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## **Guidance for Financed Emissions Accounting Tenant-Owner Associations and Tenant-Owned Apartments in Sweden**

### **Asset class definition**

This asset class includes on-balance sheet loans for:

- a) **Tenant-Owner Associations.** Lending for specific corporate purposes – namely the purchase and refinance of Tenant-Owner Associations. The purpose of a Tenant-Owned Association is to grant the use of apartments in the association's building or buildings to tenant-owners without any time limit.
- b) **Tenant-Owned Apartments.** Lending for specific consumer purposes – namely the purchase and refinance of residential apartments within a Tenant-Owner Association. This definition implies that the property is, in general, used for residential purposes.

When referring to *Property*, this is the entire Tenant-Owner Association including apartments within the association. A property might consist of one or several buildings. When referring to *Apartments*, this is individual Tenant-Owned Apartments within a Tenant-Owner Association.

If the loan is used to refinance a previous loan or mortgage and this loan is provided by the original loan or mortgage provider, the new loan supersedes the original loan or mortgage. If the refinancing is done by an institution other than the original loan provider, the new loan and associated property's or apartment's emissions are attributed to the institution providing the loan for refinancing.

### **Emission scope covered**

Financial institutions shall cover the absolute scope 1 and 2 emissions related to the energy use of the property or apartment financed through the loan or mortgage.

- a) For the **Tenant-Owner Association**, scope 1 and 2 emissions of the whole property, including the emissions from tenant-activity electricity in shared facilities (referred to as property electricity), should be covered.

- b) For the **Tenant-Owned Apartments**, scope 1 and 2 emissions related to the apartment, including emissions from tenant-activity electricity in individual apartments, should be covered.

### **Attribution of emissions**

#### ***Distribution of emissions between association and apartments***

In order to avoid double counting of property emissions between the Tenant-Owner Association and the Tenant-Owned Apartments, a distribution factor is applied to the energy related emissions of the property. This means that the property emissions from heating and hot water purposes are divided between the Tenant-Owner Association and the Tenant-Owned Apartments.

The distribution factor applied is 0.7/0.3, where 70% of the property emissions are attributed to the Tenant-Owned Apartments and 30% of the property emissions are attributed to the Tenant-Owner Associations. The distribution factor is based on a joint consideration of a number of aspects, including estimations on how emissions are distributed within a Tenant-Owner Association and the parties' capability of changing the property emissions. The distribution factor will be reviewed every five years.<sup>1</sup>

$$(1 a) \text{ Distribution factor}_a = 1 - \frac{\text{Numerator}}{\text{Denominator}}$$

(with a = Tenant-Owner Association)

$$(1 b) \text{ Distribution factor}_b = \frac{\text{Numerator}}{\text{Denominator}}$$

(with b = Tenant-Owned Apartment)

#### ***Attribution factor***

When calculating financed emissions, annual emissions are attributed to the loan or mortgage provider using a loan-to-value approach. Thus, the attribution is equal to the ratio of the outstanding amount at the time of GHG accounting to the property value at the time of loan origination.

$$(2 a) \text{ Attribution factor}_a = \frac{\text{Outstanding amount}_a}{\text{Property value at origination}_a}$$

(with a = Tenant-Owner Association)

$$(2 b) \text{ Attribution factor}_b = \frac{\text{Outstanding amount}_b}{\text{Apartment value at origination}_b}$$

(with b = Tenant-Owned Apartment)

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<sup>1</sup> The distribution factor was determined in 2023.



When the property value or apartment value at loan origination is not feasible to obtain, financial institutions shall use the property or apartment value available at the baseline year and fix this value for the following years of GHG accounting, i.e., the denominator remains constant.

If the loan amount has increased and the property has a new valuation, the new valuation will be used and then fixed. If the property has only got a new valuation but the loan amount has not increased, the initial fixed property value shall remain fixed.

### **Equation of calculating financed emissions**

Financed emissions of loans or mortgages are calculated by multiplying the annual emissions of the property or the apartment by the (1) distribution factor of a Tenant-Owner Association or a Tenant-Owned apartment and then by the (2) attribution factor of the property of apartment. Thus, financed emissions are calculated as follows for Tenant-Owner Associations and Tenant-Owned Apartments, respectively.

#### **Tenant-Owner Associations**

$$Financed\ emissions_a = \sum Property\ emissions_a \times Distribution\ factor_a \times Attribution\ factor_a$$

(with a = Tenant-Owner Association)

#### **Tenant-Owned Apartments**

$$Financed\ emissions_b = \sum Property\ emissions_b \times Distribution\ factor_b \times Attribution\ factor_b$$

(with b = Tenant-Owned Apartment)

Please note that both *Property emissions* and *Apartment emissions* include emissions from tenant-activity. For more information, please see section *Other considerations*.

Please note that *apartment emissions* are calculated using the energy emission intensity per floor area of the building. Please see *Appendix* for a calculation example.

### **Data required**

Actual building energy consumption is preferred but may not be widely available. In the absence of metered data, energy use can be estimated based on building characteristics and publicly available data.

Energy use may be estimated using energy label and information available in the Energy Performance Certificate (EPC). From the EPC, financial institutions may find



information about a building's energy efficiency, heated area and energy sources. Energy labels and EPC data is available from Boverket. Please note that EPCs are only available on building-level and not on apartment-level.

For buildings where no energy label or EPC data is available, financial institutions may use proxies to estimate the emissions of the building. Financial institutions are encouraged to be transparent in their reporting regarding the sources of any proxies used.

Data Quality	Options to estimate the financed emissions	When to use each option		
		Tenant-owner associations	Tenant-owned apartments	
Score 1	Option 1: <u>Actual building emissions</u>	1a	Primary data on <b>actual building energy consumption</b> (i.e., metered data) is available. Emissions are calculated using actual building <b>energy consumption</b> and <b>supplier-specific emission factors</b> specific to the respective <b>energy source</b> .	Primary data on <b>actual apartment energy consumption</b> (i.e., metered data) is available. Emissions are calculated using actual apartment <b>energy consumption</b> and <b>supplier-specific emission factors</b> specific to the respective <b>energy source</b> .
Score 2		1b	Primary data on <b>actual building energy consumption</b> (i.e., metered data) is available. Emissions are calculated using actual building energy consumption and <b>average emission factors</b> specific to the respective energy source.	Primary data on <b>actual apartment energy consumption</b> (i.e., metered data) is available. Emissions are calculated using actual apartment energy consumption and <b>average emission factors</b> specific to the respective energy source.
Score 3	Option 2: <u>Estimated building emissions based on floor area</u>	2a	<b>Estimated building energy consumption per floor area based on official building energy labels AND the floor area are available.</b> Emissions are calculated using estimated building energy consumption and <b>average emission factors</b> specific to the respective <b>energy source</b> .	<b>Estimated building energy consumption per floor area based on official building energy labels AND the apartment floor area are available.</b> Emissions are calculated using estimated building energy consumption and <b>average emission factors</b> specific to the respective <b>energy source</b> .
Score 4		2b	<b>Estimated building energy consumption per floor area based on building type and location-specific statistical data AND the floor area</b> are available. Emissions are calculated using estimated building energy consumption and <b>average emission factors</b> specific to the <b>respective energy source</b> .	<b>Estimated building energy consumption per floor area based on building type and location-specific statistical data AND the apartment floor area</b> are available. Emissions are calculated using estimated building energy consumption and <b>average emission factors</b> specific to the <b>respective energy source</b> .  <i>If a Tenant-Owned Apartment cannot be linked to a specific Tenant-Owner Association but the floor area of the apartment is available, this would be the default score.</i>
Score 5	Option 3: <u>Estimated building emissions based on a number of buildings</u>	3	<b>Estimated building energy consumption per building based on building type and location specific statistical data AND the number of buildings</b> are available. Emissions are calculated using estimated building energy consumption and <b>average emission factors</b> specific to the <b>respective energy source</b> .	<b>Estimated building energy consumption per building based on building type and location specific statistical data AND statistical data on average apartment floor area</b> are available. Emissions are calculated using estimated building energy consumption and <b>average emission factors</b> specific to the respective <b>energy source</b> .  <i>If a Tenant-Owned Apartment cannot be linked to a specific Tenant-Owner Association and the floor area of the apartment is not available, this would be the default score.</i>

## Other considerations

### ***A property consisting of several buildings***

A property may consist of more than one building, in which case the total emissions for the entire property should be calculated. If a property has more than one energy certificate (indicating several buildings), total emissions for the property is calculated using weighted average emissions for each building, based on heated area.

### ***Tenant-activity***

Emissions from tenant-activity should always be included in the total emission calculations of a Tenant-Owner Association and a Tenant-Owned Apartment. Data on tenant-activity (kWh/m<sup>2</sup>) is available from Energimyndigheten. If emissions are estimated using EPC data, emissions from tenant-activity must be added separately,

as tenant-activity is not included in EPC data. Please note that when applying proxies from third party sources, such as PCAF European Building Database, emissions from tenant-activity may already be included in the proxies.

When calculating the emissions from tenant-activity, the electricity intensity (kWh/m<sup>2</sup>) as indicated from the file from Energimyndigheten shall be multiplied by the emissions factor of electricity (kgCO<sub>2</sub>e/kWh) to get the emissions from tenant-activity per square meter (kgCO<sub>2</sub>e/m<sup>2</sup>).

Please note that when using the building emission intensity to calculate the emissions of the tenant-owned apartments, only the energy emissions intensity (from heating and hot water purposes) should be applied initially and thereafter emissions from tenant-activity from the apartment are added, i.e. property electricity shall not be included in the total emissions of the Tenant-Owned Apartment.

### ***Emission factors***

The emission factors applied for calculating building emissions are the latest available according to the table below. Some emission factors are by their nature static and doesn't change over time, while others are updated annually. This document will provide the latest available emission factors updated by the end of Q3 every year, for financial institutions to use in their annual disclosures. Depending on the source there are different reference years available by the end of Q3 when this document is updated.

The recommendation is to use the following emission factors, sources and reference years.

Energy source	Type	Reference year	Emission factor (gCO <sub>2</sub> e/kWh)	Source
Electricity <sup>2</sup>	Annual update	2022	Requires licence to use <sup>3</sup>	<a href="#">International Energy Agency (IEA)</a>
District heating	Annual update	2023	47.7	<a href="#">Energiföretagen</a>
Oil	Static	2022	268.11 <sup>4</sup>	<a href="#">Naturvårdsverket</a>
Gas	Static	2022	203.9562 <sup>5</sup>	<a href="#">Naturvårdsverket</a>
Biofuel	Static	2014	0	<a href="#">IPCC Table A.III.2 / GHG protocol</a>

## Limitations

### ***Results depend on data quality***

Many assumptions must be made to calculate the emissions of loans to Tenant-Owner Associations and Tenant-Owned Apartment as data is often difficult to retrieve for privacy reasons. Even though the calculation method does not differ greatly, the data sources used can yield different results—for instance, when average consumption data is replaced by actual consumption data from grid operators.

<sup>2</sup> Also includes energy sources such as geothermal heat, ground source heat and air source heat pumps that are powered by electricity.

<sup>3</sup> IEA's raw data is licensed and therefore not permitted to publish. Access to the emission factor for electricity from IEA is available through the purchase of a license. The following emission components shall be added when using data from the IEA: emissions per kWh from electricity for CO<sub>2</sub> (total) and N<sub>2</sub>O (total), adjustment for losses during transmission and distribution (CO<sub>2</sub> total) and trade adjustment (CO<sub>2</sub> total) (a total of 5 rows from the Summary tab are summed for the last reported data (not estimated/provisional)). If another equivalent data source is used, the recommendation is that the same emission components are used and added.

<sup>4</sup> The factor for oil is based on the emission values of Heating Oil 1 (the Swedish term is "Eldningsolja 1). The factor consists of emissions of nitrous oxide (N<sub>2</sub>O), methane (CH<sub>4</sub>), and carbon dioxide (CO<sub>2</sub>) and is determined by first converting the emissions of nitrous oxide (NO<sub>2</sub>) and methane (CH<sub>4</sub>) to carbon dioxide equivalents (CO<sub>2</sub>e) using GWP values (Global Warming Potential values) from the IPCC 5<sup>th</sup> assessment report. Then, all gases (N<sub>2</sub>O, CH<sub>4</sub> and CO<sub>2</sub>) are summed to a total with the unit CO<sub>2</sub>e.

<sup>5</sup> The factor for gas is based on the emission values of Town Gas (the Swedish term is "Stadsgas"). The factor consists of emissions of nitrous oxide (N<sub>2</sub>O), methane (CH<sub>4</sub>), and carbon dioxide (CO<sub>2</sub>) and is determined by first converting the emissions of nitrous oxide (NO<sub>2</sub>) and methane (CH<sub>4</sub>) to carbon dioxide equivalents (CO<sub>2</sub>e) using GWP values (Global Warming Potential values) from the IPCC 5<sup>th</sup> assessment report. Then, all gases (N<sub>2</sub>O, CH<sub>4</sub> and CO<sub>2</sub>) are summed to a total with the unit CO<sub>2</sub>e.

## Appendix

### *Calculation example*

#### **Tenant-Owner Associations**

1. EPC data from Boverket are matched to buildings and Tenant-Owner Associations. The EPC contain information about energy performance (kWh/m<sup>2</sup>/year), Atemp (heated area) and main energy source (may be a combination of energy sources).
  - If the building/Tenant-Owner Association does not have an EPC from Boverket, proxies on energy performance shall be used.
2. Energy performance per m<sup>2</sup> is multiplied by Atemp to get the total energy required for heating and hot water purposes.
3. Total energy required is then multiplied by the emission factor for the main energy source/s to get the building's total emissions from heating and hot water purposes.
  - If a building has a combination of two different energy sources, a 50/50 division between energy sources is assumed.
  - Emission factors for different energy sources are collected from public sources. Please see section *Emission factors*, for specific emission factors used.
  - If no information on main energy source is available (i.e. the building/Tenant-Owner Association have not been matched against an EPC), average emission factors shall be used.
  - If the property/Tenant-Owner Association consists of more than one building (indicated by having more than one EPC), total emissions of the property is calculated using weighted average emissions for each building, based on heated area.
4. Data on property electricity per kWh/m<sup>2</sup> is multiplied by the property's total Atemp and the emission factor for electricity to get the total emissions from property electricity.
  - Data on property electricity is collected from Energimyndigheten.<sup>6</sup>
5. The Tenant-Owner Association's total emissions (Step 3 and 4 combined) are multiplied by the distribution factor of 0.3 to get the emissions attributable to the Tenant-Owner Association.

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<sup>6</sup> [Energiindikatorer \(energimyndigheten.se\)](http://energiindikatorer.energimyndigheten.se); Energianvändning i byggnader; Elanvändning Flerbostadshus.

6. The total emissions attributable to the Tenant-Owner Association (Step 5) are multiplied by the attribution factor of the Tenant-Owner Association to get the lender's financed emissions per Tenant-Owner Association.
7. *The Tenant-Owner Associations' emissions from heating and hot water purposes (Step 3) is divided by Atemp (heated area) to get the energy emissions per m<sup>2</sup> for the Tenant-Owner Association (will be applied to calculate the emissions of individual apartments).*

### **Tenant-Owned Apartments**

1. The Tenant-Owned Apartment is matched against the property and the Tenant-Owner Association, if possible.
2. Data on the energy emissions per m<sup>2</sup> for the specific building is collected from the Tenant-Owner Association calculations (Step 7 of Tenant-Owner Associations).
3. Energy emissions per m<sup>2</sup> (Step 2) is multiplied by the floor area of the Tenant-Owned Apartment to get the total energy emissions for that Tenant-Owned Apartment.
4. Data on tenant-activity (kWh/m<sup>2</sup>) is multiplied by the floor area of the Tenant-Owned Apartment and the emission factor for electricity to get the total emissions from tenant-activity for the Tenant-Owned Apartment.
5. The total emissions from the Tenant-Owned Apartment (Step 3 and Step 4 combined) is then multiplied by the distribution factor of 0.7 to get the emissions attributable to the apartment.
6. The total emissions attributable to the Tenant-Owned Apartment (Step 5) is then multiplied by the attribution factor for that apartment to get the lender's financed emissions per Tenant-Owned Apartment.

If the Tenant-Owned Apartment cannot be matched against a property and a Tenant-Owner Association, estimates of average emissions per m<sup>2</sup> of multi-family buildings in Sweden may be applied in Step 3.