



DGNB CO₂ accounting tool

Stand: 22.01.2021

Basic Principles	1
Framework for carbon neutral buildings and sites	1
Color convention of cells	2
Tabular overview of the spreadsheets	3
Step-by-Step through the spreadsheets	4
Sheet 1: Start	4
Sheet 2: Project.....	4
Sheet 3: PART 1 Status assessment	6
Sheet 4: PART 2a CAR Measures	10
Sheet 5: PART 2b CAR Graphic	15
Sheet 6: PART 3 Climate Action Pass	15
Sheet 7: ANNEX 1 Emission factors	16
Sheet 8: ANNEX 2 Specific factors	17
Sheet 9: ANNEX 3 Partial energy values	19
Sheet 10: ANNEX 4 Data Quality Index	19
Sheet 11: ANNEX 5 Definition of terms.....	20
Acknowledgement	21

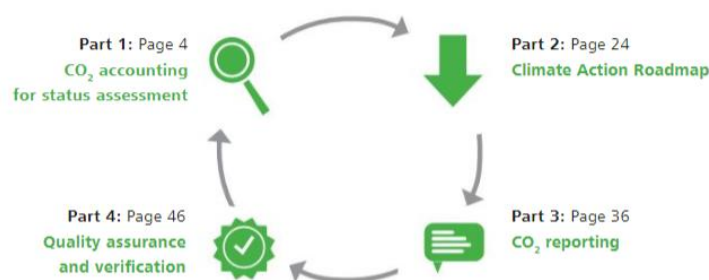


BASIC PRINCIPLES

Framework for carbon neutral buildings and sites

The DGNB Publication “*Framework for carbon neutral buildings and sites*” (hereinafter referred to as “Framework”) is the basis for the Excel tool. It contains, for example, more detailed explanations, the set of rules for CO₂ accounting, and the description of individual formulas. The Framework is available free of charge via the website www.dgnb.de/en/topics/climate-action/framework/.

The structure of the Excel tool follows the basic elements of the Framework:

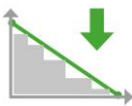


Part 1: CO₂ accounting for status assessment



„The CO₂ account for real estate as well as the associated policy allows a precise evaluation of the current greenhouse gas emissions of buildings based on the measured consumption data. In this way it provides the foundation for determining actual action requirements on the path to carbon neutrality. A solid decision foundation is required in order to minimise the risk of investing into stranding assets. This means that CO₂ accounting must be sufficiently meaningful in order to depict the actual greenhouse gas emissions as fully as possible”

Part 2: Climate Action Roadmap



„Climate action and the associated investments must be planned in a focused manner. Only those who define clear objectives for their buildings, sustain these and implement measures in a future-orientated manner can optimally combine climate action and economic viability. It is important here that this is carried out for each building individually. This is the only way in which valid measurement plans can be developed which are designed with a focus on the specific conditions.“

Part 3: CO₂ reporting



„Many stakeholder groups of actors are interested in the key figures relating to building CO₂ emissions: Building owners, planners, managers, investors, financial experts, political decision-makers as well as clients, employees and residents. The information which flows into rental and purchasing decisions acts as evidence to financial backers or proves the effectiveness of the climate action measures implemented. A structured format for the transparent, regular communication of this key metric forms a climate action passport.”

Part 4: Quality assurance and verification



„It is necessary to verify a site independently in order to reliably check whether the implemented climate action measures are actually effective and the set goals have been met. There are different external quality assurance methods available depending on whether the optimisation measures in the operation of a building concern an entirely new construction or a comprehensive renovation. The award associated with this together with a certificate create transparency and strengthen the credibility.”

Note:

The Excel tool does not directly contain Part 4 quality assurance and verification, however a completely filled Excel tool is part of the quality assurance.



Color convention of cells

The numerous cells in the Excel tool differ in their functionality. This results in the following categorisation:

- **Input field:**
For these cells, an input by the user is required. The content to be entered or its unit is defined by information fields.
- **Automatic calculation field:**
These cells are automatically filled based on input fields and formulas in the background. They have informative character and are mainly used for transparency.
- **Result field:**
Results relevant to evaluation are displayed in these cells. These are calculated automatically by formulas in the background.
- **Information field:**
These cells are used for information and user guidance, e.g. they describe the required content of an input field.

The color convention in the following figure:

Input field
Automatic calculation field
Result field
Information field



TABULAR OVERVIEW OF THE SPREADSHEETS

Spreadsheet	Content
Start	Informative spreadsheet (Color convention, note on use of the tool, notes on funding)
Project	Input of calculation-relevant project data for spreadsheet 'PART 1 Status assessment' and 'PART 2a CAR Measures' as well as input of required or optional project data for spreadsheet 'PART 3 Climate Action Pass'
PART 1 Status assessment	Input of collected consumption data of past years and calculation of the annual balance of GHG emissions (initial status assessment) – forms the initial value for the Climate Action Roadmap (CAR)
PART 2a CAR Measures	Input of relevant data for the Climate Action Roadmap (target date, measures etc.) and projection of the planned energy consumption data in the future; the projected data will be replaced by actual consumption data in the following years
PART 2b CAR Graphic	Informative spreadsheet Graphic visualisation of the building-specific Climate Action Roadmap based on the spreadsheet 'PART 2a CAR Measures'
PART 3 Climate Action Pass	Key metrics: in this spreadsheet the annual data corresponding to the specified year is linked with the spreadsheet 'PART 1 Status assessment' or 'PART 2a CAR Measures' respectively
ANNEX 1 Emission factors	Informative spreadsheet Listing of the energy sources used in the tool; these are used for the calculation of the annual balance of GHG emissions in spreadsheet 'PART 1 Status assessment' or 'PART 2a CAR Measures' respectively
ANNEX 2 Specific factors	Input of individual energy sources bzw. calculation of supplier-specific emission factors; are transferred to the listing in spreadsheet 'ANNEX 1 Emission factors' in addition to the listed emission factors
ANNEX 3 Partial Energy Values	Calculation of consumption data for partial areas/consumptions if measured data is currently not available (e.g. rented areas); the calculated consumption data are transferred to spreadsheet 'PART 1 Status assessment' for the calculation of the annual balance of GHG emissions
ANNEX 4 Data Quality Index	Assessment of the Data Quality Index (DQI) for the accounting scope operation (representativeness of data, competence etc.); the transfer to spreadsheet 'PART 1 Status assessment' or 'PART 2a CAR Measures' respectively must be done manually
ANNEX 5 Definition of terms	Informative spreadsheet (diagram of the system boundary for accounting, definition of terms according to the standard DIN V 18599)



STEP-BY-STEP THROUGH THE SPREADSHEETS

Sheet 1: Start

The 'Start' spreadsheet serves as an informative spreadsheet. It contains general information regarding:

- Color convention of cells
- Notes for the use of the Excel tool
- Funding notes

Sheet 2: Project

In the 'Project' spreadsheet basic data and information of your project are entered. The sheet is divided into the following sections depending on data/information requirements:

- Required project information for 'PART 1 Status assessment' and 'PART 2 Climate Action Roadmap'
- Required project information for 'PART 3 Climate Action Pass'
- Optional project information for 'PART 3 Climate Action Pass'

INPUT – What do you need to enter in this spreadsheet, ...

1. ... to set up the Excel tool for calculation?

In order for the Excel tool to perform a correct balance calculation, you must fill in the input fields in section

- Required project information for 'PART1 Status assessment' and 'PART2 Climate Action Roadmap'.

This sets the framework for your balance calculation

To start the calculation process, you need to select the **application** (Input in cell E7; either *CO₂ accounting* or *DGNB System Buildings In Use*) and set the **accounting scope** (input in cell E8; either *Accounting Scope "Operation"* or *Accounting Scope "Operation and Construction"*).

If you select the *Accounting Scope "Operation and Construction"* for your balance calculation, the input of the initial GHG emissions of the construction is necessary (input in cell E12-E14).

These inputs (example in the following figure) are sufficient to set up the Excel tool for calculation.

1. Required project information for PART 1 and PART 2		
<i>Selection of the application, accounting scope and reporting period</i>		
Application	CO ₂ accounting (1 year measured data)	Please select
Accounting scope	Accounting scope "Operation and Construction"	Please select
Reporting period	08.2018-12.2019	[MM.YYYY - MM.YYYY]
<i>Required information if accounting scope "Operation and Construction" is selected (according to EN 15978 or similar)</i>		
GHG emissions - product stage (A1-A3)	10.000	[kgCO ₂ eq]
GHG emissions - use stage (B1+B4)	10.000	[kgCO ₂ eq]
GHG emissions - end of life stage and recycling potentials (C3+C4+D)	10.000	[kgCO ₂ eq]
Initial greenhouse gas (GHG) emissions of the scope "Construction"	30.000	[kgCO ₂ eq]
Data quality indicator (DQI) for accounting scope "Construction"	currently no input necessary	[-]



2. ... so that a complete Climate Action Pass is created in PART 3?

In order to produce a complete Climate Action Pass, you must fill in the input fields in the sections

- Required project information for 'PART 3 Climate Action Pass' (*required* according to the Framework)
- Optional project information for 'PART 3 Climate Action Pass' (*optional* according to the Framework).

Note on the „Net floor area“ (NFA):

The input of the net floor area in 'PART 1 Status assessment' and 'PART 2 Climate Action Pass' is used for the automatic calculation of area-specific values. These values are informative only and serve the transparency, that means **the Excel tool also works without area-specific data.**

3. ... if you would like to do the calculation for certification according to the DGNB System "Buildings In Use"?

For a certification according to the DGNB System Buildings In Use you have to fill in all input fields under the marking with „*Required information if used for the DGNB System Buildings In Use, Version 2020*“ (for this, open the grouping below this line by clicking on the „+“ sign on the left frame of the Excelsheet).

RESULT – What results from your inputs in this spreadsheet?

Your inputs have the following effects on other spreadsheets:

- **Application** (input in cell E7; *CO₂ accounting* or *DGNB System Buildings In Use*)
Relation to spreadsheet 'PART 1 Status assessment': When using *CO₂ accounting* or *DGNB System Buildings In Use* the **status assessment** is determined over a period of **one** or **three year(s)**. When using the *DGNB System Buildings In Use*, the grouping of columns F-H must be unhided.
Effects on spreadsheet 'PART 2a CAR Measures': When using *CO₂ accounting* or *DGNB System Buildings In Use* the **initial value** for the Climate Action Roadmap (cell H255) is determined on the basis of **one year** or an **average of the last three years**.
- **Accounting Scope** (input in cell E8; *Accounting scope "Operation"* or *Accounting Scope "Operation and Construction"*)
Effects on spreadsheet 'PART 1 Status assessment': In the case of *Accounting Scope "Operation and Construction"*, the values under the heading *Accounting Scope "Operation and Construction"* are additionally calculated (row 209-213).
Effects on spreadsheet 'PART 2a CAR Measures': In the case of *Accounting Scope "Operation and Construction"*, the values under the heading *Accounting "Operation and Construction"* are additionally calculated.
- **Reporting Period** (input in cell E9; *MM.YYYY-MM.YYYY*)
Relation to spreadsheet 'PART 1 Status assessment': As a **reference year for status assessment** you must use the year in which the **predominant part of your reporting period** is included. If the data is available for exactly half a year, you must use the year of the last reporting month.
Relation to spreadsheet 'PART 2a CAR Measures': As an **initial year** for the Climate Action Pass you must use **the year following the reference year for status assessment**.



Sheet 3: PART 1 Status assessment

The spreadsheet 'PART 1 Status assessment' calculates the annual, building-specific CO₂ balance based on annual consumption data. The spreadsheet is divided into the following sections:

- Collection of annual consumption data (breakdown according to DIN V 18599-1: 2018-09)
 - of final energy imported into the system boundary
 - of final energy produced on-site
 - of final energy exported beyond the system boundary
- Balance of GHG emissions
- "Climate Positive" Award

INPUT – What do you need to enter in this spreadsheet, ...

1. ... to be able to start with the CO₂ balance calculation?

In order to start the CO₂ balance calculation correctly, you need to perform the following steps:

- Enter the **reference year of the status assessment** (see [Sheet 2: Project – RESULT](#)) in cell H18.
- Adjust the **reporting period of the status assessment** (see [Sheet 2: Project – RESULT](#)) according to the application – if necessary you have to expand the grouping in the column F-H.

2. ... to carry out the CO₂ balancing?

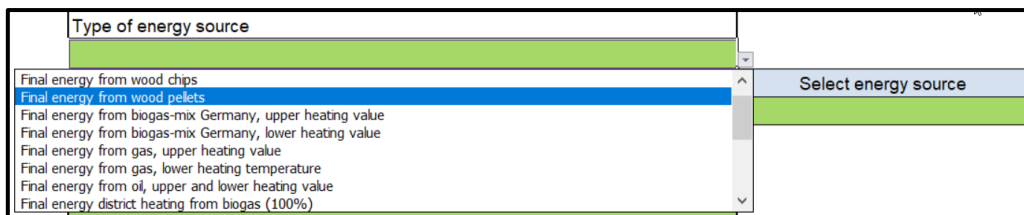
The annual CO₂ balance is calculated based on annual consumption data. To collect your annual consumption data, for each **energy source used** and for **each year of the reporting period**, you must enter

- the **type of energy source** and
- the corresponding **amount of energy** (imported into the system boundary, produced on-site or exported beyond the system boundary)

Note for the application *DGNB System Buildings In Use*:

The amount of energy [kWh] must be determined from the annual statement from the respective energy supplier and this must be submitted as proof.

The input fields for the electrical and thermal energy sources are created as a drop-down menu. The drop-down menu offers a selection of listed energy carriers (see [Sheet 7: ANNEX 1 Emission factors](#)); it is also possible to create supplier-specific or project-specific emission factors (see [Sheet 8: ANNEX 2 Specific factors](#)) and select them in the drop-down menu.





After the selection has been made, the Excel tool automatically combines and shows the CO₂ factor [kgCO₂eq/kWh] for the selected energy source from the spreadsheet 'ANNEX 1 Emission Factors'. For each selected energy source, you must now enter the **year-related consumption data [kWh]**.

		Year
		data for 2019
Thermal energy - Energy source 1.1		
Type of energy source		
Final energy from wood pellets		
CO2 factor	[kgCO ₂ eq/kWh]	0,0211
Amount of energy	[kWh]	150.000

Note on year-related input:

In the Excel tool, the data input for each year has a unique column reference, i.e. for each year the year-related consumption data of all energy sources are entered in the same column.

If there is no measured data available for parts of the building area, you can use generic Partial Energy Values (PAV) for them as a substitute in accordance with the Framework (see [Sheet 9: ANNEX 3 Partial energy values](#)).

2. Measured data not available:		
Note: Calculation of energy data see tab "ANNEX 3 Partial energy values".		
Subarea 1/Consumer 1 - Thermal energy		
Type of energy source		
Final energy from wood pellets		
CO2 factor	[kgCO ₂ eq/kWh]	0.0211
Amount of energy	[kWh]	Calculation in ANNEX 3

Note on data quality index:

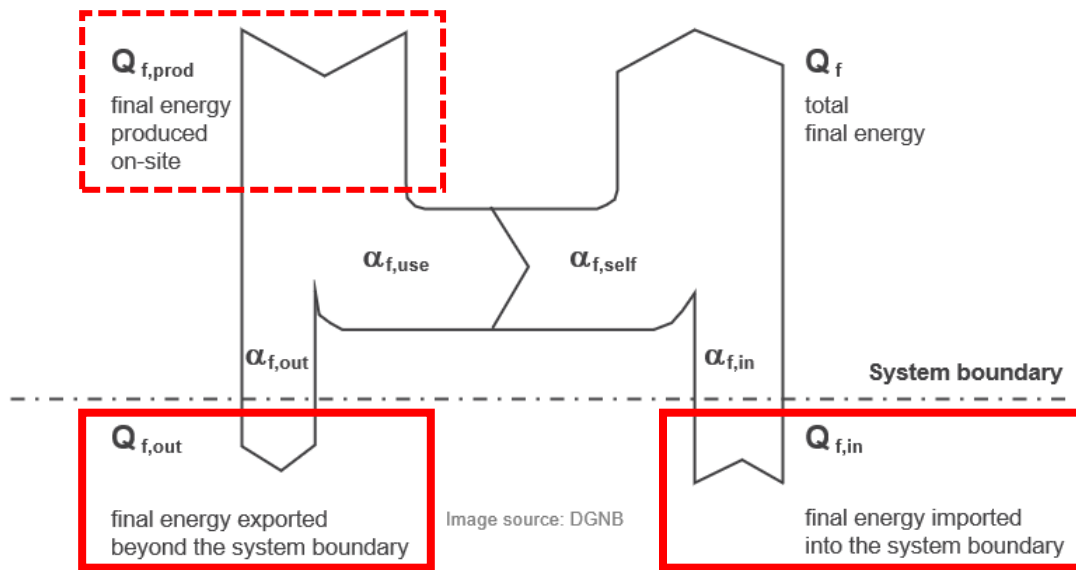
The use of generic Partial Energy Values as a substitute has an effect on the data quality of the CO₂ balance and is taken into account in the Data Quality Index (see [Sheet 10: ANNEX 4 Data Quality Index](#)).

For a complete **annual CO₂ balance** you must collect a full set of the following data:

- Final energy imported into the system boundary (Electrical und thermal energy sources)
- Final energy exported beyond the system boundary (Electrical und thermal energy sources)

For the calculation of the **self-generated fraction of consumed final energy**, the following data must be collected:

- Final energy produced on-site (Electrical und thermal energy sources)



Finally, you must perform a **data quality assessment** for the representativeness of the annual consumption data separately for each year under consideration (see [Sheet 10: ANNEX 4 Data Quality Index](#)) and transfer the result to the year-related input field.

3. ... to prepare a “Climate Positive” Award?

If your building has a negative annual CO₂ balance, you can obtain the DGNB “Climate Positive” Award for this building. If you are aiming for this award, enter the necessary data in the input fields from row 202 onwards and hereby confirm that the minimum requirements are met. The review of the documents and subsequent award process is carried out via the DGNB system Buildings In Use, Version 2020.

RESULT – What results from your inputs in this spreadsheet?
Your inputs create the following results on this spreadsheet:

- The **annual GHG emissions from imported final energy** (row 196)
Calculation see Framework
- The **annual GHG emissions from exported final energy** (row 197)
Calculation see Framework
- The **balance of GHG emissions** (row 198 and 199)
Calculation see Framework

Your inputs have the following effects on other spreadsheets:

- The **annual balance of GHG emissions** (row 198)
Effects on spreadsheet ‘PART 2a CAR Measures’: **Determination of the initial value** for the Climate Action Roadmap (cell H255). If the application *CO₂ balancing* is used, the **value** is taken **from the reference year**; if the *DGNB-System Buildings In Use* is taken, the calculation is based on an **average of the annual balance of GHG emissions of the three reference years**.



- The **year-related consumption data of the reference year for status assessment** (column H)
Effects on spreadsheet 'PART 2a CAR Measures': The year-related consumption data of the status assessment reference year are projected into the future as planned consumption data in the Climate Action Roadmap.
Important: This projection into the future represents only a first rough representation of the development under the assumption that the consumption data remain unchanged. These data are to be overwritten in the further processing of the Climate Action Roadmap (see [Sheet 4: PART 2a CAR Measures](#)) on the basis of realistic energy calculations.



Sheet 4: PART 2a CAR Measures

The spreadsheet 'PART 2a CAR Measures' requires measures identified by realistic energy calculations to achieve carbon neutrality by the planned target date. It also serves as a working document for continuous verification of the effectiveness of the implemented measures by replacing the planned consumption data with real measured consumption data.

The spreadsheet is divided into the following sections (similar structure as [Sheet 3: PART 1 Status assessment](#)):

- Year-related overview of the measures
- Year-related collection of annual consumption data (breakdown according to DIN V 18599-1: 2018-09)
 - of final energy imported into the system boundary
 - of final energy produced on-site
 - of final energy exported beyond the system boundary
- Balance of GHG emissions
- System Buildings In Use
- "Climate Positive" Award

INPUT – What do you need to enter in this spreadsheet, ...

1. ... to adapt the spreadsheet to your individual conditions?

To ensure that your Climate Action Roadmap is displayed correctly, you must "clean up" the spreadsheet manually. To do this, you must delete all year-related consumption data entered in the columns before your initial year and link the year-related consumption data of your individual initial year to the associated data in column G (initial value of CAR) if you want a projection based on the data in this column.

Note for the initial value of Climate Action Roadmap in 2020:

If you start your climate action roadmap in 2020, this adjustment can be omitted, as this is the default setting of the Excel tool and the period 2020-2050 is filled with the consumption data from the reference year.

For example, you start your climate action roadmap in 2022.

However, the Excel tool fills all year-related columns starting in 2020:

Current year of evaluation:		Year	Initial value of CAR	Data for 2020	Data for 2021	Data for 2022
2019			0	planned	planned	planned
Scheduled point in time for the achievement "carbon-neutral building operation":						
Final energy imported into the system boundary ("Import")						
According to the Framework: GHG emissions related to building energy import ("Import").						
Electrical energy						
1. Measured data available:						
Electrical energy - Energy source 1.1						
Type of energy source						
Electricity Mix Germany						
CO2 factor [kgCO2eq/kWh]	[kgCO2eq/kWh]			0.5894	0.5807	0.5721
Amount of energy	[kWh]		150.000	150.000	150.000	150.000



Therefore, you must manually "clean up" the columns and link the Climate Action Roadmap initial value to the column of your individual start year (column "G"):

Current year of evaluation: 2019 Year				
Scheduled point in time for the achievement "carbon-neutral building operation":	Initial value of CAR	Data for 2020 planned	Data for 2021 planned	Data for 2022 planned
Final energy imported into the system boundary ("Import") According to the Framework: GHG emissions related to building energy import ("Import").				
Electrical energy				
1. Measured data available:				
Electrical energy - Energy source 1.1				
Type of energy source				
Electricity Mix Germany				
CO2 factor [kgCO ₂ eq/kWh]	[kgCO ₂ eq/kWh]	0.5894	0.5807	0.5721
Amount of energy [kWh]	150.000			150.000

After "cleaning" the columns, you can hide the unused columns. This has the advantage that the previous, irrelevant years are not included in the graphical visualisation (see [Sheet 5: PART 2b CAR Graphic](#)).

You have then adapted the spreadsheet to your individual conditions:

Current year of evaluation: 2019 Year				
Scheduled point in time for the achievement "carbon-neutral building operation":	Initial value of CAR	Data for 2022 planned	Data for 2023 planned	Data for 2024 planned
Final energy imported into the system boundary ("Import") According to the Framework: GHG emissions related to building energy import ("Import").				
Electrical energy				
1. Measured data available:				
Electrical energy - Energy source 1.1				
Type of energy source				
Electricity Mix Germany				
CO2 factor [kgCO ₂ eq/kWh]	[kgCO ₂ eq/kWh]	0.5721	0.5624	0.5548
Amount of energy [kWh]	150.000	150.000	150.000	150.000

Note on the decarbonisation path:

According to the Framework, the decarbonisation pathway always starts in 2020 - regardless of the individual initial reference year. This is intended to prevent a wait-and-see approach and instead initiates rapid, targeted action, as no additional CO₂ budget is permitted:

Current year of evaluation: 2019 Year				
Scheduled point in time for the achievement "carbon-neutral building operation":	Initial value of CAR	Data for 2020 planned	Data for 2021 planned	Data for 2022 planned
Decarbonisation path - operation				
Years between the start point and end point [n]Years	28			
Decarbonisation path - carbon neutral in operation until 2050 [kgCO ₂ eq/a]		3.162	3.057	2.951
Decarbonisation path - carbon neutral in operation until 2050 (area-specific) [kgCO ₂ eq/a*NRF]		no net floor space	no net floor space	no net floor space
Accounting scope "Operation" CAR				
GHG emission balance				
GHG emissions from imported final energy ("Import") [kgCO ₂ eq/a]		6.324	6.324	6.324
GHG emissions from exported final energy ("Export") [kgCO ₂ eq/a]		0	0	0
GHG emissions balance - operation [kgCO ₂ eq/a]		6.324	6.324	6.324
GHG emissions balance - operation (area-specific) [kgCO ₂ eq/a*NRF]		no net floor space	no net floor space	no net floor space

2. ... so that the selected measures are displayed as a Climate Action Roadmap in the Excel tool?

After you have adapted the spreadsheet to your individual conditions, you can start entering the selected measures. The following input data is required for this:



- the **intended point in time for the achievement of „carbon-neutral building operation“** (enter in cell B8)
With this input you define the end point of the decarbonisation path.

- the **year-related measures** (row 12-20)

Für jede Maßnahme / jedes Maßnahmenpaket müssen Sie weitere Informationen eingeben:

- Action area according to the Framework (optional)
- Description of the measure(s)
- GHG emissions of the measure (mandatory for *accounting scope* “*operation and construction*”)
- Row(s) in Climate Action Roadmap: Here you can enter the Excel row(s) that are affected by the measure(s) for documation and traceability of your work (for information only).

4	Current year of evaluation:	2019	Year				
5							
6	Scheduled point in time for the achievement “carbon-neutral building operation”:	2050	Year				
7							
8							
9							
10	Measures						
11	Action area 1 (optional)						
12	Action area 2 (optional)						
13	Description of the measures/groups of measures						
14							
15	Important note when using ‘Green Electricity’: According to the framework (p. 32), green electricity can only be used as the final measure in the Climate Action Roadmap if this step achieves a carbon-neutral CO ₂ balance (steering effect).						
16	When using the CAR for reporting in actual operation: According to the framework (p. 32), the earliest possible use in actual operation makes perfect sense and should be considered for reporting.						
17							
18							
19	GHG emissions (Module B5 according to EN 15978)		[kgCO ₂ eq]				
20	Row(s) in Climate Action Roadmap						
21							
108	1. Measured data available:						
109							
110	Thermal energy - Energy source 1.1						
111	Type of energy source						
112							
113	CO ₂ factor [kgCO ₂ eq/kWh]		[kgCO ₂ eq/kWh]			Select energy source	Select energy source
114	Amount of energy		[kWh]		150.000	150.000	135.000
115							

If your measure includes a change of your energy source, use the input fields for **CAR energy source** for this purpose. Here, you also have the option of creating individual supplier-specific energy sources (e.g., a ‘Green Electricity’-Mix; see [Sheet 8: ANNEX 2 Specific Factors](#)) and selecting them from the drop-down menu.

Electrical energy							
1. Measured data available:							
Electrical energy - Energy source 1.1							
Type of energy source							
Electricity Mix Germany							
CO ₂ factor [kgCO ₂ eq/kWh]					0.5894	0.5807	0.5721
Amount of energy				150.000	150.000	150.000	
Electrical energy - Energy source 1.2							
Type of energy source							
CO ₂ factor [kgCO ₂ eq/kWh]					Select energy source	Select energy source	Select energy source
Amount of energy							
Electrical energy - Energy source 1.2							
Type of energy source							
CO ₂ factor [kgCO ₂ eq/kWh]					Select energy source	Select energy source	Select energy source
Amount of energy							
CAR Electrical energy - Energy source 1.1							
Type of energy source							
Green Electricity XYZ							
CO ₂ factor [kgCO ₂ eq/kWh]					0.0218	0.0218	0.0218
Amount of energy							150.000



Note on the use of green electricity:

According to the Framework, green electricity can only be applied as the last measure in the climate action roadmap if a climate-neutral CO₂ balance is achieved through this step.

Finally, you must perform a data quality assessment for the representativeness of the year-related consumption data separately for each year under consideration (see [Sheet 10: ANNEX 4 Data quality index](#)) and transfer the result to the year-related input field.

3. ... to use the spreadsheet as a working document for continuous verification of the effectiveness of the implemented measures?

If you want to use the Excel tool in the following years as a quality assurance of your established Climate Action Roadmap, you have to replace the initially planned consumption data with real measured consumption data every year. To help you with this, there is a visual display of the current year (input in cell B5), which represents the "border" between planned and measured consumption data.

Data for 2021	Data for 2022	Data for 2023
measured	this year	planned

Finally, you must perform a data quality assessment for the representativeness of the year-related consumption data separately for each year under consideration (see [Sheet 10: ANNEX 4 Data quality index](#)) and transfer the result to the year-related input field.

4. ... to prepare for verification and certification in the DGNB system Buildings In Use?

If you are aiming for a submission in the DGNB system Buildings In Use, show the data from row 280 onwards to display the evaluation of the performance according to criterion ENV1-B Climate Action and Energy indicator 6. The review of the documents and subsequent award is carried out via the DGNB system Buildings In Use, version 2020.

5. ... to prepare a "Climate Positive" Award?

If your building has a negative annual CO₂ balance, you can obtain the DGNB "Climate Positive" Award for this building. If you are aiming for this award, enter the necessary data in the input fields from row 292 onwards and hereby confirm that the minimum requirements are met. The review of the documents and subsequent award is carried out via the DGNB system Buildings In Use, Version 2020.

RESULT – What results from your inputs in this spreadsheet?

Your inputs create the following results on this spreadsheet:

- the **decarbonisation path – carbon neutral in operation until YYYY** (row 255)
Calculation see Framework
- the **annual GHG emissions balance – operation** (row 263)
Calculation see Framework
- the **total GHG emissions to be avoided by credits until 2050 – operation** (row G272)
Calculation see Framework
- the **total GHG emissions to be avoided by credits until 2050 – construction** (row G273)
Calculation see Framework



- the **avoided GHG emissions by credits during operation** (row 274)

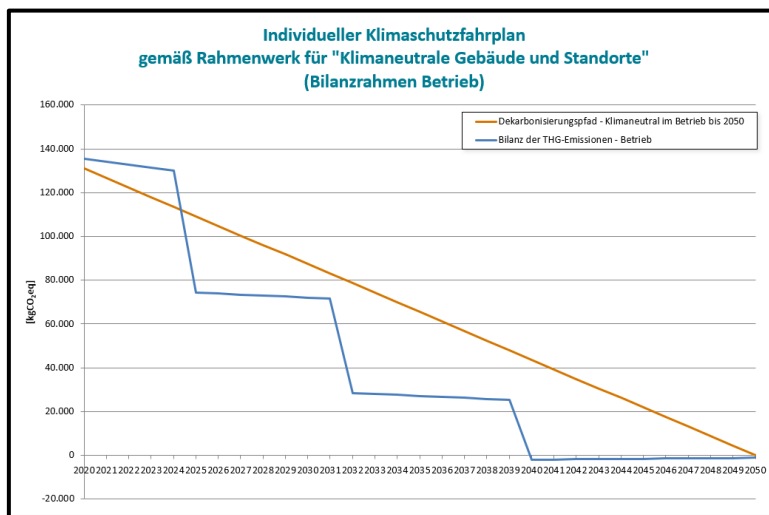
Your inputs have the following effects on other spreadsheets:

- the **decarbonisation path – carbon neutral in operation until YYYY** (row 255)
Effects on spreadsheet 'PART 2b CAR Graphic': Data series generates the graph "decarbonisation path – carbon neutral in operation until YYYY".
- the **annual GHG emissions balance – operation** (row 263)
Effects on spreadsheet 'PART 2b CAR Graphic': Data series generates the graph "annual GHG emissions balance – operation".



Sheet 5: PART 2b CAR Graphic

The spreadsheet 'PART 2b CAR Graphic' serves as an informative spreadsheet. Based on the numerical spreadsheet 'PART 2a CAR Measures', a graphical visualization of the building-specific climate action roadmap is created.



Sheet 6: PART 3 Climate Action Pass

The spreadsheet 'PART 3 Climate Action Pass' forms a structured format for the transparent, regular communication of relevant key figures of your building. Many stakeholder groups are interested in these key figures: Owners, operators, planners, developers, investors, financial experts, political decision makers as well as customers, employees and residents. The key figures are divided into the following groups:

- General information
- Key metrics on greenhouse gas emissions caused by ongoing operations (accounting scope "Operation")
- Key metrics on greenhouse gas emissions caused by construction (accounting scope "Construction")
- Key metrics when using an individual Climate Action Roadmap (CAR)
- Further key metrics and additional information
- Communication for extended accounting scope and future relevant information
- Terms according to the Framework

INPUT – What do you need to enter in this spreadsheet, ...

1. ... to create a Climate Action Pass for the year you want to report?

For the creation of a Climate Action Pass you must enter the desired year (enter in cell H4; YYYY). In the background, the Excel tool automatically takes the year-related data corresponding to the specified year from the spreadsheet 'PART 1 Status assessment' or 'PART 2a CAR Measures'.

Part 3: Climate Action Pass	
Climate Action Pass for year ...	2022 [YYYY]

In following years, you must manually update changes in the year-related data (e.g. reporting period, date of data collection, vacancy rate, etc.). In the affected cells, the coloring adjusts according to the color convention of the cells (see [color convention of cells](#)).



Sheet 7: ANNEX 1 Emission factors

The spreadsheet 'Sheet 7: ANNEX 1 Emission factors' serves as an informative spreadsheet. All energy sources are listed here, which are available for selection in the drop-down menus of the calculation sheets (see [Sheet 3: PART 1 Status assessment - INPUT](#)). The list contains the following information for each energy source:

- Description of the energy source
- Reference unit
- Fraction of renewable energy
- Scope 1 or 2
- Data source
- CO_{2,eq}-factors



Sheet 8: ANNEX 2 Specific factors

The worksheet 'ANNEX 2 Specific factors' allows you to create CO₂-factors for individual energy sources. Supplier-specific and project-specific emission factors can be entered and calculated. For the data, verification according to the Framework is required. Three individual energy sources can be created in each of the following categories:

- Supplier-specific 'Green Electricity'-Mix
- Project-specific Emission factor (in consultation with the DGNB office or your local GBC)
- Supplier-specific District heating
- Supplier-specific District cooling

INPUT – What do you need to enter in this spreadsheet, ...

1. ... to create an individual energy source?

When creating an individual energy source, you must identify to which category the individual energy source belongs, since the first category "Supplier-specific 'Green Electricity'-Mix" slightly differs from the other categories.

When creating **Supplier-specific 'Green Electricity'-Mix** there are two options to enter the emission factors:

'Green Electricity'-Mix 1 (supplier-specific)		
Product name:		e.g. green-electricity mix of local utility supplier
Supplier:		
Input factor:		
Evidence:	Specific emission factor Percentage composition	
Specific emission factor:		
CO ₂ -factor:		[kgCO ₂ eq/kWh]
Data source:		[]
Percentage breakdown:		
Electricity from solar PV	[%]	
Electricity from biomass	[%]	
Electricity from biogas	[%]	
Electricity from wind power	[%]	
Electricity from hydropower	[%]	
CO ₂ -factor	[kgCO ₂ eq/kWh]	

- Input option *Specific emission factor*
If you select this input option, you can enter an externally calculated emission factor. The external calculation must follow the rules according to the Framework. In addition, you must specify the underlying data source.
- Input option *Percentage composition*
If you select this input option, you can enter the percentage composition of your 'Green Electricity'-Mix and the individual emission factor will be calculated based on the listed emission factors (see [Sheet 7: ANNEX 1 Emission factors](#)). You can ask your supplier for the percentage composition.



'Green Electricity'-Mix example:

'Green Electricity'-Mix 1 (supplier-specific)		
Product name:	Green Electricity'-Mix example by DGNB	e.g. green-electricity mix of local utility supplier
Supplier:	DGNB	
Input factor:	Percentage composition	
Evidence:	Evidence x.y_Supplier-specific 'Green Electricity'-Mix	
Specific emission factor:		
CO ₂ -factor:		[kgCO ₂ eq/kWh]
Data source:		[-]
Percentage breakdown:		
Electricity from solar PV	[%]	20%
Electricity from biomass	[%]	50%
Electricity from biogas	[%]	
Electricity from wind power	[%]	
Electricity from hydropower	[%]	30%
CO ₂ -factor	[kgCO ₂ eq/kWh]	0,0404

When **creating an energy source for the other categories**, the following input mask appears:

Product name:		e.g. electricity from neighbouring property
Share of renewable energy:		[%]
Supplier:		
Evidence:		
Specific emission factor:		
CO ₂ -factor:		[kgCO ₂ eq/kWh]
Data source:		[-]

In addition to the product name and the supplier, the **share of renewable energy [%]** must also be entered. The percentage of renewable energy has an impact on the key figures under '5. Further key metrics and additional information' for the Climate Action Pass - see [Sheet 6: PART 3 Climate Action Pass](#).

The emission factor must be calculated externally. The external calculation must follow the rules according to the framework. In addition, you must specify the underlying data source.

RESULT – What results from your inputs in this spreadsheet?

Your inputs have the following effects on other spreadsheets:

- The created **energy sources** have effects on spreadsheet 'PART 1 Status assessment':
The created individual energy sources are now available in the drop-down menu of the calculation.

effects on spreadsheet 'PART 2a CAR Measures':
The created individual energy sources are now available in the drop-down menu of the calculation.

effects on spreadsheet 'Sheet 7: ANNEX 1 Emission factors':
The created individual energy sources are now available in the listed emission factors.



Sheet 9: ANNEX 3 Partial energy values

The spreadsheet 'ANNEX 3 Partial energy values' allows you to determine generic consumption data if there are subareas and/or energy use in your building with currently unavailable measured data. In this tool the calculation of generic Partial Energy Values (PAV) for up to three subareas/consumers is possible.

INPUT – What do you need to enter in this spreadsheet, ...

1. ... to create a subarea / a partial consumer?

When creating a subarea / partial consumer, it is relevant for the calculation whether you want to determine the electricity and/or heat consumption. To do this, select your application from the drop-down menu:

After that you have to enter the area [m²] according to the space types listed in column B.

Note on electricity consumption:

In the formulas (columns "L", "P" and "T") the electricity consumption from lighting (column "F"), ventilation (column "G"), cooling (column "H") and user-energy/plug-loads ("column I") is calculated. If the electricity consumption for ventilation and cooling is already included in the general areas, the partial energy values in columns "G" and "H" can be omitted manually from the sum formulas.

RESULT – What results from your inputs in this spreadsheet?

Your inputs have the following effects on other spreadsheets:

- the **electricity and/or heat consumption** of individual subareas/consumptions
Effect on spreadsheet 'PART 1 status assessment': The determined, generic consumption data is transferred to this calculation in the section "Final Energy imported into the system boundary" for both "Electrical Energy" and/or "Thermal Energy" in the field "2. Measured data not available". The selection of the type of energy source is required to activate the energy consumption calculated by partial energy values.

Sheet 10: ANNEX 4 Data Quality Index

The spreadsheet 'ANNEX 4 Data Quality Index' allows you to evaluate the quality of your annual CO₂ balance. For this purpose, you need to perform a qualitative assessment of the following aspects:

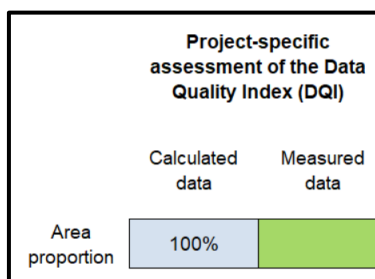
- Technical representativeness
- Geographical representativeness
- Time representativeness
- Professional capabilities
- Independant verification



INPUT – What do you need to enter in this spreadsheet, ...

1. ... to determine the data quality index for **a particular year**?

In order for the calculation process to start, you must enter the percentage of areas with consumption data available as measured data (enter in cell I7):



After that you have to make a qualitative assessment of all aspects according to the descriptions and transfer the result numerically into the corresponding input field in spreadsheet ‘PART 1 Status assessment’ resp. ‘PART 2a CAR Measures’.

Note on data quality assessment:

The data quality assessment must be performed for each reporting period **(annually)**.

RESULT – What results from your inputs in this spreadsheet?

Your inputs have the following effects on other spreadsheets:

- the **Data Quality Index** for a particular year has
Effects on spreadsheet ‘PART 1 Status assessment’: You must transfer the determined year-related Data Quality Index into the corresponding input field.
Effects on spreadsheet ‘PART 2a CAR Measures’: You must transfer the determined year-related Data Quality Index into the corresponding input field.

Sheet 11: ANNEX 5 Definition of terms

The spreadsheet ‘ANNEX 5 Definition of terms’ serves as an informative spreadsheet

It contains illustrations for further information on:

- the system boundary according to the Framework
- the definition of terms for final energy calculation according to DIN V 18599-1: 2018-09



ACKNOWLEDGEMENT

The development and implementation of the DGNB CO₂ accounting tool was supported by the Federal Environment Agency and the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety within the research project [Wissenstransfer Bau](#).

