

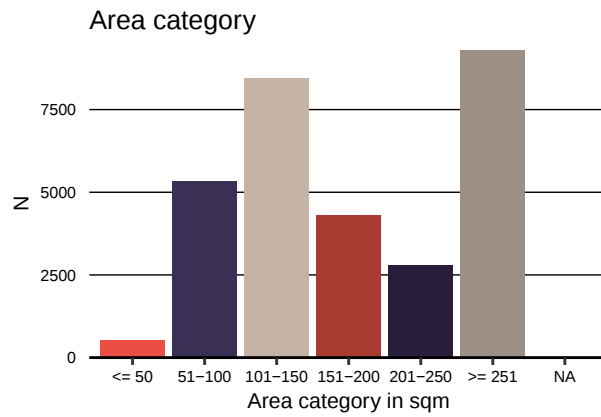
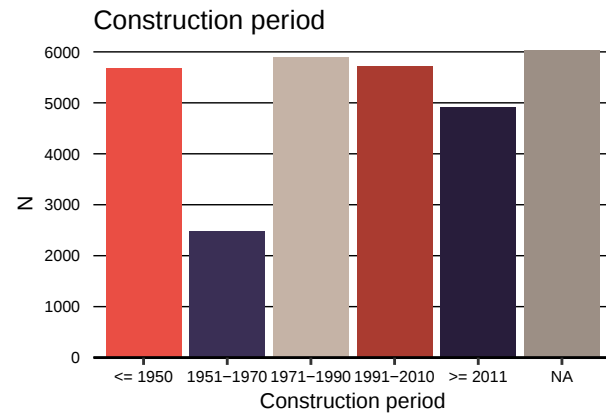
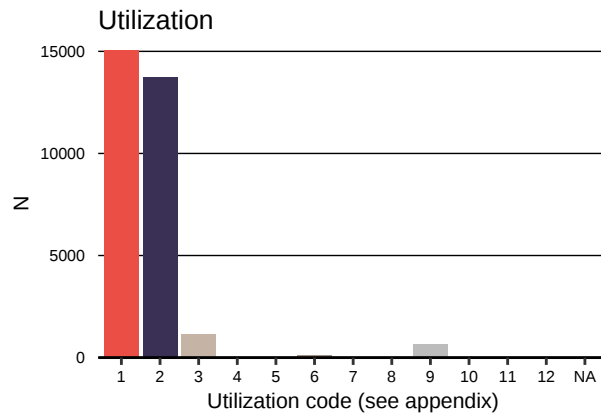
Climate Impact Evaluation of Portfolio

Project number:	117244.0011
Client:	Banque cantonale de Fribourg
Version portfolio:	2024-12-31
Number of observations:	30'742
Sum of market value of portfolio in CHF:	NA
Weighted average loan-to-value ratio of portfolio in %:	86 %
Financed emissions coverage rate portfolio in %:	61 %
Total energy reference area in square meters:	11'040'307
Emission factors:	Emissionsfaktoren des Gebäudesektors
Processed by:	Margarita Agriantoni
Date:	2025-02-04



Portfolio

Descriptive analysis of key variables



Data quality

Data quality score Wüest Partner

Data quality score WP	n	%
0: No calculation possible	9638	31 %
1: Data quality insufficient	2674	9 %
2: Data quality sufficient	18430	60 %
3: Data quality good	0	0 %
Total	30742	

Notes:

- "No calculation possible" means that important data was missing (from the original data and from the GWR). GHG emissions are only calculated for buildings that fulfill the following criteria:
 1. Coordinates are available with sufficient quality regarding spatial accuracy
 2. Year of construction, energy reference area, number of floors, utilization and heating source are available
 3. The sum of the area share of all utilizations is equal to 1
- "Data quality insufficient" can mean two things: Either the heating carrier is not known (neither from the original data nor from the GWR) and was enriched (i.e. Monte Carlo simulation, assumption oil heating). Or the area of a condominium was not available in the client's data and was enriched from the GWR by taking the average apartment size of all apartments in a specific building.
- "Data quality sufficient" states that at least one variable is enriched from the GWR or that the building is older than 30 years and no refurbishments are known.
- "Data quality good" indicates that none of the key variables had to be enriched from the GWR and that refurbishments are known for buildings that are older than 30 years.

Data origin

Variable	Original Data	GWR	Other	Missing Data
Area	38 %	44 %	18 %	0 %
Floors	8 %	34 %	46 %	12 %
Construction Year	48 %	34 %	0 %	18 %
Energy Carrier	0 %	55 %	18 %	27 %

Notes:

This table shows the origin of each of the key variables (if the variable was available in the client's dataset or had to be enriched with the GWR etc.). The category "other" includes the following specifications:

- The specification "weighted mean of portfolio" for the area.
- The specification "no number of floors necessary for condominiums" for the number of floors.
- The specification "monte carlo simulation" for the energy carrier.

Data quality score PCAF

PCAF data quality score	n	%
Score 1	0	0 %
Score 2	0	0 %
Score 3	0	0 %
Score 4	21104	69 %
Score 5	9638	31 %
Total	30742	

Notes:

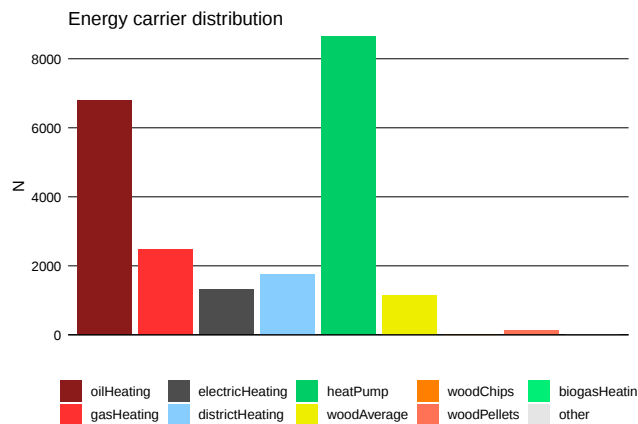
PCAF stands for Partnership for Carbon Accounting Financials. Find more information here: <https://carbonaccountingfinancials.com/standard>.

The scores are described as follows:

- **Score 1:** Primary data on actual building energy consumption (i.e., metered data) is available. Emissions are calculated using actual building energy consumption and supplier-specific emission factors specific to the respective energy source.
- **Score 2:** Primary data on actual building energy consumption (i.e., metered data) is available. Emissions are calculated using actual building energy consumption and average emission factors specific to the respective energy source.
- **Score 3:** Estimated building energy consumption per floor area based on official building energy labels AND the floor area are available. Emissions are calculated using estimated building energy consumption and average emission factors specific to the respective energy source.
- **Score 4:** Estimated building energy consumption per floor area based on building type and location-specific statistical data AND the floor area are available. Emissions are calculated using estimated building energy consumption and average emission factors specific to the respective energy source.
- **Score 5:** Estimated building energy consumption per building based on building type and location-specific statistical data AND the number of buildings are available. Emissions are calculated using estimated building energy consumption and average emission factors specific to the respective energy source.

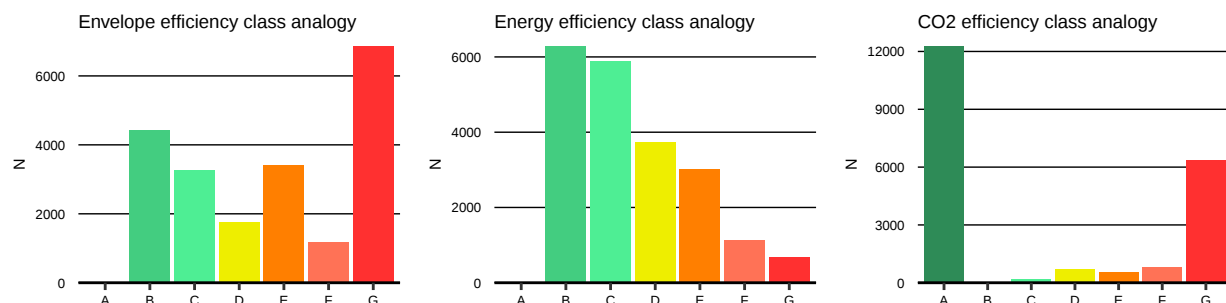
Energy analysis

Heating carrier



Simplified energy efficiency rating: Envelope, Energy and CO2 efficiency

Class	Envelope Efficiency Class	Energy Efficiency Class	CO2 Efficiency Class
A	0 %	0 %	40 %
B	14 %	20 %	0 %
C	11 %	19 %	1 %
D	6 %	12 %	2 %
E	11 %	10 %	2 %
F	4 %	4 %	3 %
G	22 %	2 %	21 %
No calculation possible	32 %	33 %	32 %



Notes:

- **Envelope Efficiency:** The envelope efficiency describes the quality of the building envelope based on the simulated space heating energy demand. A well-insulated building reaches a better efficiency rating than a poorly or non-insulated building.
- **Overall Energy Efficiency:** The overall energy efficiency describes the performance of the weighted end energy demand. This includes heating energy demand, hot water demand, and further electricity demand and respective system efficiencies. A building can therefore perform well, when it uses little energy or when it is equipped with non-fossil heating systems or, ideally, both.
- **CO2 Efficiency:** The CO2 efficiency rating describes the amount of direct fossil emissions that are emitted on site. A building with a non-fossil heating system will, therefore, always be in class A.

Greenhouse gas emissions

Measure	Scope 1	Scope 2	Scope 3.3	N
Relative emissions kgCO ₂ e/ m ² Year: Mean	20.7	1.7	7.3	30'742
Relative emissions kgCO ₂ e/ m ² Year: Weighted Mean	16.9	1.6	6	30'742
Absolute emissions t CO ₂ e/ Year	186'554.7	17'351.1	66'779.1	30'742

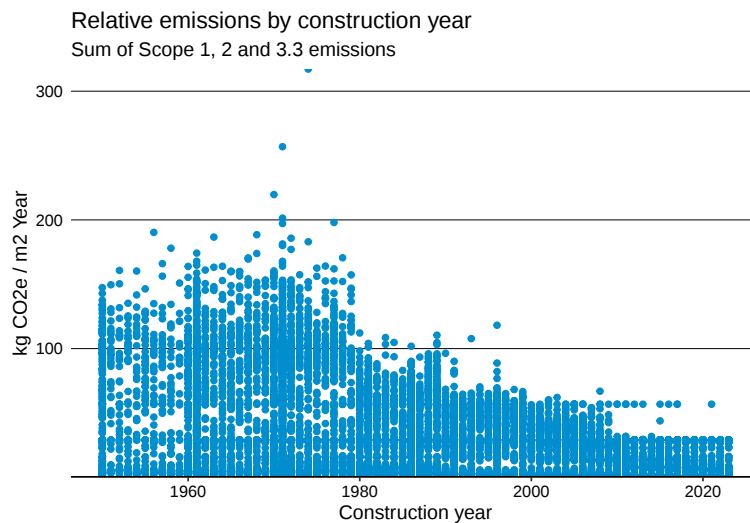
Notes:

Relative emissions denote the emissions per square meter (energy reference area). Absolute emissions denote the total per year emissions from the entire building (relative emissions multiplied by the energy reference area of the building).

The GHG Protocol defines how the GHG footprint of companies should be calculated.

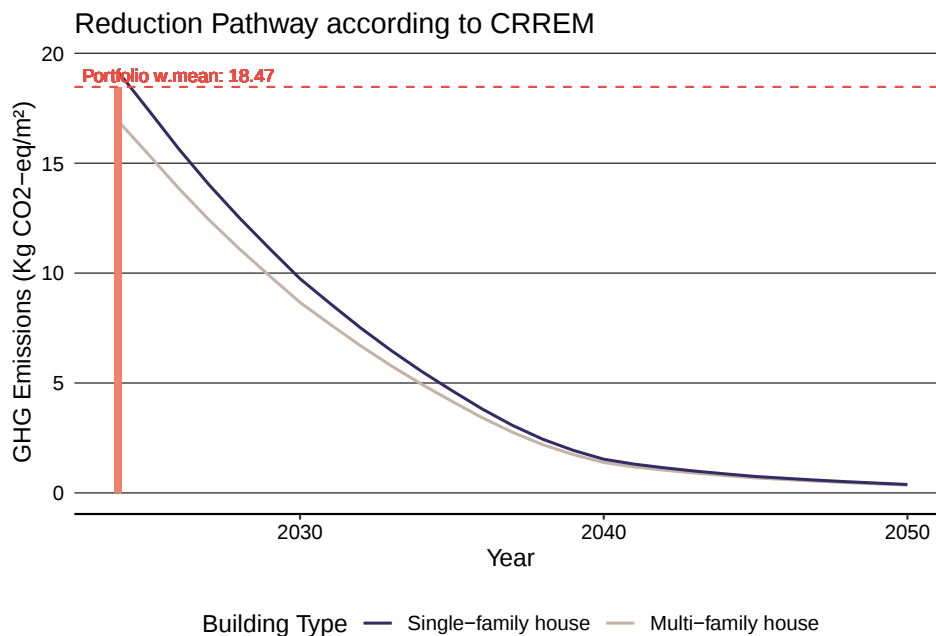
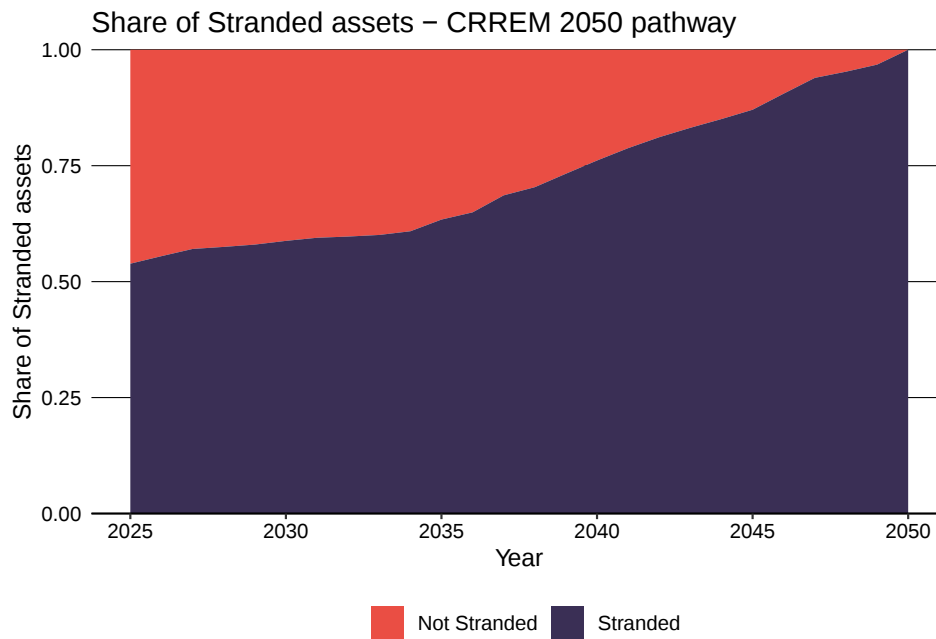
- Scope 1: Direct fossil emissions happening on premise.
- Scope 2: Indirect emissions occurring at the generation of imported energy such as electricity or heat (e.g., district heating).
- Scope 3.3: Emissions from upstream processes for extraction, production and transportation of the energy source or for the production facilities and their transportation of electricity (e.g. maintenance of the electricity grid).

Correlation between relative GHG emissions and construction year



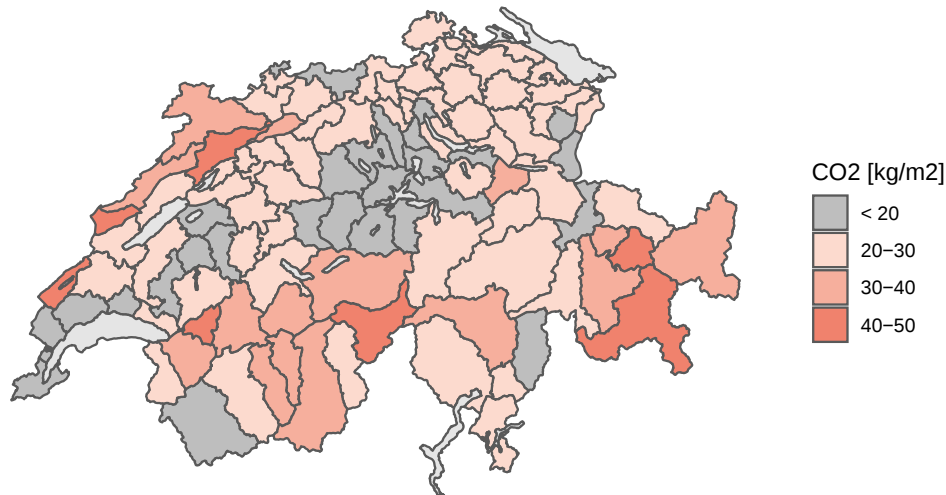
Transitory risks: Share of Stranded Assets

An asset is stranded, as soon as its emissions exceed the target emission of a chosen reduction path. We use the CRREM-SBTi reduction paths with horizon 2050 (see <https://www.crrem.eu/tool/>). The reduction paths are calculated top down using the global greenhouse gas budget. The greenhouse gas budget for achieving the 1.5° C targets of the Paris Climate Conference is decomposed by country and sector.



Benchmark analysis

Weighted mean total emissions by MS region for heated building park



Benchmark Swiss building park by scope

Benchmark	Scope 1	Scope 2	Scope 3.3	N
Heated building park Switzerland				
Relative emissions kgCO2e/ m2Year: Mean	30.7	1.6	10.3	1'850'894
Relative emissions kgCO2e/ m2Year: Weighted Mean	23	1.6	7.9	1'850'894
Total building park Switzerland				
Relative emissions kgCO2e/ m2Year: Mean	25.2	1.3	8.5	2'255'075
Relative emissions kgCO2e/ m2Year: Weighted Mean	20.6	1.5	7.1	2'255'075
Multi-family houses Switzerland				
Relative emissions kgCO2e/ m2Year: Mean	27.8	1.6	8.9	417'852
Relative emissions kgCO2e/ m2Year: Weighted Mean	21.9	1.6	7.2	417'852
Single-family houses Switzerland				
Relative emissions kgCO2e/ m2Year: Mean	31	1.5	10.6	1'294'016
Relative emissions kgCO2e/ m2Year: Weighted Mean	27.6	1.3	9.5	1'294'016

Benchmark for main canton by scope

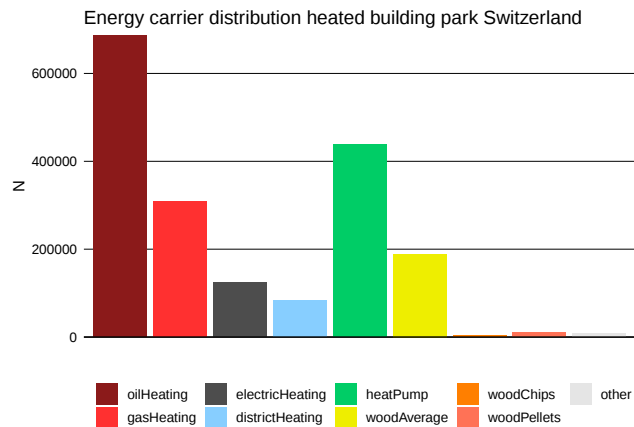
Benchmark	Scope 1	Scope 2	Scope 3.3	N
Heated building park Fribourg				
Relative emissions kgCO ₂ e/ m ² Year: Mean	22.9	1.6	8.2	75'954
Relative emissions kgCO ₂ e/ m ² Year: Weighted Mean	19.6	1.6	7.1	75'954
Total building park Fribourg				
Relative emissions kgCO ₂ e/ m ² Year: Mean	17.9	1.3	6.5	97'395
Relative emissions kgCO ₂ e/ m ² Year: Weighted Mean	16.9	1.4	6.2	97'395
Multi-family houses Fribourg				
Relative emissions kgCO ₂ e/ m ² Year: Mean	22.2	1.7	7.5	11'972
Relative emissions kgCO ₂ e/ m ² Year: Weighted Mean	18.5	1.8	6.4	11'972
Single-family houses Fribourg				
Relative emissions kgCO ₂ e/ m ² Year: Mean	21.3	1.5	7.8	59'685
Relative emissions kgCO ₂ e/ m ² Year: Weighted Mean	20.2	1.3	7.5	59'685

Distribution of emission intensity (sum of relative Scope 1, 2 and 3.3 emissions) in kgCO₂e/a

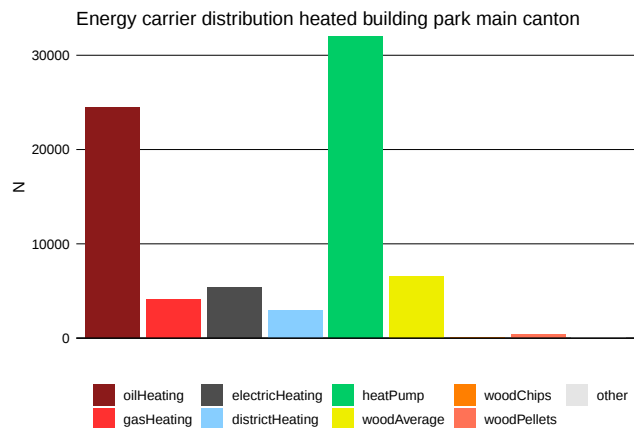
Percentile	Switzerland	Fribourg	Portfolio Banque cantonale de Fribourg
90	107.9	103.6	82.4
70	63.2	43.2	29
50	26.8	7.9	27.3
30	7.2	3	5.7
10	1.8	1.3	1.4

Notes: The percentiles of the benchmarks were calculated by using the heated building park.

Heating carrier distribution heated building park Switzerland



Heating carrier distribution heated building park Fribourg



Assumptions

Assumptions utilization key

1. Residential, multi-family house
2. Residential, single-family house
3. Administration/Office
4. School
5. Retail
6. Restaurant
7. Assembly center
8. Hospital
9. Industry
10. Warehouse
11. Sports building
12. Indoor swimming pool

Assumptions condominiums

- For the calculation of Scope 1 and 2 emissions, the position and the number of walls of condominiums must be specified.
 - The position of a condominium is defined by the following rules:
 - * If "condominium floor" is equal to 0, the position is "ground floor".
 - * If "condominium floor" is greater than 0 and less than the total number of floors (minus ground floor), the position is "middle".
 - * If "condominium floor" is greater than 0 and equal to the total number of floors (minus ground floor), the position is "top floor".
 - * For combinations or missing data, "ground floor" is assumed.
 - The number of walls is derived using the following rules:
 - * If "house type" equals "Detached" or "Rustico" or is missing, the number of walls is 4 (Worst case assumption).
 - * If "house type" is equal to "Attached end building", the number of walls is 3.
 - * If "house type" is equal to "Attached midterrace building", the number of walls is 2.
 - * If the area of the dwelling is less than or equal to 50

Assumptions refurbishment years

- Assumption of refurbishment year for windows, facade, roof and basement:
 - If a refurbishment year for windows, facade, roof or basement is available in the original data, then this is used.
 - If there is no refurbishment year in the original data for specific building components, the following rule is applied:
 - * If a refurbishment took place more than 40 years ($\geq$) and less than 60 years ($<$) after the year of construction and the refurbishment costs were greater than 30
 - * If the refurbishment took place more than 60 years ($\geq$) after the year of construction and the refurbishment costs were greater than 50
 - * To derive the building costs, internal benchmarks are used based on year of construction and standard. These benchmarks are extrapolated into the past based on the construction cost index of the BFS. Benchmarks are only available up to 1998. If the year of construction is before 1998, the benchmark for 1998 is used. If no standard is available, a value of 3.0 is assumed.
- No general refurbishment years from the GWR are used.

Assumptions carbon value at risk

1. The cvar is calculated as follows:

$$CVAR = \frac{NPV \left(\sum_{t=2022}^{2050} ((emissions_t - emissions\ reduction\ path_t) \times emission\ price_t) \right)}{market\ value}$$

2. Discount rate: Use of 30-year federal bond yield: 0.3
3. Carbon price: CO2 tax (BAFU) of CHF 120 /TCO2 in Switzerland

Information regarding GRI Reporting Framework 305

1. General information: The GRI Reporting assumes the perspective of the client. In this sense, the calculated emissions of the mortgage portfolio make part of Scope 3. Therefore, the following information refers to the GRI reporting chapter 305-3 (Scope 3).
2. Regarding point a: Information can be found in the report (chapter „Greenhouse gas emissions“). See absolute emissions.
3. Regarding point b: For the emission factors „Emissionsfaktoren des Gebäudesektors“ (intep), the following greenhouse gases are included in the calculation: CO2, CH4, N2O, HCF's, SF6 and NF3 (see „Treibhausgas-Emissionsfaktoren für den Gebäudesektor“, intep, p.7)
4. Regarding point c: The biogenic emissions are reported and can be found in the output file (variable „absolute-biogenic-oos“, „oos“ meaning „out of scope“).
5. Regarding point d and e: Has to be defined by client.
6. Regarding point f: See title page for emission factors.
7. Regarding point g: We follow SIA Norms for the calculation procedure and the utilisation benchmarks. Standardised climate data from MeteoSchweiz is included. A more detailed description of the simulation procedure can be found in the model documentation.