Financing towards net-zero buildings

a PCAF project

User guide to the PCAF European Building Emission Factor Database

August 2023

PCAF Partnership for Carbon Accounting Financials

Disclaimer

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Introduction

Timeline

How to use the PCAF European building emission factor database

Introduction to the PCAF European building emission factor database

The PCAF European building emission factor database, created by Guidehouse Netherlands B.V. on behalf of PCAF, provides financial institutions with a specified set of emission factors for mortgages and commercial real estate for all countries in the European Union, as well as Norway, Switzerland and the United Kingdom. The key objective of the database is to enable the financial industry **to measure and track the financed emissions of their European building portfolios towards net zero.** Depending on the data availability, financial institutions are able to distinguish between asset classes, European countries, residential and non-residential building types and energy performance certificate (EPC) ratings, to extract the specified emission or energy intensity per floor area or unit from the database.

The database has the following key features:

- available for **free to all financial institutions and further interested stakeholders,**
- based on **publicly available sources,**
- **web-based**, providing downloadable files with emissions factors, and
- **easy to access** and **user-friendly**.

The PCAF European emission factor database is developed within the scope of the PCAF project *Financing towards net-zero buildings*

Mobilizing the financial industry to accelerate their actions to transition European buildings to net zero and make the impact of those actions transparent via clear carbon accounting

Establishing a core project team and creating and implementing a communication strategy

Enabling financial institutions to measure and track the climate impact of their mortgage and real estate portfolios and their actions towards net zero

Understanding the challenge towards net zero, and creating of a good practice guideline on financing the European building transition to net zero

Funded by: Laudes Foundation

PCAF

The PCAF European building emission factor database contains ~22,760 emission factors so far

Physical activity-based emission factors for mortgages (i.e. residential buildings) and commercial real estate (i.e. residential or non-residential buildings) provided in the PCAF European building emission factor database can be extracted per EPC rating and are either expressed in:

- tCO_2e per unit (e.g. per building)
- tCO_2e per floor area (e.g. square meter)
- MWh per unit (e.g. per building)
- MWh per floor area (e.g. square meter)

Asset classes

Emission factors are provided for two asset classes:

- **Commercial Real Estate:** residential or non-residential buildings
- **Mortgages:** residential buildings

Geographies

Emission factors are provided for all countries in the European Union, as well as Norway, Switzerland and the United Kingdom

For countries where EPC bands are defined for climate zones/regions (i.e. Croatia, Greece, Italy, Sweden and UK), the EPC energy and emission intensity factors can be extracted per climate zone/region.

Building types

Emission factors are provided for several different building types:

- **Commercial Real Estate:** Retail (High street; Shopping center; Strip mall); Office; Industrial distribution warehouse; Hotel; Healthcare; Leisure and sport facilities; Non- residential total
- **Mortgages:** Single family house (SFH); Multi-family house (MFH); Residential total

EPC ratings

Emission factors can be extracted per country-specific energy performance certificate (EPC) rating per floor area or unit.

PCAF emphasizes that using floor area data together with the EPC rating enables a higher quality approach.

With new or more granular data becoming available, emission factors will be updated and specified over time.

Overview of sources used in the PCAF European building emission factor database

Parameters	Sources	Description
EPC rating band distribution	National EPCs, EU/National EPC registers/databases EU/National statistical databases and reports	EPCs, EPC registers and databases provide data on EPC ratings, bands and distribution per country (see methodology document, Annex I on data sources per country). These sources provide data on EPC implementation and distribution across European countries (see methodology document, Annex I on data sources per country).
Emission intensity (per m²), Energy intensity (per m²)	CRREM Global Pathways	This source contains emission intensity factors ($kgCO_2/m^2/yr$) and energy intensity factors ($kWh/m^2/yr$) per building type and European country based on measured data from 2018.
Average building size (Building floor area, Number of buiding units)	Guidehouse Global Building Stock Model, GLOBUS (2021)	GLOBUS provides building stock data for all building types (floor area and number of building units) per European country.

[1] CRREM (2023), CRREM Global Pathways, https://www.crrem.org/pathways/

Introduction

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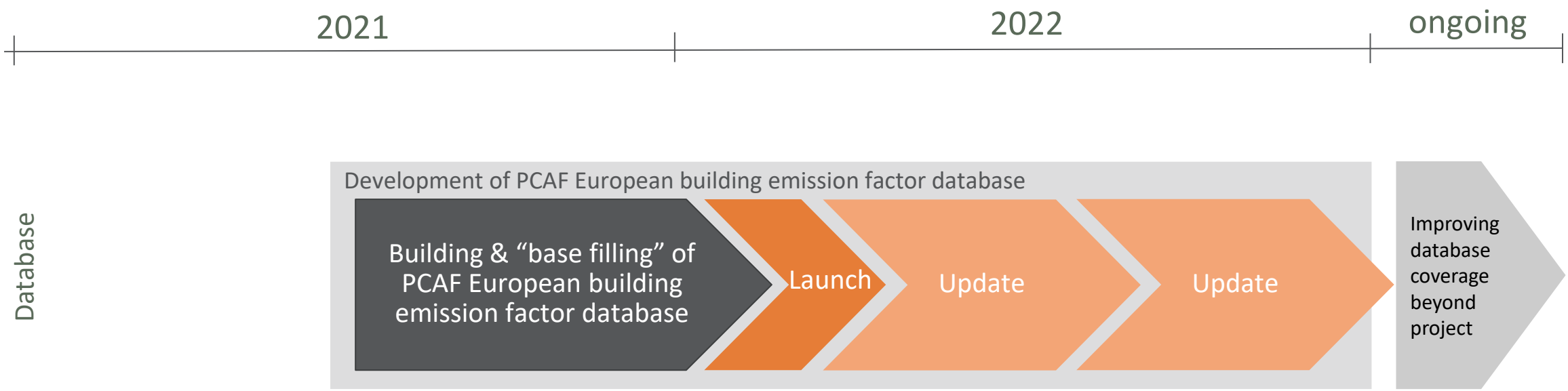
How to use the PCAF European building emission factor database

The PCAF European building emission factor database is regularly updated by the PCAF Secretariat



Introduction

Timeline

How to use the PCAF European building emission factor database

The user first needs to register to access the database

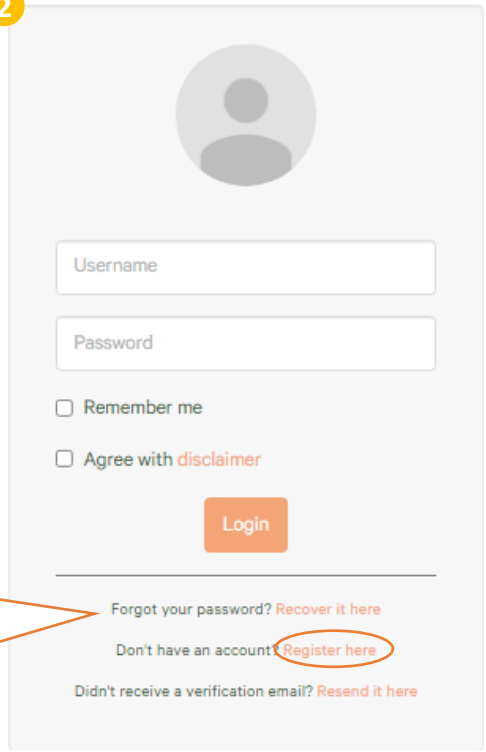
1 building-db.carbonaccountingfinancials.com

Start the process by registering

1. Go to the ‘PCAF European Building Emission Factor Database’.
2. Ensure to register first by clicking on ‘Register here’.
3. Fill out the registration form.
4. Verify your account in your mailbox.

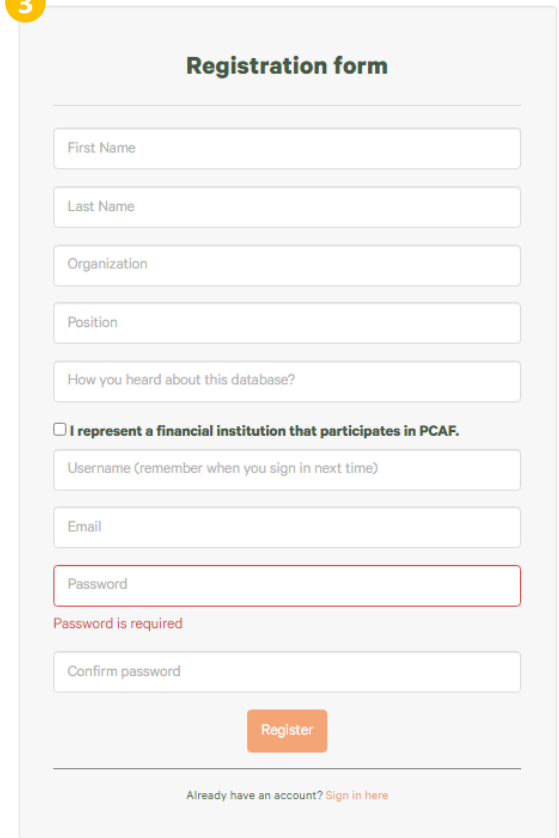
You will receive an email to verify your account. Please also check your ‘Spam’ mailbox.

2

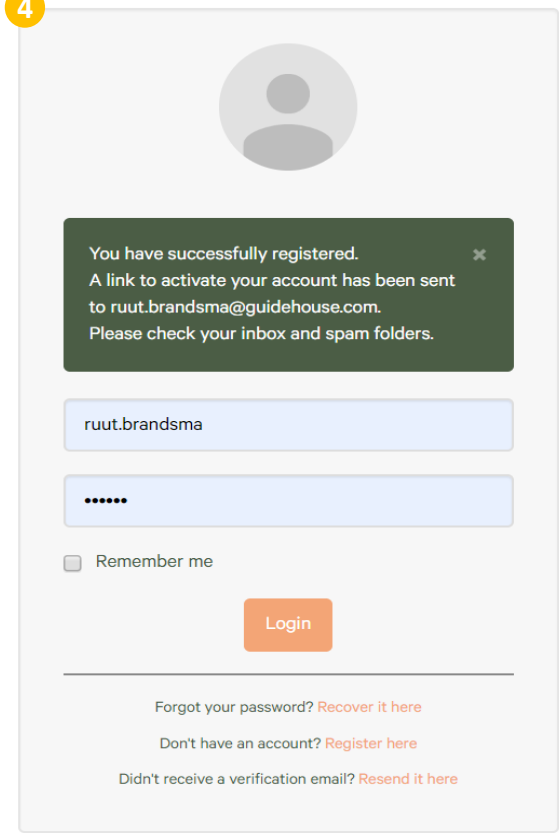


Here the user can register to the database.

3



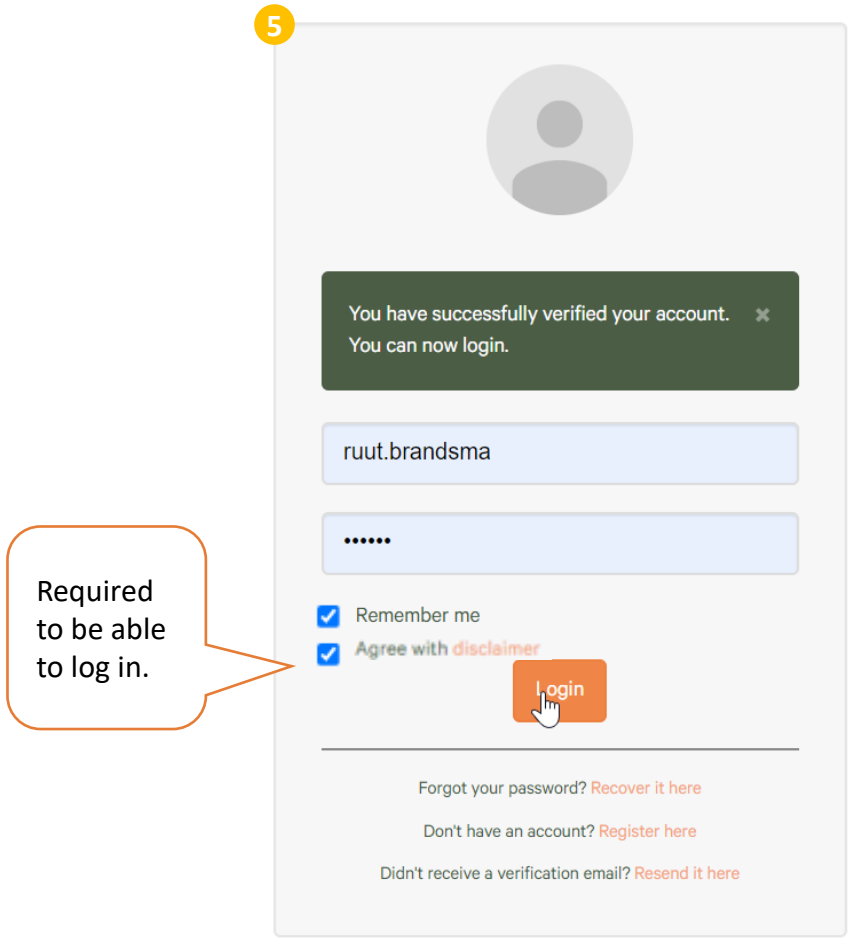
4



After verification of the account, the user can directly log into the database

Continue after verifying the account

5. After clicking on the link “Verify your account” in the email, you should be able to directly log into the database. Please make sure to agree with the disclaimer.



After the log-in, the user is firstly directed to general information on the PCAF European building emission factor database

Start using the database

Here the user gets directed to the database.

Update announcement

This dataset was last updated in August 2023.

The first version of this dataset was released in 2022, and has been updated, following the publication of the new CRREM Global Pathways in 2023. [illegible], the new version also expands the geographical scope of the dataset, including countries such as Serbia, Bosnia & Herzegovina, Kosovo and Turkey.

For more information on changes, as well as for a description of the methodology, please refer to the Methodology report.

Here the user gets information on database updates along with the database methodology report

Introduction to the PCAF European building emission factor database

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The database has the following key features:

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- **easy to access** and **user-friendly**.

Here the user gets information on the objective of the database.

The user guide in this link provides screenshots and explanations of the PCAF European building emission factor database showing its functionalities and content.

Here the user can find the link to the user guide for the database.

PCAF

After the log-in, the user is firstly directed to general information on the PCAF European building emission factor database

Additional Resources: Building Embodied Emission Factors

As part of the PCAF project Financing towards net-zero buildings (funded by the Laudes Foundation), PCAF developed an early guidance on the treatment of embodied emissions for financial institutions. This project includes a report and an emission factor dataset.

The report contains background on embodied emissions, a suggested accounting methodology, a literature review and emission factors. Please view the report here.

The emission factor dataset contains emission ranges for the construction phase of the building life cycle. Two files are provided, one for total building embodied emissions intensities, and one for embodied emissions for construction materials. Please also see the report for further information.

- Please access the dataset for building embodied emissions intensities here.
- Please access the dataset for construction material embodied emissions intensities here.

Here the user gets information on embodied emissions intensities datasets for buildings and construction material, literature review and a suggested accounting methodology

Version History

In the table below, you can find the downloads for the previous data included in the the PCAF European Buildings Database (prior to August 2023).

Asset Class	Methodology	CSV format	Data dictionary JSON format
Commercial real estate	Open	Download	Download
Mortgages		Download	Download

Here the user can find the links to access previous versions of the database

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For the embodied emissions report, please consider the additional disclaimer in the document

Here the user gets information that PCAF and Guidehouse disclaim any liability.

PCAF

The database is structured in an Excel-style manner with rows representing emission factors and columns showing features

Asset Class: **Commercial real estate**

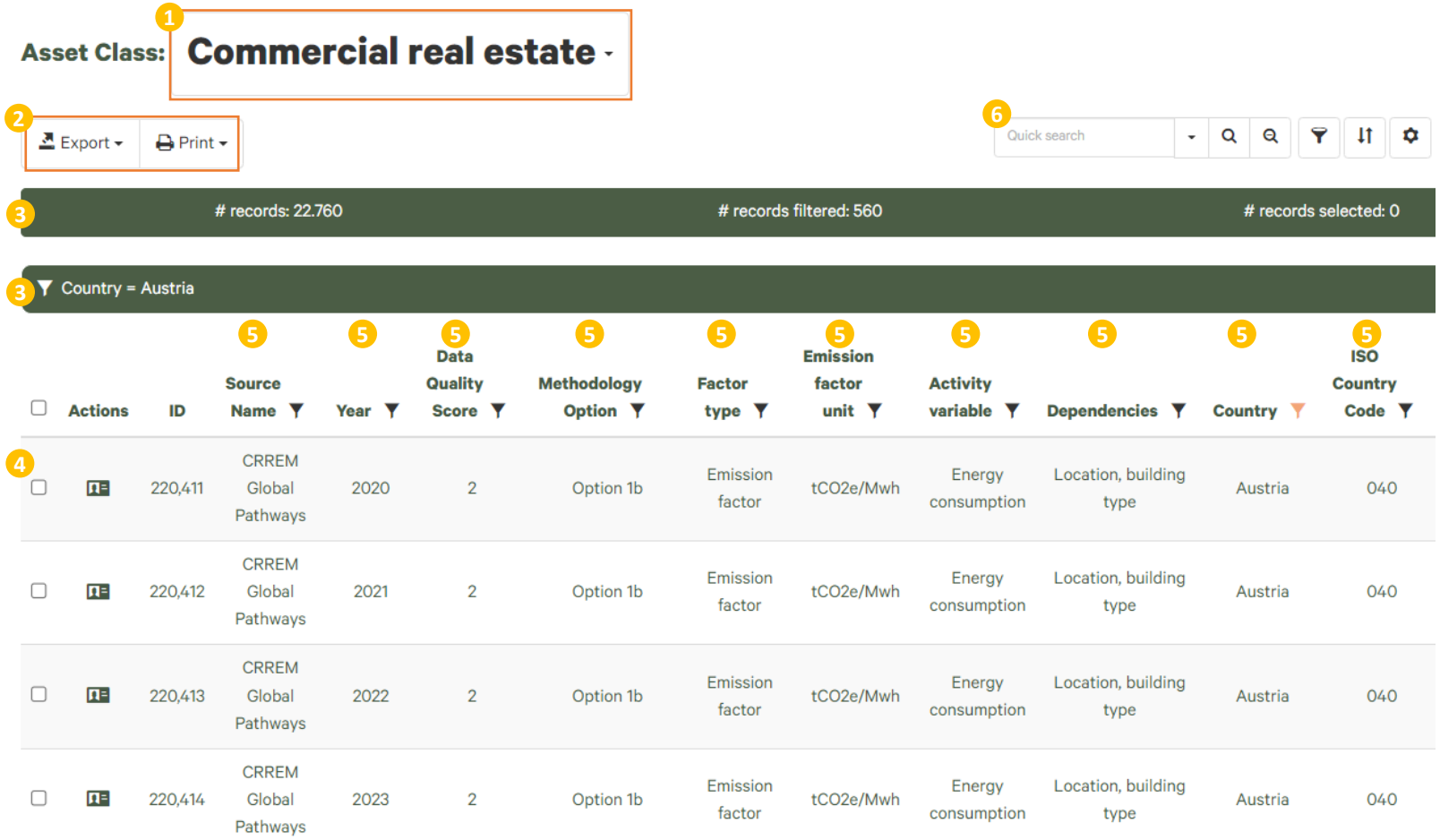
Export | Print | Quick search

records: 22.760 | # records filtered: 560 | # records selected: 0

Country = Austria

Actions	ID	Source Name	Year	Data Quality Score	Methodology Option	Factor type	Emission factor unit	Activity variable	Dependencies	Country	ISO Country Code	Subdivision	EPC Rating	Building category (level 1)	Building type (level 2)	Value	Comments
	220,411	CRREM Global Pathways	2020	2	Option 1b	Emission factor	tCO2e/Mwh	Energy consumption	Location, building type	Austria	040	*n.a.*	*n.a.*	Non-residential	Office	0.1801	n.a.
	220,412	CRREM Global Pathways	2021	2	Option 1b	Emission factor	tCO2e/Mwh	Energy consumption	Location, building type	Austria	040	*n.a.*	*n.a.*	Non-residential	Office	0.1715	n.a.
	220,413	CRREM Global Pathways	2022	2	Option 1b	Emission factor	tCO2e/Mwh	Energy consumption	Location, building type	Austria	040	*n.a.*	*n.a.*	Non-residential	Office	0.1712	n.a.
	220,414	CRREM Global Pathways	2023	2	Option 1b	Emission factor	tCO2e/Mwh	Energy consumption	Location, building type	Austria	040	*n.a.*	*n.a.*	Non-residential	Office	0.1706	n.a.

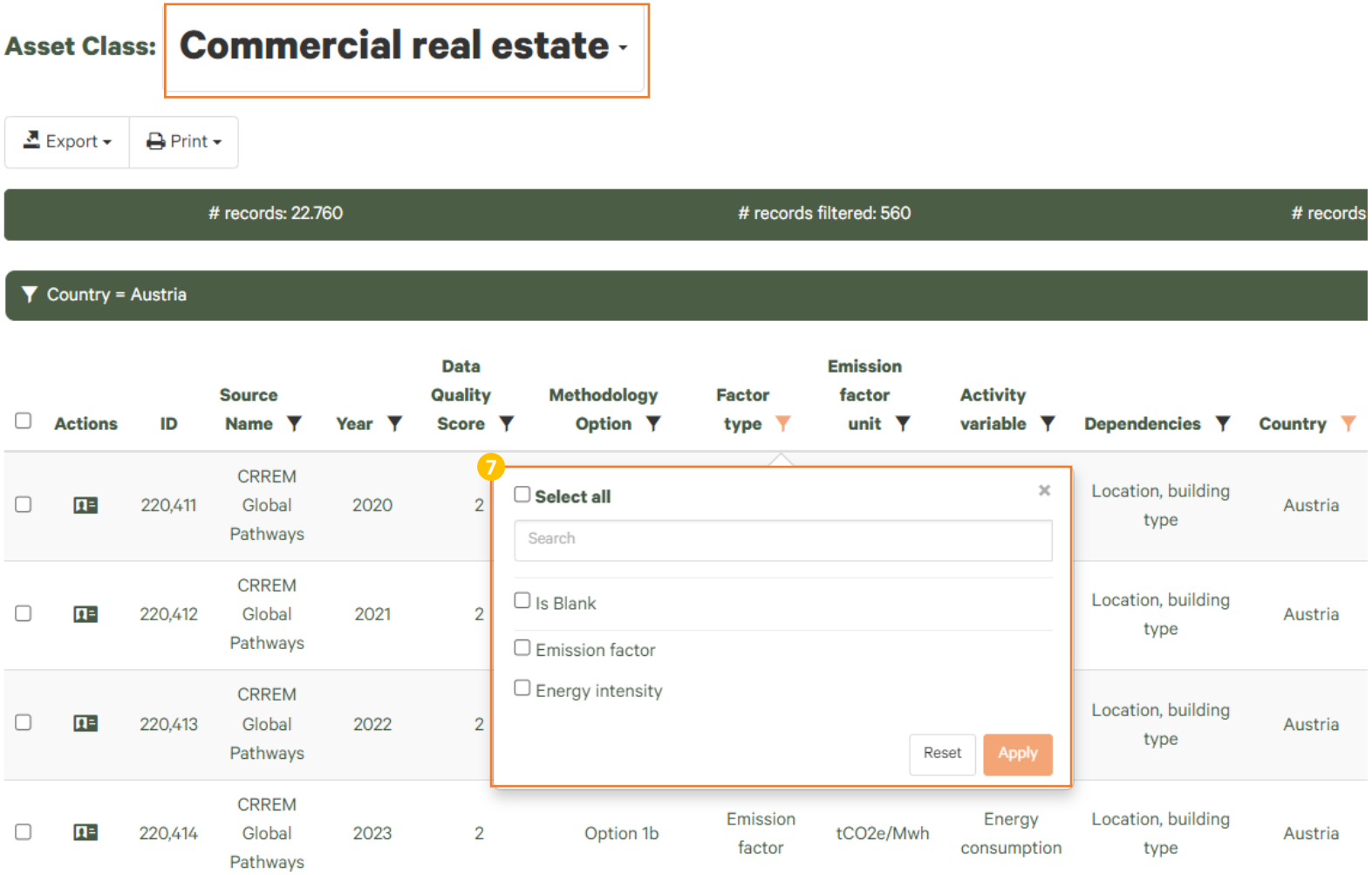
The database is structured in an Excel-style manner with rows representing emission factors and columns showing features



Discover the database features

1. Here, the user can select the asset class, either ‘commercial real estate’ or ‘mortgages’.
2. Here the user can export and print data.
3. Here the user can see how many records are shown, filtered and selected.
4. Each **row** represents one single emission factor.
5. Each **column** provides information on the respective emission factor features. Note that when hovering with the mouse over a column title, more explanation is provided about the content of the column.
6. Here the user can search/filter/sort emission factors and change the page settings.

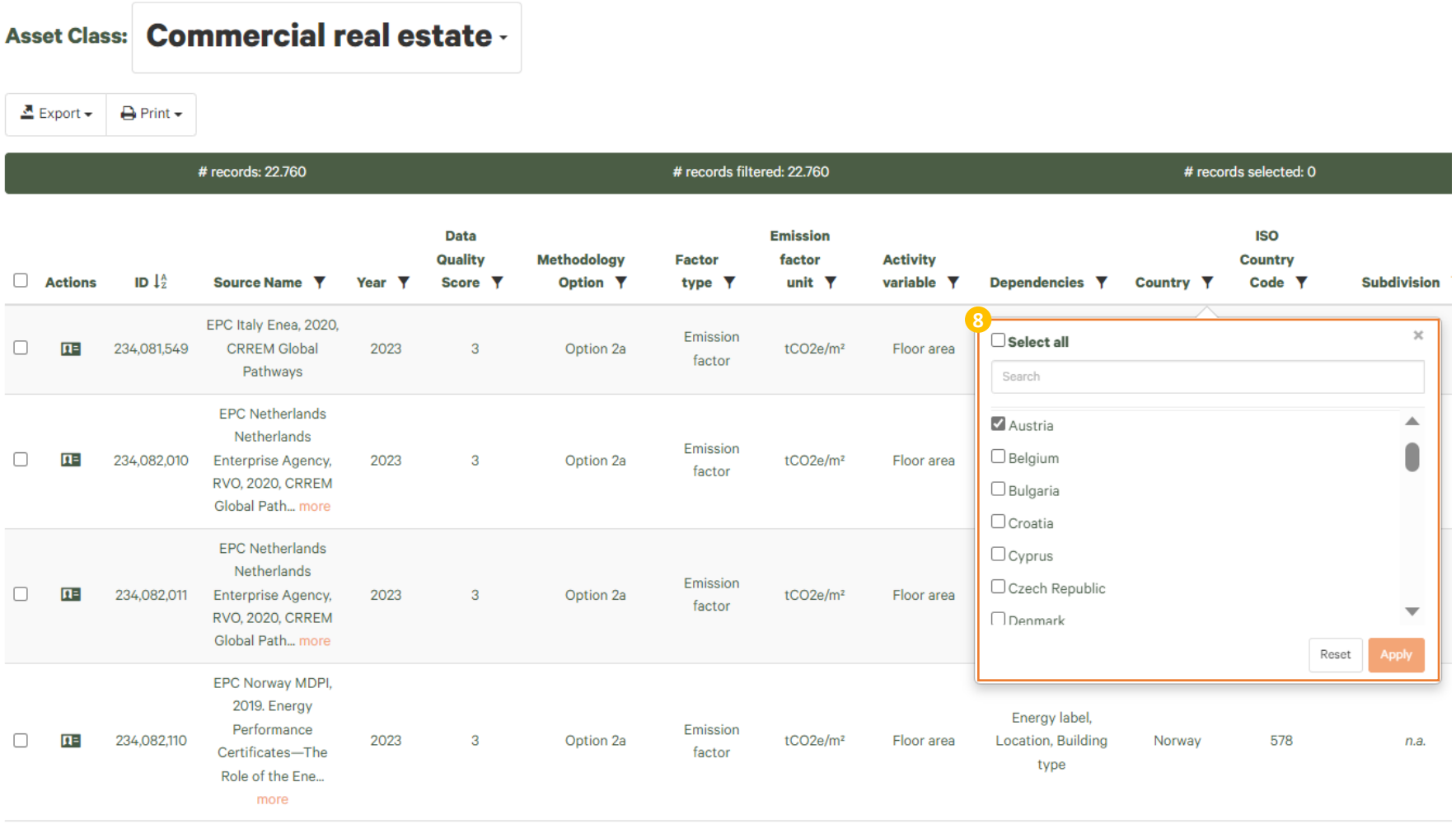
The user can select an asset class (here: commercial real estate) and then specify the factor type (here: emissions)



Discover the database features

7. Here the user can select the factor type between emission factor and/or energy intensity

The user can then specify the country of interest (here: Austria)

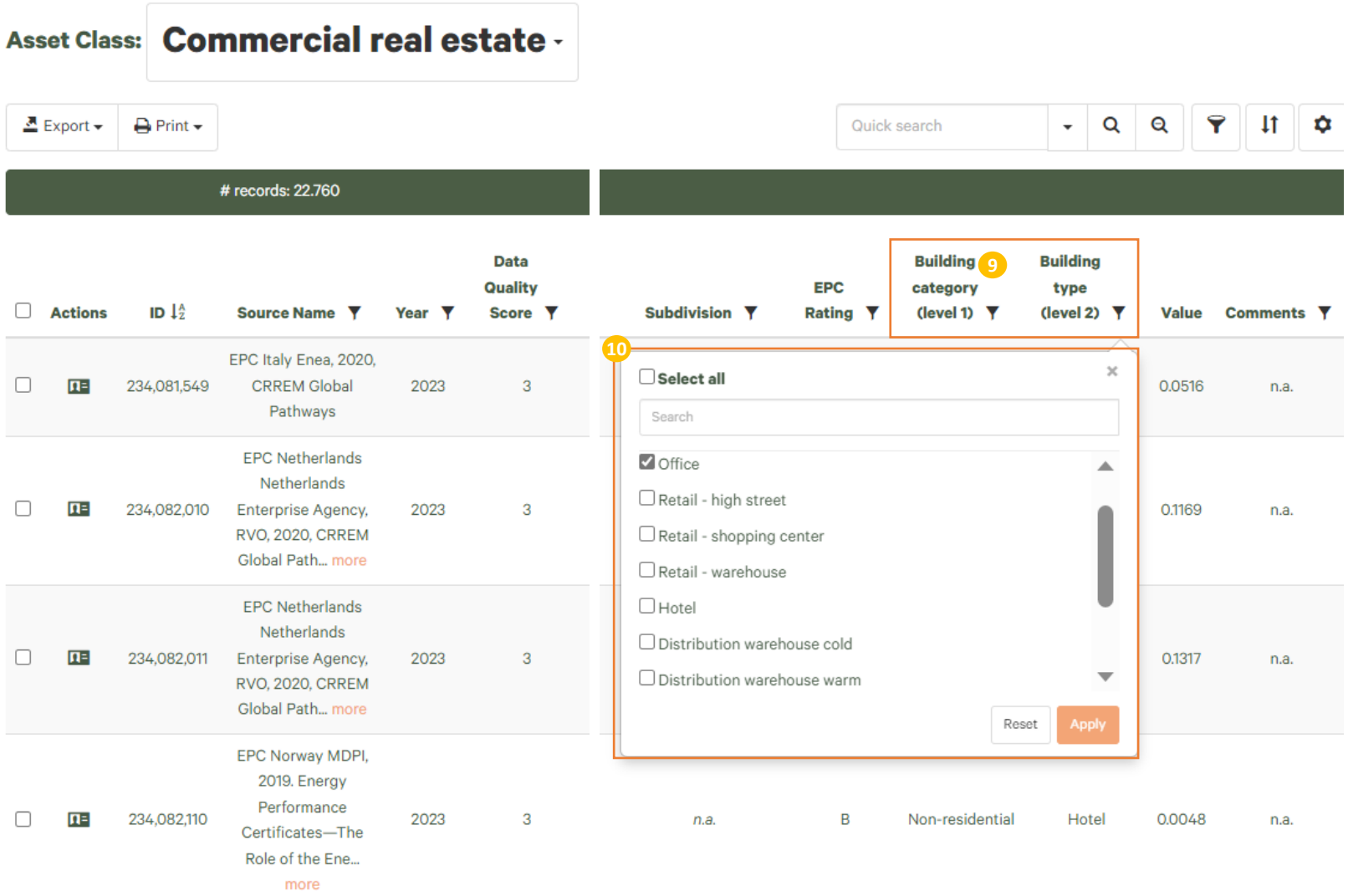


Discover the database features

8. Here the user can select the country.

   For countries where EPC bands are defined for climate zones, the EPC energy and emission intensity factors can be extracted per climate zone.

Next, the user can specify two levels of building types, depending on the data availability

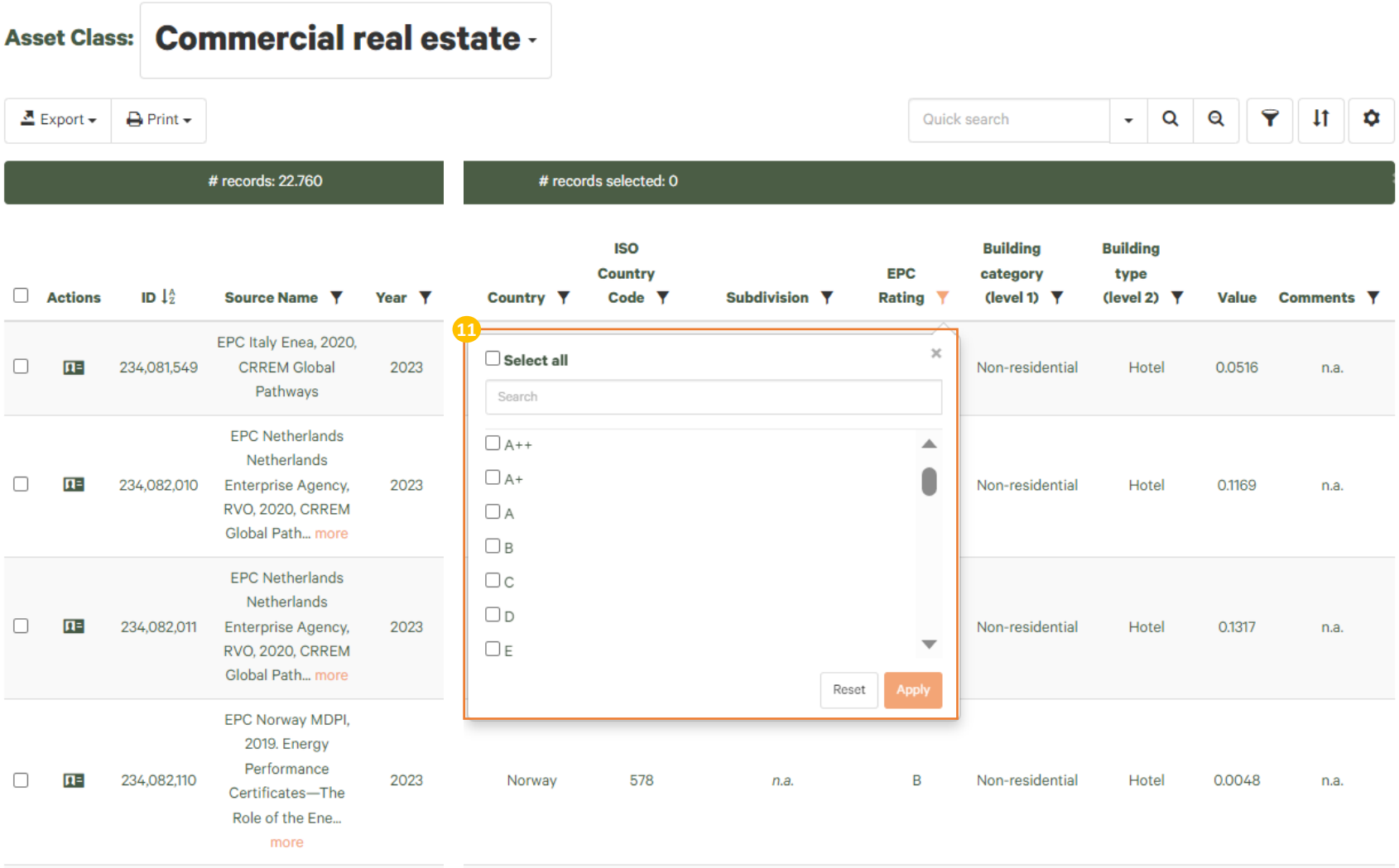


Discover the database features

9. Here the user can select the overall building type, either non-residential or residential.

10. Here the user can distinguish between different types of buildings within the asset class (e.g. Hotel, Leisure and sports facilities, Retail – Shopping Center, etc.). The user can select multiple building types at the same time.

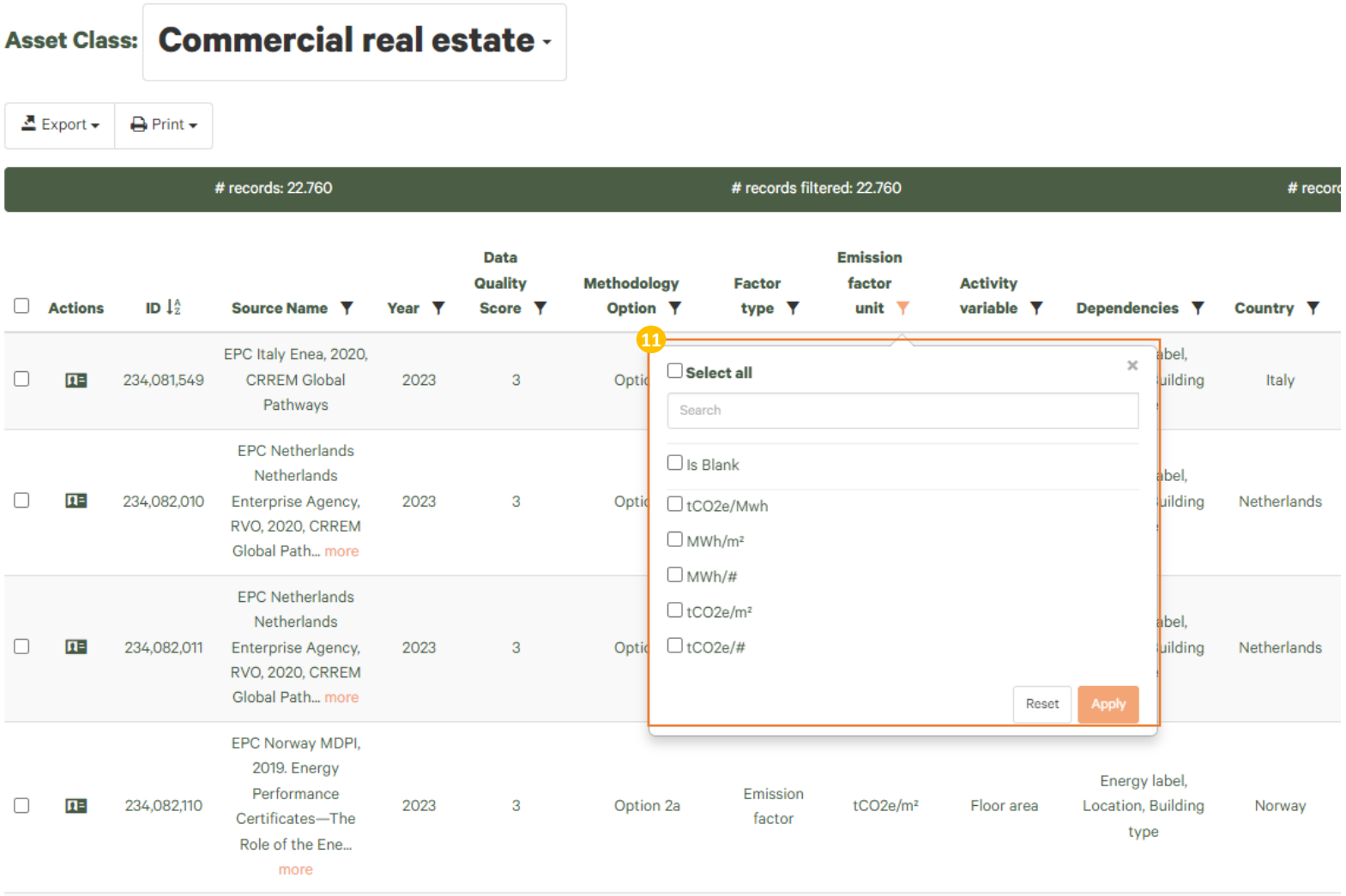
The user can further specify the energy performance certificate (EPC) rating of the building, if available



Discover the database features

11. Here the user can select the country-specific EPC rating of the building.

The user can select the unit of the emission factor (e.g. tCO_{2e}/m^2)

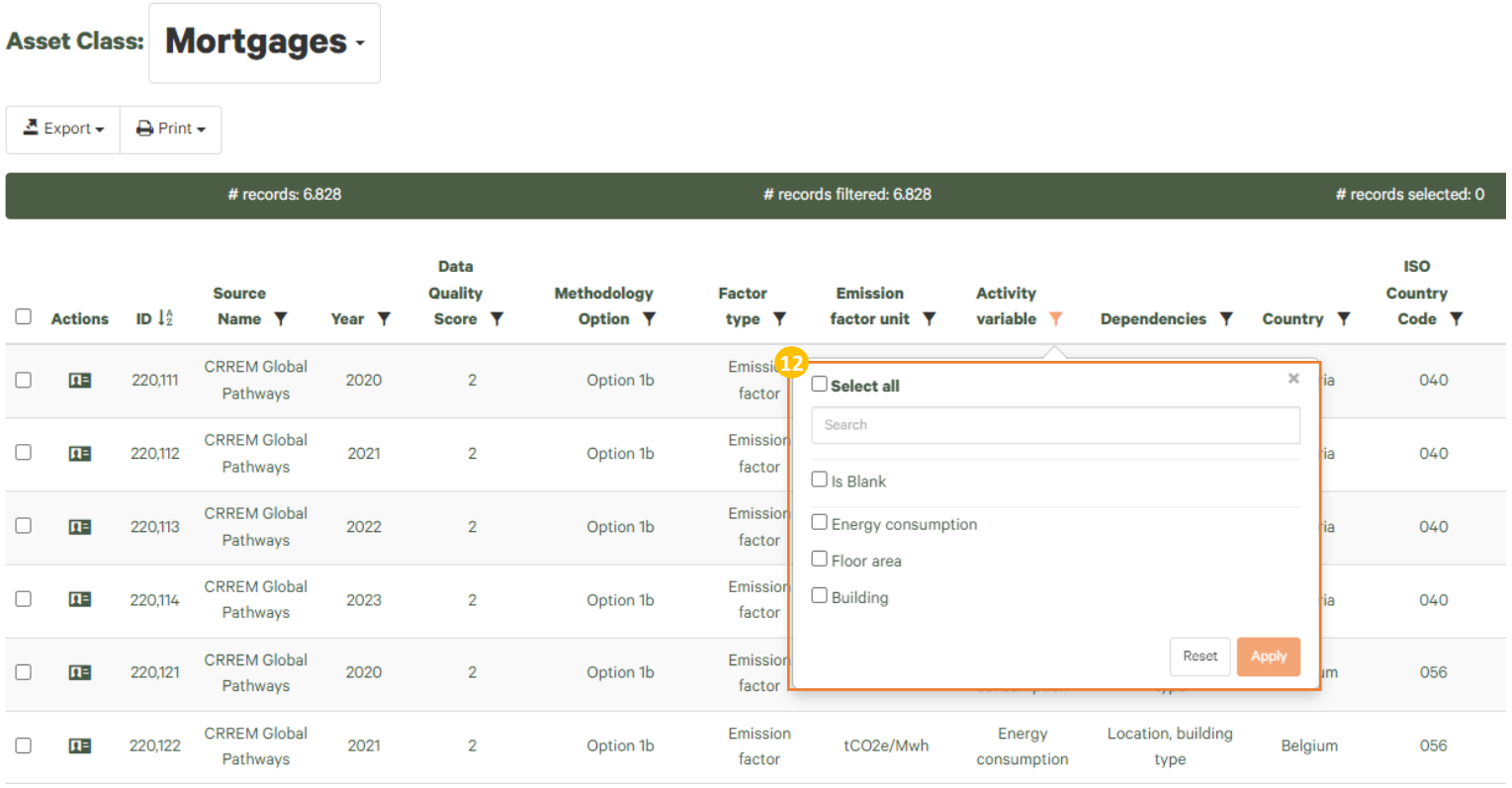


Actions	ID	Source Name	Year	Data Quality Score	Methodology Option	Factor type	Emission factor unit	Activity variable	Dependencies	Country
	234,081,549	EPC Italy Enea, 2020, CRREM Global Pathways	2023	3	Optic				abel, uilding	Italy
	234,082,010	EPC Netherlands Netherlands Enterprise Agency, RVO, 2020, CRREM Global Path... more	2023	3	Optic				abel, uilding	Netherlands
	234,082,011	EPC Netherlands Netherlands Enterprise Agency, RVO, 2020, CRREM Global Path... more	2023	3	Optic				abel, uilding	Netherlands
	234,082,110	EPC Norway MDPI, 2019. Energy Performance Certificates—The Role of the Ene... more	2023	3	Option 2a	Emission factor	tCO2e/m²	Floor area	Energy label, Location, Building type	Norway

Discover the database features

11. Here the user can select the unit of the emission factor.

The user can select if the emission factor should be expressed per ‘dwelling’, ‘floor area’ or ‘energy consumption’

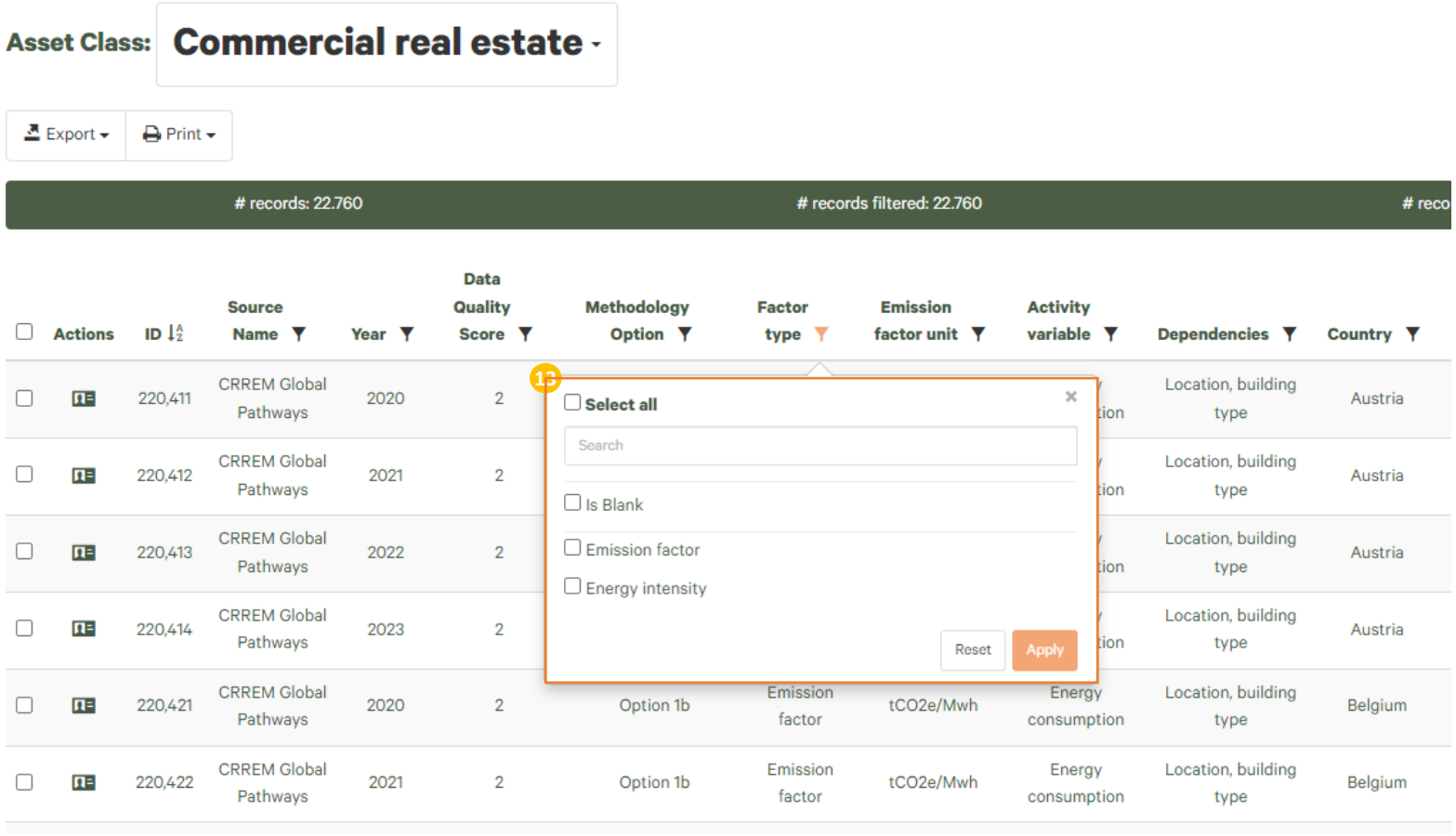


Actions	ID	Source Name	Year	Data Quality Score	Methodology Option	Factor type	Emission factor unit	Activity variable	Dependencies	Country	ISO Country Code
	220,111	CRREM Global Pathways	2020	2	Option 1b	Emissi factor				ia	040
	220,112	CRREM Global Pathways	2021	2	Option 1b	Emission factor				ia	040
	220,113	CRREM Global Pathways	2022	2	Option 1b	Emission factor				ia	040
	220,114	CRREM Global Pathways	2023	2	Option 1b	Emission factor				ia	040
	220,121	CRREM Global Pathways	2020	2	Option 1b	Emission factor				um	056
	220,122	CRREM Global Pathways	2021	2	Option 1b	Emission factor	tCO2e/Mwh	Energy consumption	Location, building type	Belgium	056

Discover the database features

11. Here the user can select the activity variable of the emission factor.

Depending on the unit of the emission factor ('dwelling' or 'floor area'), the user can also select the specific emission factor



Actions	ID	Source Name	Year	Data Quality Score	Methodology Option	Factor type	Emission factor unit	Activity variable	Dependencies	Country
	220,411	CRREM Global Pathways	2020	2					Location, building type	Austria
	220,412	CRREM Global Pathways	2021	2					Location, building type	Austria
	220,413	CRREM Global Pathways	2022	2					Location, building type	Austria
	220,414	CRREM Global Pathways	2023	2					Location, building type	Austria
	220,421	CRREM Global Pathways	2020	2	Option 1b	Emission factor	tCO2e/Mwh	Energy consumption	Location, building type	Belgium
	220,422	CRREM Global Pathways	2021	2	Option 1b	Emission factor	tCO2e/Mwh	Energy consumption	Location, building type	Belgium

Discover the database features

13. The user can select between emission factor or energy intensity

Depending on the applied filters, the user can extract the corresponding emission factors

Asset Class: **Commercial real estate**

Export | Print | Quick search

records: 22.760 | # records filtered: 22.760 | # records selected: 0

Actions	ID	Source Name	Year	14 Data Quality Score	Methodology Option	Factor type	Emission factor unit	Activity variable	Dependencies	Country	ISO Country Code	Subdivision	EPC Rating	Building category (level 1)	Building type (level 2)	15 Value	Comments
	220,411	CRREM Global Pathways	2020	2	Option 1b	Emission factor	tCO2e/Mwh	Energy consumption	Location, building type	Austria	040	n.a.	n.a.	Non-residential	Office	0.1801	n.a.
	220,412	CRREM Global Pathways	2021	2	Option 1b	Emission factor	tCO2e/Mwh	Energy consumption	Location, building type	Austria	040	n.a.	n.a.	Non-residential	Office	0.1715	n.a.
	220,413	CRREM Global Pathways	2022	2	Option 1b	Emission factor	tCO2e/Mwh	Energy consumption	Location, building type	Austria	040	n.a.	n.a.	Non-residential	Office	0.1712	n.a.
	220,414	CRREM Global Pathways	2023	2	Option 1b	Emission factor	tCO2e/Mwh	Energy consumption	Location, building type	Austria	040	n.a.	n.a.	Non-residential	Office	0.1706	n.a.
	220,421	CRREM Global Pathways	2020	2	Option 1b	Emission factor	tCO2e/Mwh	Energy consumption	Location, building type	Belgium	056	n.a.	n.a.	Non-residential	Office	0.2395	n.a.
	220,422	CRREM Global Pathways	2021	2	Option 1b	Emission factor	tCO2e/Mwh	Energy consumption	Location, building type	Belgium	056	n.a.	n.a.	Non-residential	Office	0.2352	n.a.

Discover the database features

14. Here the corresponding PCAF data quality score of the emission factor is shown.
15. Here the user can extract the specified emission factor (expressed as emission or energy intensity per m² or #; or EPC emission or energy intensity per m² or #) in line with the applied filters.

The user can find information on the methodology and sources of the emission factor

Asset Class: **Commercial real estate**

Export | Print | Quick search

records: 22.760 | # records filtered: 22.760 | # records selected: 0

Actions	ID	Source Name (17)	Year	Data Quality Score	Methodology Option (16)	Factor type	Emission factor unit	Activity variable	Dependencies	Country	ISO Country Code	Subdivision	EPC Rating	Building category (level 1)	Building type (level 2)	Value	Comments
	220,411	CRREM Global Pathways	2020	2	Option 1b	Emission factor	tCO2e/Mwh	Energy consumption	Location, building type	Austria	040	n.a.	n.a.	Non-residential	Office	0.1801	n.a.
	220,412	CRREM Global Pathways	2021	2	Option 1b	Emission factor	tCO2e/Mwh	Energy consumption	Location, building type	Austria	040	n.a.	n.a.	Non-residential	Office	0.1715	n.a.
	220,413	CRREM Global Pathways	2022	2	Option 1b	Emission factor	tCO2e/Mwh	Energy consumption	Location, building type	Austria	040	n.a.	n.a.	Non-residential	Office	0.1712	n.a.
	220,414	CRREM Global Pathways	2023	2	Option 1b	Emission factor	tCO2e/Mwh	Energy consumption	Location, building type	Austria	040	n.a.	n.a.	Non-residential	Office	0.1706	n.a.
	220,421	CRREM Global Pathways	2020	2	Option 1b	Emission factor	tCO2e/Mwh	Energy consumption	Location, building type	Belgium	056	n.a.	n.a.	Non-residential	Office	0.2395	n.a.
	220,422	CRREM Global Pathways	2021	2	Option 1b	Emission factor	tCO2e/Mwh	Energy consumption	Location, building type	Belgium	056	n.a.	n.a.	Non-residential	Office	0.2352	n.a.

Discover the database features

16. Here the user can filter the emissions factors based on the methodology options outlined in the methodology document.
17. Here the user has an overview of the sources used to calculate the emission factor. Detailed sources per country can be also found in the methodology document.

The user can easily delete the selected filters by clicking on the cross on the right-hand side

Here the user can disable or reset the filters.

The user can click and select those emission factors that he/she wants to analyze or export

Asset Class: **Commercial real estate**

Export | Print | 3 item(s) selected | Do not

Here the user can see how many items are selected.

Quick search

records: 22.760 | # records filtered: 22.760 | # records selected: 3

Actions	ID	Source Name	Year	Data Quality Score	Methodology Option	Factor type	Emission factor unit	Activity variable	Dependencies	Country	ISO Country Code	Subdivision	EPC Rating	Building category (level 1)	Building type (level 2)	Value	Comments
	220,411	CRREM Global Pathways	2020	2	Option 1b	Emission factor	tCO2e/Mwh	Energy consumption	Location, building type	Austria	040	n.a.	n.a.	Non-residential	Office	0.1801	n.a.
	220,412	CRREM Global Pathways	2021	2	Option 1b	Emission factor	tCO2e/Mwh	Energy consumption	Location, building type	Austria	040	n.a.	n.a.	Non-residential	Office	0.1715	n.a.
	220,413	CRREM Global Pathways	2022	2	Option 1b	Emission factor	tCO2e/Mwh	Energy consumption	Location, building type	Austria	040	n.a.	n.a.	Non-residential	Office	0.1712	n.a.
	220,414	CRREM Global Pathways	2023	2	Option 1b	Emission factor	tCO2e/Mwh	Energy consumption	Location, building type	Austria	040	n.a.	n.a.	Non-residential	Office	0.1706	n.a.
	220,421	CRREM Global Pathways	2020	2	Option 1b	Emission factor	tCO2e/Mwh	Energy consumption	Location, building type	Belgium	056	n.a.	n.a.	Non-residential	Office	0.2395	n.a.

Here the user can select emission factors by clicking on the check boxes in the first column.

The user can easily compare the selected emission factors with each other

Asset Class: **Commercial real estate**

Export | Print | 3 item(s) selected | **Do not** show selected

Clear
Selection filter
Compare
Export
Print

records filtered: 22.760

Actions	ID	Source Name	Year	Data Quality Score	Methodology Option	Factor type	Emission factor unit
☐	220,411	[illegible]	[illegible]	2	Option 1b	Emission factor	tCO2e/Mwh
☑	220,412	CRREM Global Pathways	2021	2	Option 1b	Emission factor	tCO2e/Mwh
☑	220,413	CRREM Global Pathways	2022	2	Option 1b	Emission factor	tCO2e/Mwh
☑	220,414	CRREM Global Pathways	2023	2	Option 1b	Emission factor	tCO2e/Mwh
☐	220,421	CRREM Global Pathways	2020	2	Option 1b	Emission factor	tCO2e/Mwh

Here the user can compare the selected emission factors of choice.

Here the user can decide to either show only 'differences' between emission factors…

Show differences | Show all

Year	2021	2022	2023
Value	0.1715	0.1712	0.1706
	Remove from comparison	Remove from comparison	Remove from comparison

…or all emission factors features (i.e. 'show all') at a time.

Show differences | Show all

Source Name	CRREM Global Pathways	CRREM Global Pathways	CRREM Global Pathways
Year	2021	2022	2023
Asset class	Commercial real estate	Commercial real estate	Commercial real estate
Data Quality Score	2	2	2
Methodology Option	Option 1b	Option 1b	Option 1b
Factor type	Emission factor	Emission factor	Emission factor
Emission factor unit	tCO2e/Mwh	tCO2e/Mwh	tCO2e/Mwh
Activity variable	Energy consumption	Energy consumption	Energy consumption
Dependencies	Location, building type	Location, building type	Location, building type
Country	Austria	Austria	Austria
ISO Country Code	040	040	040
Subdivision	n.a.	n.a.	n.a.
EPC Rating	n.a.	n.a.	n.a.
Building category (level 1)	Non-residential	Non-residential	Non-residential
Building type (level 2)	Office	Office	Office
Value	0.1715	0.1712	0.1706
Comments	n.a.	n.a.	n.a.
	Remove from comparison	Remove from comparison	Remove from comparison

The user can also display selected emission factor items in a chart

A chart pops up when clicking on “Show selected items in chart”.

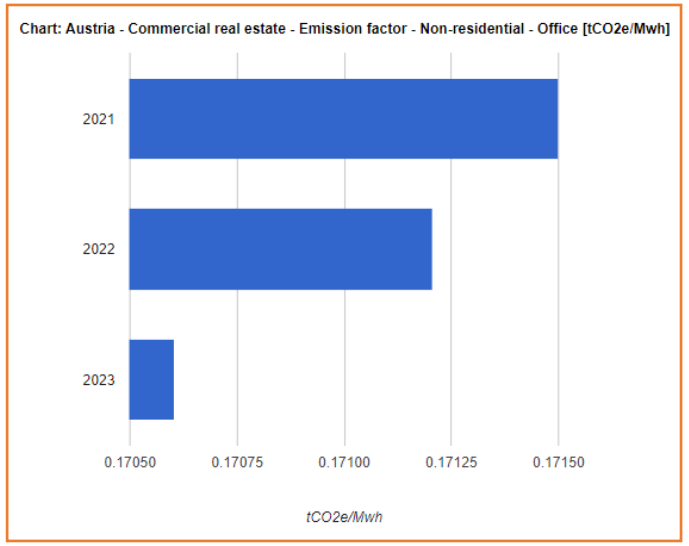
Here the user can select emission factors

Asset Class: **Commercial real estate**

Export | Print | 3 item(s) selected | Show selected items in chart

records: 22.760 | # records filtered: 22.760

Actions	ID	Source Name	Year	Data Quality Score	Methodology Option	Factor type	Emission factor unit
☐	220,411	CRREM Global Pathways	2020	2	Option 1b	Emission factor	tCO2e/Mwh
☑	220,412	CRREM Global Pathways	2021	2	Option 1b	Emission factor	tCO2e/Mwh
☑	220,413	CRREM Global Pathways	2022	2	Option 1b	Emission factor	tCO2e/Mwh
☑	220,414	CRREM Global Pathways	2023	2	Option 1b	Emission factor	tCO2e/Mwh



Asset Class: **Commercial real estate**

Export | Print | 3 item(s) selected | **Do not** show selected items in chart

records: 22.760 | # records filtered: 22.760

Actions	ID	Source Name	Year	Data Quality Score	Methodology Option	Factor type	Emission factor unit
☐	220,411	CRREM Global Pathways	2020	2	Option 1b	Emission factor	tCO2e/Mwh

A chart can only be displayed if the columns on
- emission factor unit
are identical over all filtered/selected emission factors.

PCAF

Emission factor items can also be displayed in the form of a map…

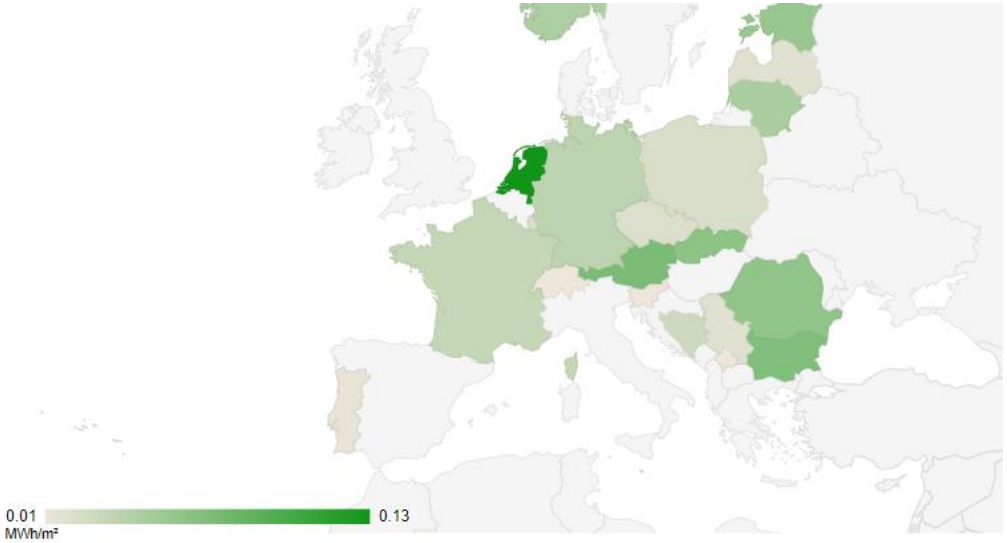
Asset Class: **Mortgages**

Export | Print | 3 item(s) selected | Sh | Quick search

records: 6.828 | records filtered: 45

(Emission factor unit = MWh/m²) And (EPC Rating = A) | (Building type (level 2) = Resident

Actions	ID	Source Name	Factor type	Emission factor unit	EPC Rating	Building category (level 1)	Building type (level 2)	Value	Comments
	1,340,313	EPC Austria Österreichisches Institut für Bautechnik, 2011, GLOBUS	Energy intensity	MWh/m²	A	Residential	Residential total	0.0750	n.a.
	1,340,332	EPC Bulgaria Energbg.com, GLOBUS	Energy intensity	MWh/m²	A	Residential	Residential total	0.0715	n.a.
	1,340,351	EPC Cyprus European Energy Efficiency Platform, 2017, GLOBUS	Energy intensity	MWh/m²	A	Residential	Residential total	0.0500	n.a.
	1,340,361	EPC Czech Republic Časopis Stavebnictví, 2009, GLOBUS	Energy intensity	MWh/m²	A	Residential	Residential total	0.0230	n.a.



A map can only be displayed if the columns on
- for each country only one record is displayed
- and building category, building type, EPC rating and emission factor unit are identical.

Note that records for which the subdivision isn't blank are not shown on the map.

...together with a corresponding chart

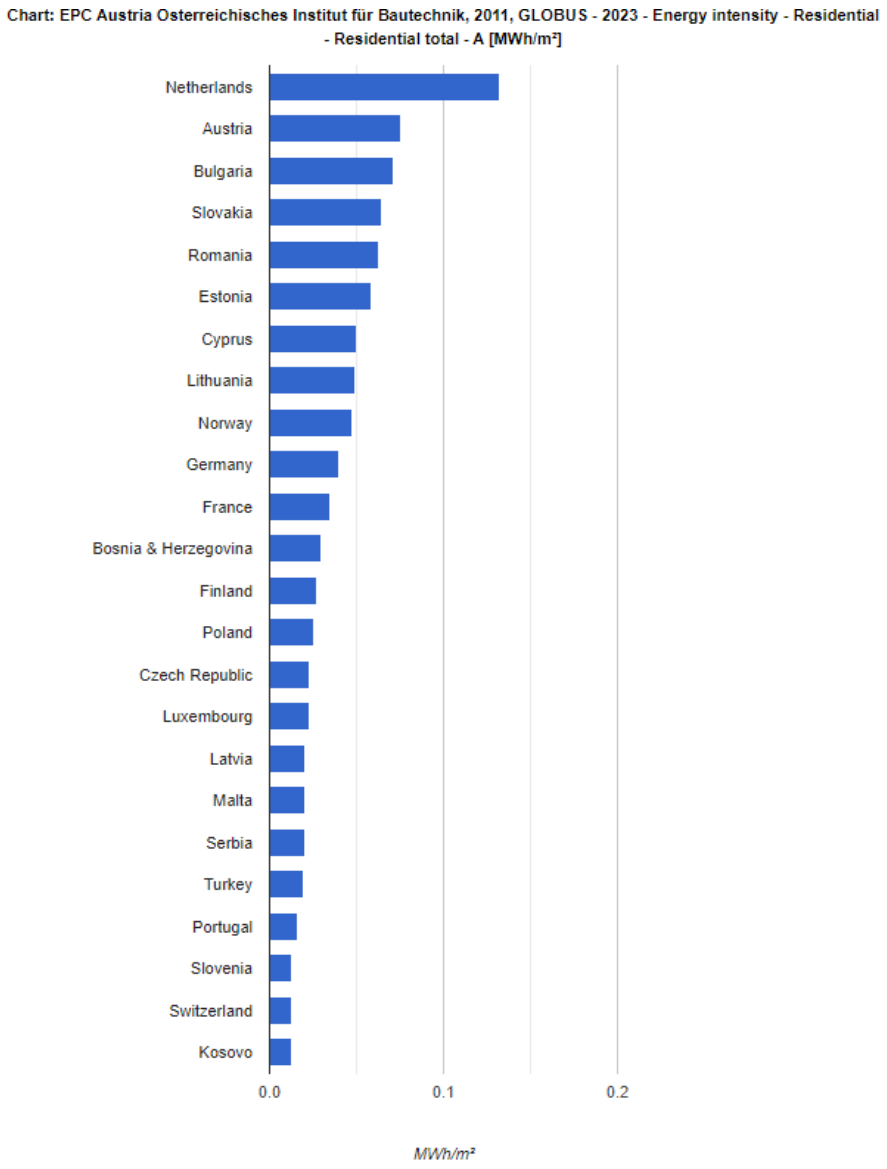
Asset Class: **Mortgages**

Export | Print | 3 item(s) selected | Sh | Quick search

records: 6.828 | records filtered: 45

(Emission factor unit = MWh/m²) And (EPC Rating = A) And (Building type (level 2) = Resident

Actions	ID	Source Name	Factor type	Emission factor unit	EPC Rating	Building category (level 1)	Building type (level 2)	Value	Comments
	1,340,313	EPC Austria Österreichisches Institut für Bautechnik, 2011, GLOBUS	Energy intensity	MWh/m²	A	Residential	Residential total	0.0750	n.a.
	1,340,332	EPC Bulgaria Energbg.com, GLOBUS	Energy intensity	MWh/m²	A	Residential	Residential total	0.0715	n.a.
	1,340,351	EPC Cyprus European Energy Efficiency Platform, 2017, GLOBUS	Energy intensity	MWh/m²	A	Residential	Residential total	0.0500	n.a.
	1,340,361	EPC Czech Republic Časopis Stavebnictví, 2009, GLOBUS	Energy intensity	MWh/m²	A	Residential	Residential total	0.0230	n.a.

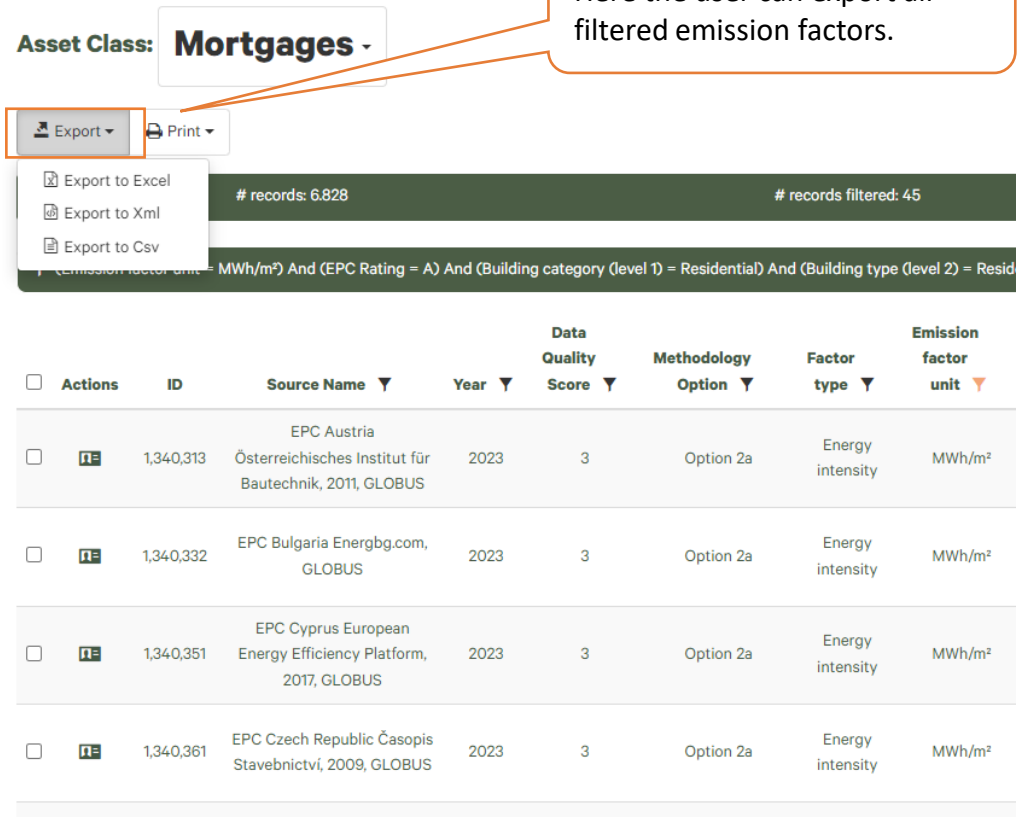


PCAF

The user can export all filtered emission factors in different formats (xls., xml., csv.)

Here the user can export all filtered emission factors.

All filtered emission factors are exported.

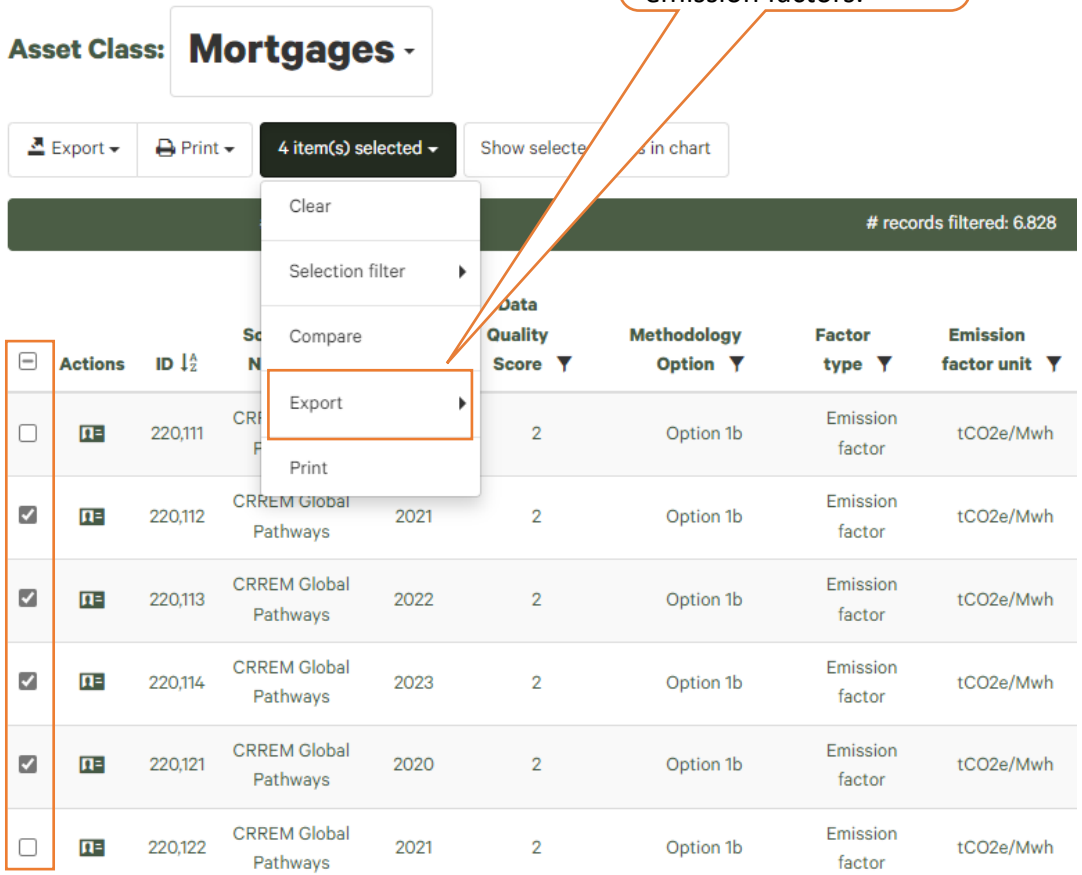


Example of Excel export

ID	Source Name	Year	Asset class	Data Quality Score	Methodology Option	Factor type	Emission factor unit	Activity variable
1,340,313	EPC Austria Österreichisches Institut für Bautechnik, 2011, GLOBUS	2023	Mortgages	3	Option 2a	Energy intensity	MWh/m²	Floor area
1,340,332	EPC Bulgaria Energbg.com, GLOBUS	2023	Mortgages	3	Option 2a	Energy intensity	MWh/m²	Floor area
1,340,351	EPC Cyprus European Energy Efficiency Platform, 2017, GLOBUS	2023	Mortgages	3	Option 2a	Energy intensity	MWh/m²	Floor area
1,340,361	EPC Czech Republic Časopis Stavebnictví, 2009, GLOBUS	2023	Mortgages	3	Option 2a	Energy intensity	MWh/m²	Floor area
1,340,381	EPC Estonia riigiteataja, 2015, GLOBUS	2023	Mortgages	3	Option 2a	Energy intensity	MWh/m²	Floor area
1,340,391	EPC Finland Oikeusministeriö, 2013, GLOBUS	2023	Mortgages	3	Option 2a	Energy intensity	MWh/m²	Floor area
13,403,101	EPC France Ministere de la Transition énergétique, 2023, GLOBUS	2023	Mortgages	3	Option 2a	Energy intensity	MWh/m²	Floor area
13,403,112	EPC Germany Verbraucherzentrale.de, GLOBUS	2023	Mortgages	3	Option 2a	Energy intensity	MWh/m²	Floor area
13,403,161	EPC Latvia CA EPBD - Latvia, 2019, GLOBUS	2023	Mortgages	3	Option 2a	Energy intensity	MWh/m²	Floor area
13,403,173	EPC Lithuania CA EPBD - Lithuania, 2019, GLOBUS	2023	Mortgages	3	Option 2a	Energy intensity	MWh/m²	Floor area
13,403,181	EPC Luxembourg European Commission, 2013, GLOBUS	2023	Mortgages	3	Option 2a	Energy intensity	MWh/m²	Floor area
13,403,191	EPC Malta bca.org.mt, GLOBUS	2023	Mortgages	3	Option 2a	Energy intensity	MWh/m²	Floor area
13,403,205	EPC Netherlands Netherlands Enterprise Agency, RVO, 2020, GLOBUS	2023	Mortgages	3	Option 2a	Energy intensity	MWh/m²	Floor area
13,403,212	EPC Belgium Argenta, 2022, GLOBUS	2023	Mortgages	3	Option 2a	Energy intensity	MWh/m²	Floor area
13,403,219	EPC Norway MDPI, 2019. Energy Performance Certificates—The Role of the Energy Price, GLOBUS	2023	Mortgages	3	Option 2a	Energy intensity	MWh/m²	Floor area
13,403,221	EPC Poland CA EPBD - Poland, 2018, GLOBUS	2023	Mortgages	3	Option 2a	Energy intensity	MWh/m²	Floor area
13,403,231	EPC Belgium Argenta, 2022, GLOBUS	2023	Mortgages	3	Option 2a	Energy intensity	MWh/m²	Floor area
13,403,238	EPC Portugal sce.pt, GLOBUS	2023	Mortgages	3	Option 2a	Energy intensity	MWh/m²	Floor area
13,403,241	EPC Romania certificatenergetic.info, 2009, GLOBUS	2023	Mortgages	3	Option 2a	Energy intensity	MWh/m²	Floor area

The user can also only export all selected emission factors (again in different formats)

Here the user can export all filtered emission factors.

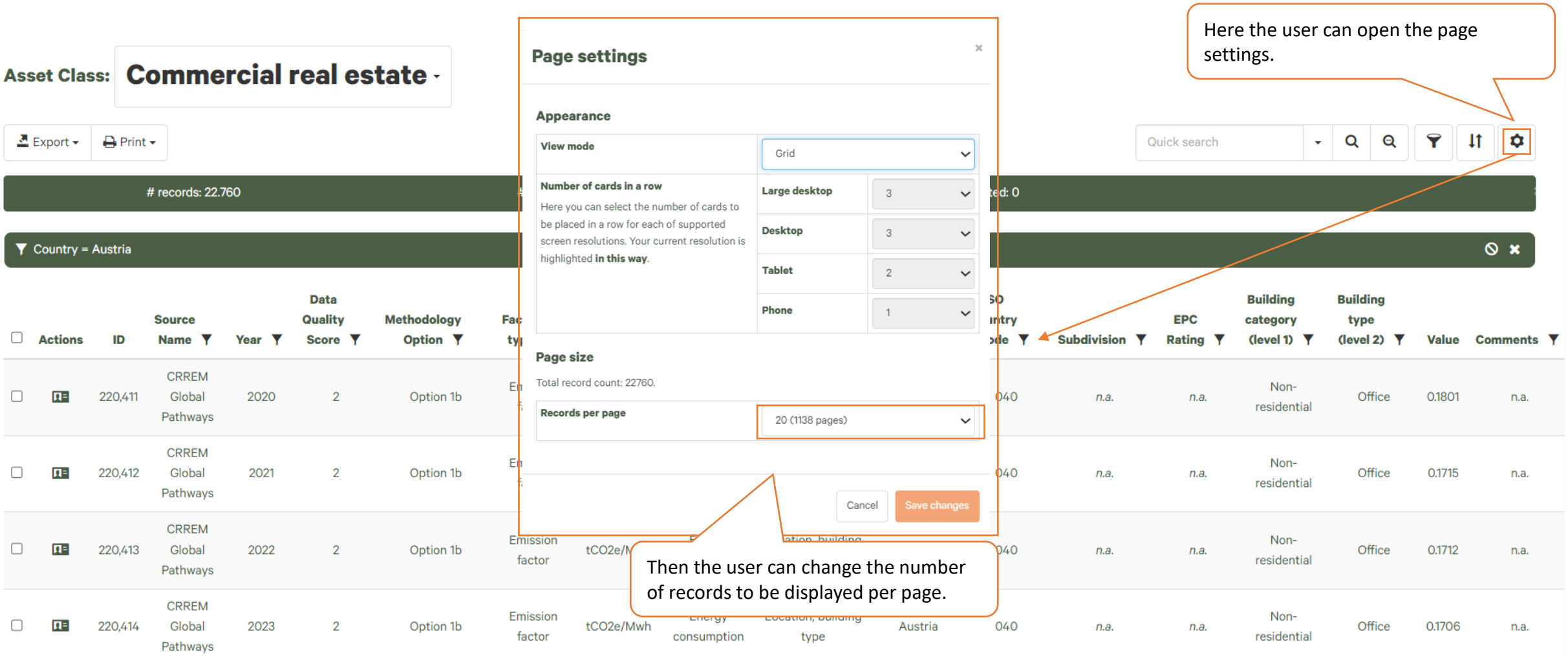


All selected emission factors are exported (i.e. 4 records).

Example of Excel export

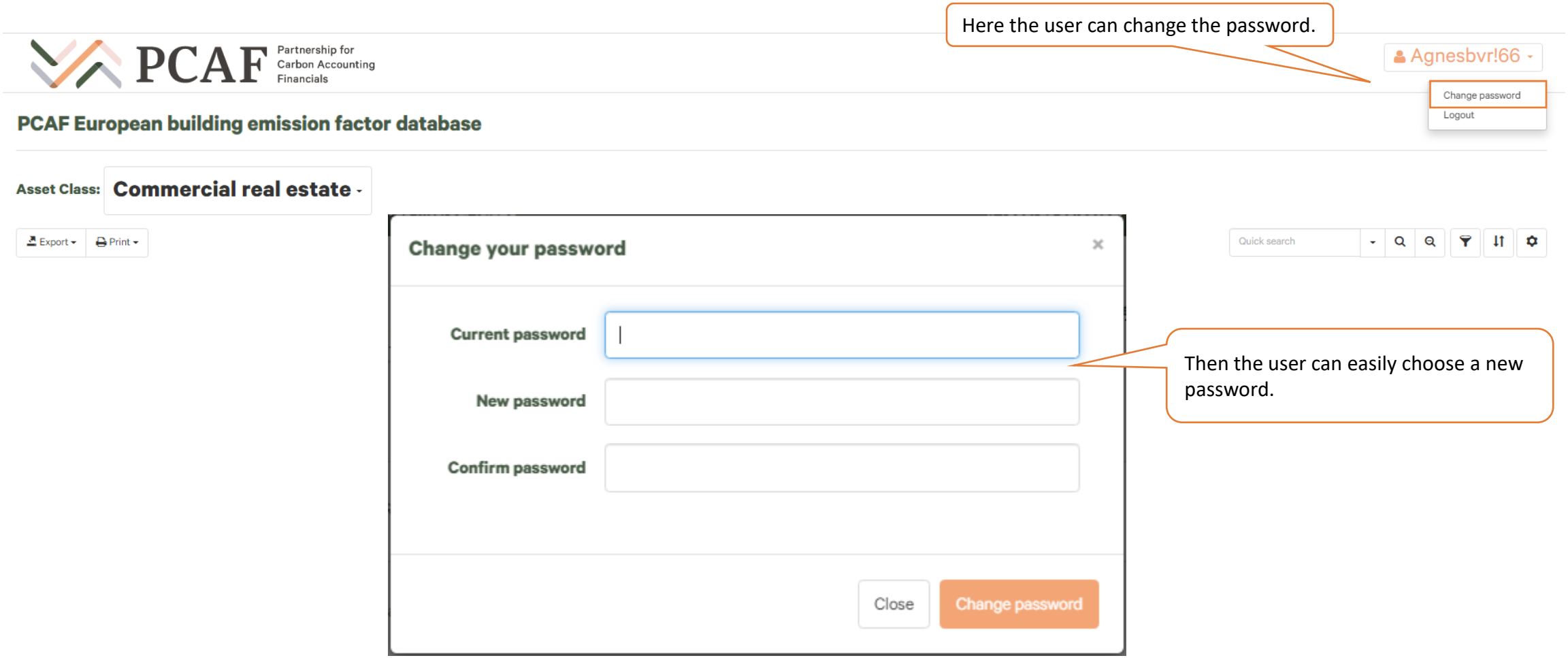
ID	Source Name	Year	Asset class	Data Quality Score	Methodology Option	Factor type	Emission factor unit	A
220,112	CRREM Global Pathways	2021	Mortgages	2	Option 1b	Emission factor	tCO2e/Mwh	E
220,113	CRREM Global Pathways	2022	Mortgages	2	Option 1b	Emission factor	tCO2e/Mwh	E
220,114	CRREM Global Pathways	2023	Mortgages	2	Option 1b	Emission factor	tCO2e/Mwh	E
220,121	CRREM Global Pathways	2020	Mortgages	2	Option 1b	Emission factor	tCO2e/Mwh	E

The user can also change the number of records to be displayed on a page under page settings



PCAF

The user can also change the password easily



All features are applicable to both asset classes ‘Mortgages’ and ‘Commercial real estate’

Asset Class: **Commercial real estate**

Export Print

records: 22.760 | # records filtered: 560

Country = Austria

Actions	ID	Source Name	Year	Data Quality Score	Methodology Option	Factor type	Emission factor unit
	220,411	CRREM Global Pathways	2020	2	Option 1b	Emission factor	tCO2e/Mwh
	220,412	CRREM Global Pathways	2021	2	Option 1b	Emission factor	tCO2e/Mwh
	220,413	CRREM Global Pathways	2022	2	Option 1b	Emission factor	tCO2e/Mwh
	220,414	CRREM Global Pathways	2023	2	Option 1b	Emission factor	tCO2e/Mwh

Asset Class: **Mortgages**

Export Print

records: 6.828 | # records filtered: 6.828

Actions	ID	Source Name	Year	Data Quality Score	Methodology Option	Factor type	Emission factor unit
	220,111	CRREM Global Pathways	2020	2	Option 1b	Emission factor	tCO2e/Mwh
	220,112	CRREM Global Pathways	2021	2	Option 1b	Emission factor	tCO2e/Mwh
	220,113	CRREM Global Pathways	2022	2	Option 1b	Emission factor	tCO2e/Mwh
	220,114	CRREM Global Pathways	2023	2	Option 1b	Emission factor	tCO2e/Mwh
	220,121	CRREM Global Pathways	2020	2	Option 1b	Emission factor	tCO2e/Mwh

Building classification mapping

- Financial institutions may classify their building portfolios according to a certain classification system.
- The European Building Database is classified according to the CRREM building categories.
- If your organisation uses a different classification system to the CRREM system, then a mapping exercise is required.
- Mapping should be done based on the sector definitions or descriptions, using a 'best-fit' approach – one can never achieve a perfect mapping, as definitions are often ambiguous

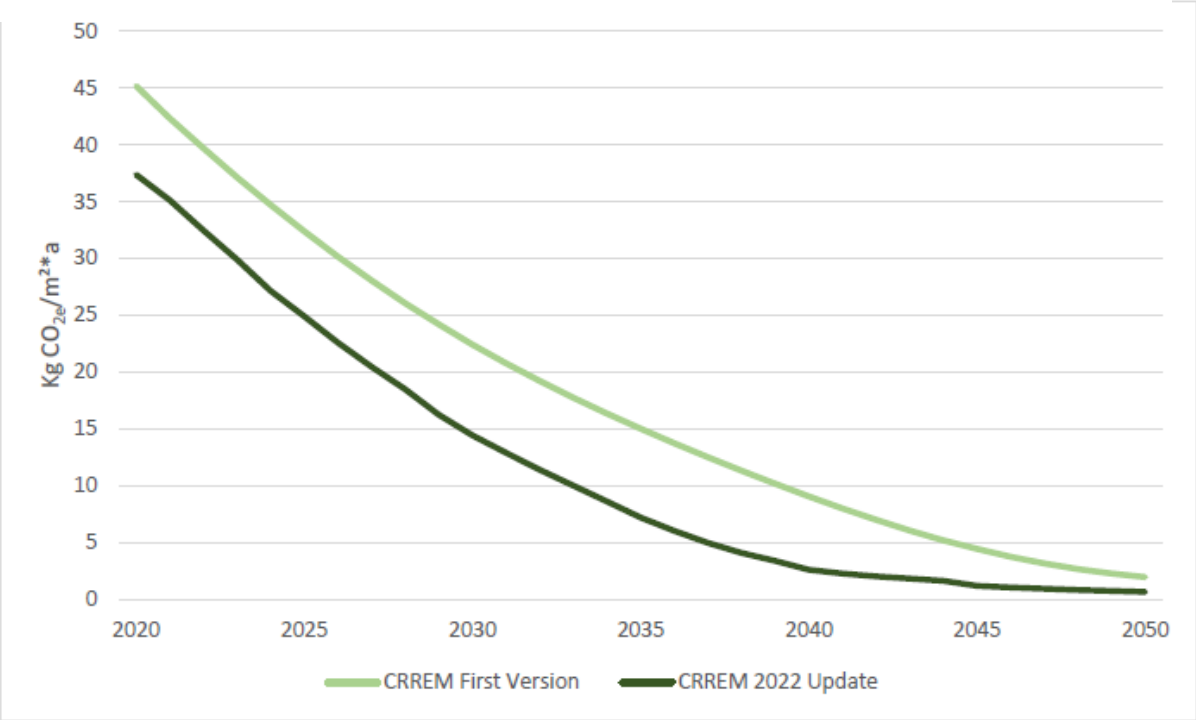
LEVEL 1	LEVEL 2	DESCRIPTION
Residential buildings	Single-family house (SFH)	Free-standing residential properties occupied by one household or family.
	Multi-family house (MFH)	Multi-dwelling units, such as duplex, semi-detached, townhouses and apartment blocks.
Non-residential buildings	Office	Office properties including free-standing offices, office terraces, unattributed office buildings and office parks.
	Retail - high street	Retail properties located on the high street, such as terraced properties located in the city center or other high-traffic pedestrian zones.
	Retail - shopping center	Enclosed centers for retail purposes consisting of multiple retail stores connected with internal walkways.
	Retail - warehouse	Unenclosed retail space, such as strip center or strip mall, where buildings are usually stand-alone and situated side-by-side with their entrance facing a main street or carpark.
	Hotel	Accommodation properties including hotels, motels, youth hostels, lodging, and resorts.
	Distribution warehouse cold	Unenclosed industrial properties, such as large halls in the outskirts, used for the purpose of storing, processing, and distribution of goods. Not heated
	Distribution warehouse warm	Unenclosed industrial properties, such as large halls in the outskirts, used for the purpose of storing, processing, and distribution of goods. Heated
	Healthcare	Properties used for primary healthcare, such as hospitals, clinics, physical therapy centers, mental health centers, rehabilitation or restorative care centers.
	Leisure/Lodging	Properties used for leisure and sports, such as sports club houses, gyms, sports stadia, indoor sports arenas, halls, swimming pools, theatre and auditoria.

Note on the CRREM time series

While calculating financed emissions, it is recommended to use the CRREM factors from 2020.

- We provide CRREM factors for 2020 up to 2023. The 2020 data is the baseline, and 2021 to 2023 are projections based on the 1.5C decarbonization pathway.
- Since the 2020 factors are based on actual baseline information, it is in-line with a conservative accounting approach to use these factors for carbon accounting purposes.
- If financial institutions seek to perform calculations that would allow them to take actions aligned to a 1.5C decarbonization pathway, then the projected emission factors from 2021 to 2023 might be more useful.
- It is to be noted that these projections are likely to be optimistic in nature, considering the alignment of CRREM pathways with expected decarbonization in the electricity grid.

From CRREM Global Pathways Methodology: Comparison of the (total) decarbonisation pathways between the first version and the 2022 update



Referencing

Results of calculations that rely on emission factors from the PCAF database should always be accompanied by correct referencing

- The PCAF European Buildings Database is a *secondary* data source – the data is derived from other sources
- Details of the calculations and data sources can be found in the methodology report
- Our reporting guidelines prescribe that users reference both the PCAF Database and the underlying data sources used to calculate the emission factors
- Any underlying assumptions or calculations should also be noted

Example of a correct reference:
'Our results are based on emission factors extracted from the PCAF European Buildings Database in September 2023, which were derived from CRREM Global Pathways v2.0, using 2020 baseline data.

Follow PCAF's *Financing towards net-zero buildings* closely on the project website:
https://carbonaccountingfinancials.com/financing-towards-net-zero-buildings

Any feedback on the database is greatly appreciated and can be shared via:
info@carbonaccountingfinancials.com

PCAF

Partnership for Carbon Accounting Financials

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