Energy System – IEA)

- In 2022:
  - **direct CO_2** emissions from buildings **decreased to 3 Gt**
  - **indirect CO_2** emissions(from production of electricity and heat used in buildings) **increased to 6.8 Gt**
  - another **2.5 Gt CO_2** were associated with **buildings construction**
- In 2021, **investments in building energy efficiency increased** by 16% to USD 237 billion, **but growth in floor space outpaced efficiency efforts** (UNEP, 2022)

Source: The GlobalABC releases 2022 Global Status Report for Buildings and Construction

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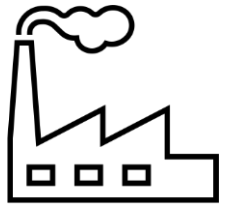
CO_2 emissions in a building's life-cycle

Embodied emissions are emitted in the production of a building; operational emissions are released from its ongoing operation

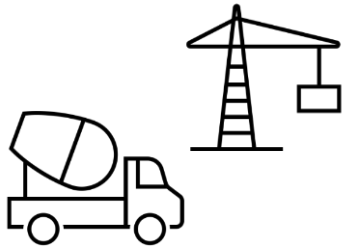
Embodied Emissions



Product Stage

- Building materials production
- Building materials transportation

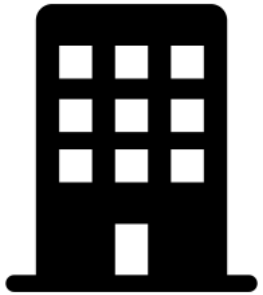
Responsible for about 26% of emissions from buildings (UNFCCC)



Construction Stage

- Construction energy consumption

Operational Emissions



Use Stage

- Heating
- Air conditioning
- Lighting
- Energy consumption
- Maintenance

More than 70% of total emissions from buildings are released (UNFCCC)

Disposal Stage

- Building demolition
- Waste material handling

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Avoid, Shift, Improve – to reduce emissions in the building sector

The A-S-I framework needs to be adopted throughout the building process to ensure emissions are slashed

AVOID

energy and resource demand in buildings
through integrated planning, bioclimatic design and passive measures

SHIFT

to low-emission technologies and materials
such as efficient appliances, thermal storage and local bio-based materials

IMPROVE

the energy supply
by connecting to district networks and producing renewable energy on site

Reducing operational and embodied emissions

Mitigation actions in the building sector should focus on the use and production stage

Reducing operational emissions

- **Energy efficiency upgrades** (implement better insulation, high-efficiency HVAC systems LED lighting, etc.)
- **Building electrification** (replace any equipment – usually heating – in a facility that uses natural gas with equipment that only uses electricity, like heat pumps)
- **Renewable energy sources** (install on-site renewable energy sources)
- **Energy management systems** (implement smart building automation systems for control of energy use)
- **Occupant engagement** (educate building occupants about energy conservation practices and encourage them to reduce energy consumption)

Reducing embodied emissions

- **Material selection** (choose low-carbon or carbon-neutral building materials such as recycled steel, reclaimed wood, and sustainable concrete alternatives)
- **Local sourcing** (select materials that are locally sourced to reduce transportation-related emissions)
- **Innovative construction methods** (e.g., modular construction, where building components are prefabricated off-site and then assembled on-site thus reducing construction waste and transportation-related emissions)
- **Building information modeling** (BIM enables virtual simulations to optimize construction processes)
- **Circular economy** (embrace circular economy principles by reusing and recycling materials from existing buildings)

Typical building mitigation projects focus on the use stage

Most mitigation projects in the buildings sector focus on the usage phase, i.e. improving the building's energy performance

Mitigation categories	Identified technology and/or measure	Typical monitoring indicators for impact assessment
Sufficiency	• Bioclimate and passive design measures	• Energy savings (kWh) and reduced energy intensity (kWh/m^2) • Emission factor (EF) of energy source (tCO_2/MWh)
Energy efficiency	• Energy efficient heating and cooling systems • Improved energy efficiency of appliances	• Energy savings (kWh) and reduced energy intensity (kWh/m^2) • EF of energy source (tCO_2/MWh)
Renewable energy	• Renewable energies for power, heat and cooling supply at buildings	• Installed capacity (kW) • Renewable energy generation (kWh) • Number of installed units (#) • EF of replaced energy source (tCO_2/MWh)
GHG emission avoidance and others	• Reduction/ replacement of refrigerant with high climate impact potential	• Tons of refrigerant (t) • GWP of refrigerant

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Choosing an applicable methodological approach and default values

Numerous methodologies and tools exist to assess emissions associated with building sector project activities

To identify suitable methodological approaches and useful default / reference values,

- check other projects that estimated emission reductions from same / similar activities, e.g.
  - CDM Project Search, VERRA / VCS Project Registry, NAMA Support Projects etc.
  - consult existing methodologies: CDM Meths, VCS, GS etc., e.g. in the CDM Methbook
- consult and use simplified tools for the estimation, if existing, e.g.
  - Programme for Energy Efficiency in Buildings (PEEB), e.g. UNFCCC Compendium on greenhouse gas baselines and monitoring
  - Embodied Carbon in Construction Calculator (EC3) - Carbon Leadership Forum
  - Instruments for your CO2 accounting | DGNB
  - Risk Assessment Tool I CRREM Project
  - IFC EDGE App I EDGE Buildings
- make use of default values and reasonable assumption source from references, e.g.
  - CDM TOOL33 Methodological tool: Default values for common parameters
  - Harmonized IFI Default Grid Factors 2021 v3.2

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4 Typical baseline and project scenario (incl. leakage)

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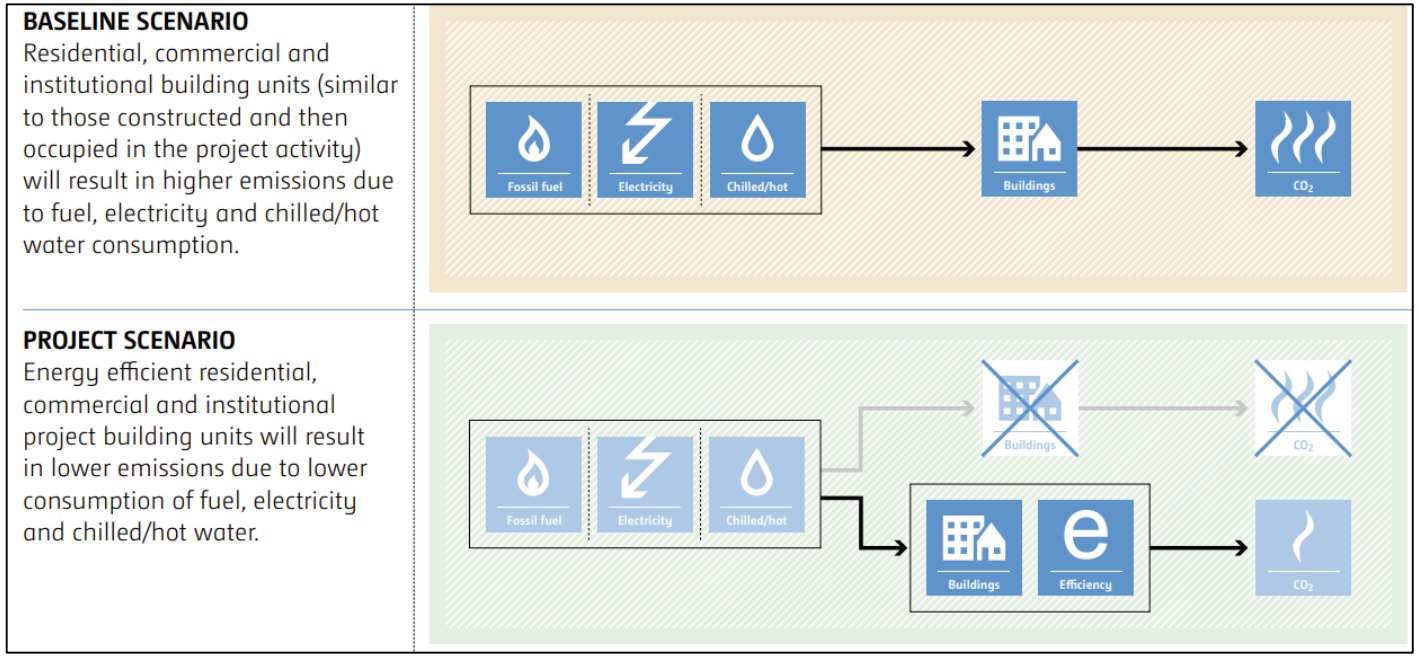
Typical baseline and project scenario

Baseline scenario

- reflects the emissions that would occur without the project
- represents the reference situation, e.g.
  - *the continuation of current activities (e.g. Business-as-Usual)*
  - *emissions from a technology that represents an economically attractive course of action*
  - *a benchmark approach (considering emissions from similar project activities undertaken in the previous five years in similar circumstances)*

Project scenario

- represents the emissions associated with the (proposed) project's implementation
- reflects the expected outcomes of the project



Source: UNFCCC (2022a): CDM Methodology Booklet, p. 113

Calculation of emission reductions

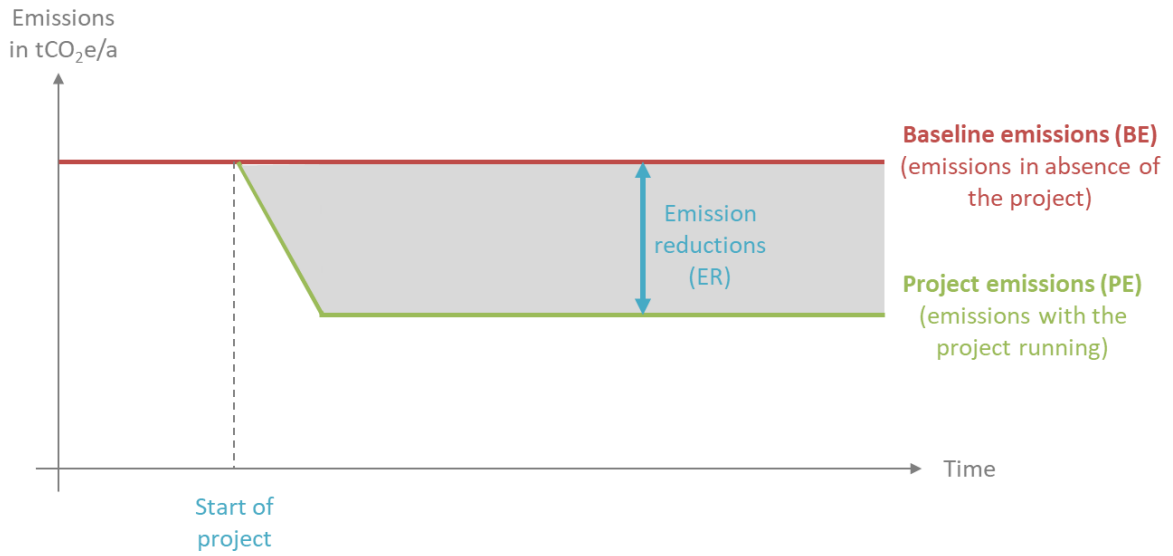
General approach for mitigation activites considering baseline and project emissions

The achieved emissions reductions are typically calculated as the difference between baseline emissions and emissions after project implementation, considering any potential leakage.

$$ER_y = BE_y - PE_y - LE_y$$

Where:

ER_y = Emissions reductions in year *y* (tCO_2)
BE_y = Baseline emissions in year *y* (tCO_2)
PE_y = Project emissions in year *y* (tCO_2)
LE_y = Leakage emissions in year *y* (tCO_2)



Source: Mitigation Action Facility (2023): Mitigation Action Facility – Mitigation Guideline for the Project Concept Phase, p. 10

Consideration of leakage emissions

GHG emissions which occurs outside the project boundary attributable to the project activity

Carbon leakage

- The increase of **GHG emissions which occurs outside the project boundary** which is attributable to the project activity (cf. Glossary: CDM terms)
  - Under GHG Protocol, leakage emissions are also referred to as “secondary effects”
  - Attention: leakage is used in different meanings: e.g. “physical leakage” from bio-digester (i.e. a project emission source)

Examples of carbon leakage in buildings projects

- Transfer and continued use of baseline equipment outside of the project boundary (e.g. replaced inefficient ACs, inefficient electric appliances or cook-stoves)

5 Calculation of emission reductions (incl. example)

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Case study: Retrofitting existing residential buildings

Introduction to an example case for illustrating the approach and calculation

Case study

Project: Retrofitting existing residential buildings

- Target group: Building owners / building developers in the project city
- Project intervention:
  - Technical support
  - **Financial support for implementing energy efficiency and renewable energy measures within existing residential buildings**

Source: Applied Sciences (mdpi.com)

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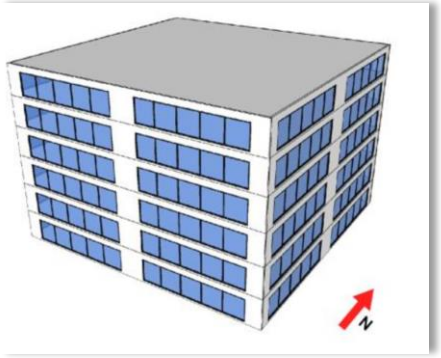
Baseline and project scenario

Case study

Baseline scenario

- Due to high renovation costs, the building owners would not retrofit their buildings
- **Energy efficiency and renewable energy measures would not be implemented**



Source: Sustainability (mdpi.com)

Project scenario

- Support the **retrofitting of 10 existing residential buildings**
  - Energy efficiency measures are implemented (efficient lighting systems, efficient heating, efficient thermal envelope)
  - The share of renewable energy sources is increased (switch from coal to renewable energy sources for heat supply and onsite renewable electricity generation)

Source: Sustainability (mdpi.com)

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Project boundary

The project boundary

- Refers to the defined **scope or geographical area** within which emissions and emission reductions are accounted for
- Sets the limits for **what emissions** are included in the assessment

For energy efficiency measures in buildings the project boundary is the

- the **physical, geographical site of the buildings** (see CDM AMS-II.E. Energy efficiency and fuel switching for buildings)

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It’s common practice to concentrate on the “use phase” emissions

Energy inflow, fuel oil, LPG, natural gas

Energy inflow, electricity, steam, hot, or chilled water

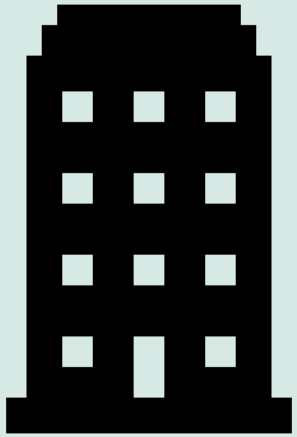
Material inflow embodied energy and GHG

Combustion of fuels, release of refrigerants

Scope 1

Scope 2

Scope 3



Energy outflow, e.g. on-site energy generation fed into the grid

Material outflow

Common practice:
Focus on
Scope 1 + 2 =
Use stage of the building

Best practice:
Also include Scope 3, i.e. the embodied energy and carbon

Source: PEEB

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Calculation of baseline emissions in the use stage

For calculating the baseline emissions at the use stage, the **energy use and/ or fuel consumption** in the buildings **before the project implementation** is determined.

$$ER_y = BE_y - PE_y - LE_y$$

$$BE_y = BE_{EC,y} + BE_{FC,y} + BE_{WC,y}$$

Where:

BE_y = Baseline emissions of baseline building in year *y* (tCO_2)

$BE_{EC,y}$ = Baseline emissions from electricity consumption of baseline building in year *y* (tCO_2)

$BE_{FC,y}$ = Baseline emissions from fossil fuel consumption of baseline building in year *y* (tCO_2)

$BE_{WC,y}$ = Baseline emissions from chilled/ hot water consumption of baseline building in year *y* (tCO_2)

Three options to determine baseline emissions

1. Based on ex-post **monitoring of fuel and electricity consumed** (see example calculation)
2. Based on a **standardized tCO_2 emission factor per m^2**
3. Based on a **standardized value of tCO_2 emissions per occupant** of building

→ For more information on Options 2 and 3 see CDM AMS-II.E.: Energy efficiency and fuel switching measures for buildings and CDM Methodological Tool 31

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Calculation of project emissions in the use stage

Project emissions from new building / mitigation actions, are calculated accordingly to the baseline procedures above.

$$ER_y = BE_y - PE_y - LE_y$$

$$PE_y = PE_{EC,y} + PE_{FC,y} + PE_{WC,y}$$

Where:

PE_y = Project emissions of project building in year *y* (tCO_2)

$PE_{EC,y}$ = Project emissions from electricity consumption of project building in year *y* (tCO_2)

$PE_{FC,y}$ = Project emissions from fossil fuel consumption of project building in year *y* (tCO_2)

$PE_{WC,y}$ = Project emissions from chilled/ hot water consumption of project building in year *y* (tCO_2)

Approaches to determine project emissions

There are different ways to assess ex-ante the percentage or amount of energy savings caused by the implementation of energy efficiency measures, including:

- Commissioning of an **energy service expert** who can evaluate the potential energy savings of planned measures
- Some **government agencies offer guidance** and support for emissions reductions in buildings; they may have experts who can assist or provide resources
- **Digital modelling tools** can be used to assess retrofit interventions (e.g. the IFC EDGE App I EDGE Buildings or CARE Tool which is used for estimating the carbon benefits of reusing and upgrading existing buildings)

Consideration of leakage emissions

- Leakage may result from replaced equipment through a mitigation action project that is continued to be used outside of the project boundary leading to increased emissions
- Typical examples at buildings are **replaced inefficient ACs, inefficient electric appliances or cook-stoves that are then used elsewhere**
- If leakage is a relevant and significant emissions source, corresponding emissions should be addressed in the same level of detail as project emissions

$$ER_y = BE_y - PE_y - LE_y$$

Estimation of embodied carbon from the production stage

Best practice for full lifecylce assessment

- Most of the climate funds and facilities are **focused on emission reduction achieved though measures in Scope 1 and 2** (i.e. in the building's use phase) as per common methodologies and **do not require the calculation of embodied emissions**
- For an estimation of the embodied energy and carbon, data on building material used in the local context are needed
- Environmental Product Declaration (EPD) databases provide specific information regarding the properties of certified products
- It is recommended to use available tools such as the EDGE App and underlying data bases

Example: Calculation of baseline emissions

Case study

Emissions caused by electricity and thermal energy consumption during the use phase **before retrofitting**

$$BE_y = (EC_{BL,y} * EF_{EL} + TEC_{BL,y} * EF_{CH,y}) * N_y$$

- $EC_{BL,y}$: Electricity consumption per building (MWh/a)
- EF_{EL}: Grid EF (tCO_2/MWh)
- $TEC_{BL,y}$: Thermal energy consumption per building (MWh/a)
- $EF_{CH,y}$: Central heating coal-based EF (tCO_2/MWh)
- N_y: Number of buildings

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Example: Calculation of baseline emissions

Parameter	Unit	Source
Electricity consumption per building (unit)	MWh/a	Utility billing records / invoices
Thermal energy consumption per m^2 or per building (unit)	MWh/a	Utility billing records / invoices
Grid EF	tCO_2/MWh	Harmonized IFI Default Grid Factors 2022 | UNFCCC
Central heating EF (coal based)	tCO_2/MWh	National/ local default values or Emissions Factors 2022 I IEA
Heated floor area per building (unit)	m^2	Project documentation (building plan, statistics or onsite measurement)
Number of buildings	#	Project documentation

Example: Calculation of baseline emissions

Case study

Emissions caused by electricity and thermal energy consumption during the use phase **before retrofitting**

$$BE_y = (EC_{BL,y} * EF_{EL} + TEC_{BL,y} * EF_{CH,y}) * N_y$$

- $EC_{BL,y}$: Electricity consumption per building (kWh/a)
- EF_{EL}: Grid EF (tCO_2/MWh)
- $TEC_{BL,y}$: Thermal energy consumption per building (kWh/a)
- $EF_{CH,y}$: Central heating coal-based EF (tCO_2/MWh)
- N_y: Number of buildings

$$BE_1 = \left(36\ MWh * 0.65 \frac{tCO_2}{MWh} + 470\ MWh * 0.4 \frac{tCO_2}{MWh}\right) * 2 = 424\ \mathrm{tCO_2}$$

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Example: Calculation of project emissions

Case study

Emissions caused by electricity and thermal energy consumption during the use phase **after retrofitting**

$$PE_y = (EC_{PJ,y} * EF_{EL} + TEC_{PJ,y} * EF_{CH_r,y}) * N_y$$

- $EC_{PJ,y}$: Electricity consumption per building (kWh/a)
- EF_{EL}: Grid EF (tCO_2/MWh)
- $TEC_{PJ,y}$: Thermal energy consumption per building (kWh/a)
- $EF_{CH_r,y}$: Central heating renewable EF (tCO_2/MWh)
- N_y: Number of building / unis

$$PE_1 = \left(\mathbf{123}\ MWh * 0.325 \frac{tCO2}{MWh} + \mathbf{282}\ MWh * \mathbf{0} \frac{tCO2}{MWh}\right) * 2 = 80\ \text{tCO2}$$

- **123** MWh: = 36 MWh * 0.8 (20% saving potential through EE measures + Electricity for heat pumps (50% of heat demand))
- 0.325 $\frac{tCO2}{MWh}$: = 0.65 tCO_2/MWh * 0.5 (50% reduction due to onsite RE generation)
- **282** MWh: = 470 MWh * 0.6 (40% saving potential through EE measures)
- **0** $\frac{tCO2}{MWh}$: Equals zero, as the heat mix now consists exclusively of renewable energies

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Example: Calculation of emission reductions in year 1

Case study

Emissions reductions caused by retrofitting measures

$$ER_1 = BE_1 - PE_1$$

$$ER_1 = 424\,tCO_2 - 80tCO_2 = 344\,tCO_2$$

If cooling will be addressed the GWP of refrigerants need to be considers

A small amount can have an enormous impact

GWP of refrigerants, if applicable, e.g., for exchange of ACs or chillers	**Selected default values**		**GHG Protocol** Global Warming Potential Values **based on IPCC values,** IPCC Fifth Assessment Report, 2014 (AR5)
	• HFC-23: 12,400 • HFC-32: 677 • HFC-41: 116	• HFC-125: 3,170 • HFC-134: 1,120 • HFC134a: 1,300	

Number of devices	No. of ACs	10
Average cooling capacity per AC	kW	small (< 5 kW)
Leakage rate (in-use)	%/year	10%
Refrigerant type	Type	R22 (HCFC)
Global Warming Potential (GWP) of refrigerant used - 100 years time horizon (Choose "Other" for entering own value of GWP in appearing yellow field)	tCO_2e/t_{ref}	*1,760*
Typical charge size (Choose "Other" for entering own value of charge size in appearing yellow field)	kg	*0.8*
Emissions:		
Annual emissions	tCO_2e/a	1.3

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Example: Retrofitting existing residential buildings

View into the IKI Standard Indicator Report (Excel tool)

Case study

Zukunft Umwelt Gesellschaft

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S 1 - Mitigation: GHG emissions reduced or carbon stocks enhanced directly or indirectly by IKI project measures.

< SI 1 | 1 ER: Direct mitigation (Emission reductions) > Go to: Basic Data Manual Overview

Does our project need to provide information in this sheet?	Yes: Since the project aims at mitigating GHG directly through financial investments, please fill out this sheet.

Planned target estimate - "Baseline emissions"

Please use the table below to qutantify the baseline emission for the planned target estimate.

Item / Description	Row reference	Calculation / Source	Unit
4 storey multi-family buildings	A		
Accumulated number of buildings (4 storeys) to be retrofitted	B	Project Implementation Plan	No.
Heated floor area per building	C	Energy Efficiency Study, 2020, See Appendix 2, p. 3	m^2
Specific thermal energy demand (baseline)	D	Energy Efficiency Study, 2020, See Appendix 2, p. 4	kWh_t/m^2a
Specific electric energy demand (baseline)	E	Energy Efficiency Study, 2020, See Appendix 2, p. 4	kWh_e/a
Thermal energy consumption before EE measures per building	F	Calculated based on data from Energy Efficiency Study,	MWh_t/a
Electricity consumption before EE measures per building	G	Calculated based on data from Energy Efficiency Study,	MWh_e/a
	H		
Grid emission factor (GEF) and central heating emission factors	I		
Central heating emission factor (coal based)	K	Calculated based on public utility data, Annual Energy Statistic Report for Project Country, p. 64, see sheet "Auxiliary calculation"	tCO_2/MWh_t
GEF_{grid}	J	The latest version of the Harmonized IFI Default Grid Factors 2021 (v3.2, April 2022, "Combined Margin Grid Emission Factor, gCO2/kWh"", Energy Efficiency)	tCO_2/MWh_{el}
Dynamic baseline improvement	L	Energy Plan Project Country, 2021	%
		Baseline emissions (BE) per annum	tCO_2e
		Baseline emissions cumulative (BE)	tCO_2e

2021	2022	2023	2024	2025							
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12
2	5	8	10	10	10	10	10	10	10	10	10
1,680	1,680	1,680	1,680	1,680	1,680	1,680	1,680	1,680	1,680	1,680	1,680
280	280	280	280	280	280	280	280	280	280	280	280
1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
470	470	470	470	470	470	470	470	470	470	470	470
36	36	36	36	36	36	36	36	36	36	36	36
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0.40	0.40	0.40	0.39	0.39	0.39	0.39	0.39	0.38	0.38	0.38	0.38
0.65	0.65	0.64	0.64	0.64	0.63	0.63	0.63	0.62	0.62	0.62	0.62
0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
424	1,054	1,678	2,087	2,077	2,066	2,056	2,046	2,035	2,025	2,015	2,005
424	1,478	3,156	5,243	7,320	9,386	11,442	13,487	15,523	17,548	19,563	21,568

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6 Relevant default values and reference sources

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Default values for mitigation estimation of energy projects

Parameter	Value and Unit	Source
Emission factor electricity grid for the specific country (for energy efficiency / electricity consumption / for renewable electricity)	tCO_2/MWh	Harmonized IFI Default Grid Factors 2021 v3.2, combined margin for energy consumption or for renewable electricity
Transmission and distribution losses (for conservativeness distinguished between project and baseline energy consumption)	• 20% for project (or leakage) electricity consumption sources • 3% for baseline electricity consumption sources	CDM TOOL05 Methodological tool Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation Version 03.0
Emission factors of typical **fossil fuel** types, for heating	IPCC default CO2 Emission Factors for combustion	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2: Energy, Chpt. 1, Page 1.23
GWP of refrigerants, if applicable, e.g., for exchange of ACs or chillers	Selected default values • HFC-23: 12,400 • HFC-32: 677 • HFC-41: 116 • HFC-125: 3,170 • HFC-134: 1,120 • HFC134a: 1,300	GHG Protocol Global Warming Potential Values based on IPCC values, IPCC Fifth Assessment Report, 2014 (AR5)

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7 Conclusion

Wrap-up

Identify relevant project/ activity types and develop a clear understanding of the project type and mitigation action covered

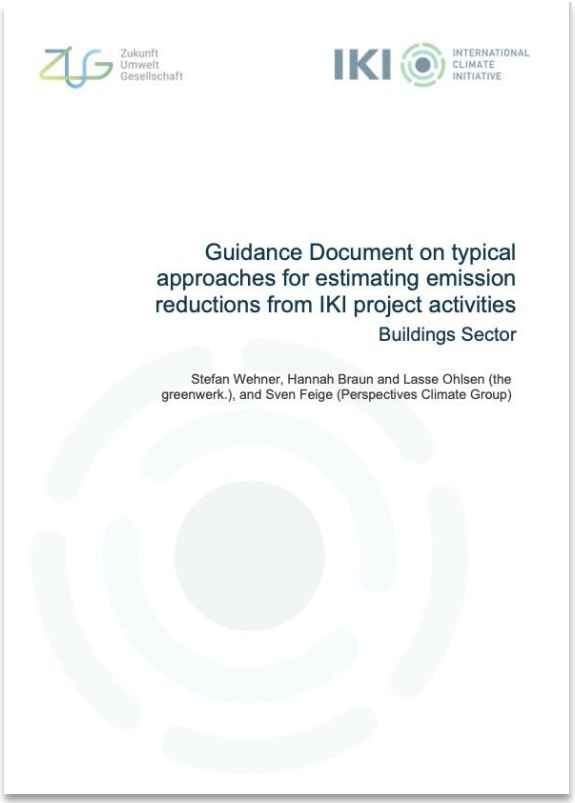
- Identify the **project's key characteristics and the underlying technologies**
- Conduct an **impact assessment**, e.g., using a causal chain analysis to identify the envisaged effects and possible co-benefits

Identify and quantify emission reductions

- Identify the **emission sources** for emission reduction activities
- Select a **suitable methodology** or define an **applicable estimation approach**
- Define **clear baseline and project scenario**

Prepare a **monitoring plan** incl. monitoring and reporting processes

? Contact IKI Standard Indicator Helpdesk for questions: iki-si-helpdesk@z-u-g.org



Related Guidance Document will be published shortly

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THANK YOU FOR YOUR ATTENTION

Stefan Wehner (the greenwerk.) & the IKI Standard Indicator Helpdesk

12.10.2023

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