



CRREM – Carbon Risk Real Estate Monitor

CRREM Tool: Guidance for application of the CRREM Risk Assessment Tool outside the EU

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(1) BACKGROUND

The CRREM Risk Assessment tool has been implemented within the framework of an EU funded Horizon 2020 Framework Programme and is therefore applicable for the analysis of commercial real estate for all 27 EU member states including the UK. Due to the great success of the project and the tool itself, there have been repeated enquiries about the applicability of the tool outside the EU and for residential use. This request was expressed intensively, especially in the wake of the publication of the global decarbonisation pathways for the real estate industry (sponsored by PGGM, APG and Norges Bank, see the “Global downscaling pathways” via www.crrem.org/pathways/).

This document takes up the request and explains in detail which adaptations have to be undertaken by the users in order to make all functions in the EU-version usable for other regions to obtain regional specific and reliable results.

In principle, the tool can also be used outside the EU and also applicable for other building types. The excel-based solution is flexible and not limited to the EU or commercial real estate. Nevertheless, the following aspects have to be considered, which are automatically selected (default-values) by the tool starting from the data in the back-end and included in the calculation:

- **Climatic conditions:** The tool performs an adjustment of the input data based on the climatic conditions of the selected location (HDD & CDD). Based on climate forecasts, the software also makes specific regional adjustments in order to align with the heating and cooling requirements. For both aspects, current and future developments of the HDD and CDD at the selected location need to be defined and entered in the back-end. Currently, only the European values are entered in the tool.
- **Decarbonisation pathways:** currently, only the decarbonisation pathways for energy and carbon intensity for all European member states are provided in the tool. The international pathways based on the CRREM data (available via www.crrem.org) must be entered manually.
- **Emission factors (EF):** the grid emission factors and the development of these until 2050 are also entered in the back-end. Country specific EF need to be entered in the back-end for the analysis of a country outside the EU.
- **Energy and carbon prices:** Country specific average energy and carbon prices are entered in the back-end of the tool for all European countries. For an analysis of assets outside the EU, the respective energy and carbon prices must be entered.

The following sections explain the necessary manual adjustments in detail. The adjustments should always be made on the basis of the current version of the tool (latest version V1.13 available on www.crrem.eu/tool) and the corresponding reference guide/user manual (available via www.crrem.eu/reference guide/).



- Decarbonisation pathways: CRREM “Back-end” Sheet: AXG & AYQ - The user can now exchange the GHG & kWh pathways for the 1.5 & 2°C targets for the respective country selected.

Back-End Sheet (Example Switzerland in place of France):

AXG	AXH	AVH	AVJ	AVK	AVL	AVM	AVN	AVO	AVP	AVQ	AVR	AVS	AVT	AVU	AVV	AVW	AVX	AVY	AVZ	ATA	ATB	ATC	ATD	ATE	ATF	ATG	AUH	AUI	AUJ	AUK	AVL	AVM	AVN	AVO	AVP	AVQ	AVR
C.BT_GW	Y2018	Y2019	Y2020	Y2021	Y2022	Y2023	Y2024	Y2025	Y2026	Y2027	Y2028	Y2029	Y2030	Y2031	Y2032	Y2033	Y2034	Y2035	Y2036	Y2037	Y2038	Y2039	Y2040	Y2041	Y2042	Y2043	Y2044	Y2045	Y2046	Y2047	Y2048	Y2049	Y2050	C.BT_GW	Y2018	Y2019	
FR_OFF	39.0	39.0	37.2	35.6	34.2	32.9	31.7	30.4	29.2	27.9	26.7	25.5	24.3	23.2	22.0	20.9	19.8	18.7	17.6	16.5	15.4	14.2	13.0	11.9	10.7	9.6	8.4	7.4	6.4	5.5	4.7	4.0	3.4	3.0	FR_OFF	220	217
FR_RHS	14	414	394	348	349	336	323	310	296	283	271	259	246	234	222	210	199	187	175	163	151	139	126	114	101	90	7.8	6.8	5.8	5.0	4.3	3.7	3.2	FR_RHS	34.474	34.474	
FR_OFF	39.0	39.0	37.2	35.6	34.2	32.9	31.7	30.4	29.2	27.9	26.7	25.5	24.3	23.2	22.0	20.9	19.8	18.7	17.6	16.5	15.4	14.2	13.0	11.9	10.7	9.6	8.4	7.4	6.4	5.5	4.7	4.0	3.4	FR_OFF	220	217	
FR_RHS	14	414	394	348	349	336	323	310	296	283	271	259	246	234	222	210	199	187	175	163	151	139	126	114	101	90	7.8	6.8	5.8	5.0	4.3	3.7	3.2	FR_RHS	34.474	34.474	

- Other default data: The user should also overwrite all areas that refer to country & asset-type specific default values. Please find the complete list below:

Default values to be changed in the “Back-end” sheet:

Pathway: AXG & AYQ (country & asset-type specific for 1.5 & 2°C).
You may find the global pathways for all asset-types [here](#).

Electricity EF & development until 2050: Back-end A 22-A 51

District Heating EF: Back-end ratio J 123 to Electricity EF UK is used

The default emission factors evolve dynamically over time, with the district heating emission factor being coupled to the development of the electricity emission factor of the selected country. User-defined emission factors and the development can be entered in the settings sheet.

Electricity Price & development until 2050: Back-end AVH 213

Gas Price & development until 2050: Back-end AVH 96

Oil Price & development until 2050: Back-end AVH 127

Coal Price & development until 2050: Back-end AVH 344

Wood Chip Price & development until 2050: Back-end AVH 187

Pellets Price & development until 2050: Back-end AVH 253

District Heating Price & development until 2050: Back-end AVH 344

Carbon Price (€/Kg) & development until 2050: Back-end AVH 439

Carbon Price Development: Back-end CVQ

HDD/CDD in respective year: Back end 4 (please blend in this sheet (“unhide”))

HDD/CDD development until 2050: Back end AXD

(3) RESIDENTIAL BUILDING DATA INPUT

The default decarbonisation pathways within the tool include commercial real estate for Europe.

Nevertheless, users can always enter “User-Defined Decarbonisation Pathways”, this includes entering country-specific residential pathways. The global pathways, including asset-type specific pathways for multi-family and single-family buildings can be downloaded [here](#).

The CRREM Tool “Settings” sheet enables users to enter individual decarbonisation pathways for each asset. This enables the user to either make own assumptions or benchmark individual assets of the portfolio against the country specific residential pathways for the 1.5°C/2°C targets.

Input Guide – Option 1:

- CRREM “Settings” Sheet: Column KM- LT
- User-defined decarbonisation pathway from 2018-2050 in terms of GHG for residential real estate

Input Guide – Option 2:

The user also has the option to overwrite data in the Back-end sheet and input the residential pathways e.g. instead of the asset-type “e.g. Leisure”. This results in a change in the drop-down “Property-type” list in the Input sheet. The user can now select “Residential” instead of “Leisure” in the Input sheet.

- CRREM “Back-end” Sheet: M128-M135. Note: Please do NOT change any input in N128-N135.
- CRREM “Back-end” Sheet: AXG & AYQ - The user can now exchange the (e.g. Leisure ‘LEI’) GHG & kWh pathways for the 1.5 & 2°C residential targets for the respective country selected.
- CRREM “Back-end” Sheet: EF can be changed in E23-E51.

(4) DATA INPUT FROM THE GRESB DATA SHEET

The CRREM asset data input is fully aligned with GRESB. Should you use / already have the GRESB data input sheet available, you may input the GRESB parameters into the CRREM tool using the following GRESB/CRREM mapping:

Asset ID: Input data from the GRESB “Asset Characteristics” sheet (name GRESB Asset ID).

General Information

- Asset name: GRESB Sheet “Asset Characteristics”.
- Reporting year: GRESB Sheet “Reporting Characteristics”.
- GAV: GRESB Sheet “Asset Characteristics”.
- Reporting period: GRESB Sheet “Energy Consumption”.
- Entity: GRESB does not report entity name, this can be completed additionally.

Building Characteristics

- Location: GRESB Sheet “Asset Characteristics” (F, H, G, I).
- Property Type: GRESB Sheet “Asset Characteristics” (E).
- Air conditioning: GRESB does not air conditioning, this can be completed additionally.
- Asset size: GRESB Sheet “Asset Characteristics” (L).
- Vacancy: GRESB Sheet “Reporting Characteristics” (F).

Energy Consumption

- Energy consumption – Grid: GRESB “Energy Consumption” ((S or AB/AK + AT/BC)-BJ).
- Data Coverage – Grid: GRESB “Energy Consumption” (T or AC/AL + AU/BD).
- Max Coverage – Grid: GRESB “Energy Consumption” (U or AD/AM + AV/BE).
- Energy consumption – Gas: GRESB “Energy Consumption” (M or V/AE + AN/AW).
- Data Coverage – Gas: GRESB “Energy Consumption” (N or W/AF + AO/AX).
- Max Coverage – Gas: GRESB “Energy Consumption” (O or X/AG + AP/AY).
- Energy consumption – District Heating: GRESB “Energy Consumption” (P or Y/AH + AQ/AZ).
- Data Coverage – District Heating: GRESB “Energy Consumption” (Q or Z/AI & AR/BA).
- Max Coverage – District Heating: GRESB “Energy Consumption” (R or AA/AJ & AS/BB).
- Other energy consumption: Please fill in this section separately, GRESB does not record this data.

Fugitive Emissions

- Please fill in this section separately, GRESB does not record this data.

Renewable Energy

- Onsite renewable (generated & consumed on-site for PV & Wind): GRESB “Energy consumption” (BJ).
- Onsite renewable (generated & exported for PV & Wind): GRESB “Energy consumption” (BK).
- Generated off-site & consumed on-site: GRESB “Energy consumption” (BM + BN).
- Heat-pump & solar: GRESB does not differentiate, therefore energy consumption is included in the GRESB sheet “Energy consumption” (BJ + BL and BM & BN).

Retrofit actions

- Please fill in this section separately, GRESB does not record this data.

For further information on GRESB & CRREM data output please see the [CRREM Tool Risk Assessment Reference Guide](#).