

# PCAF Report 2024

Report on Financed Carbon Emissions  
in Aareal Bank's Commercial  
Real Estate Financing Portfolio

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## 1 Introduction

Aareal Bank (“the Bank”) recognises that as a provider of finance for commercial property, it plays a meaningful role in helping the commercial real estate sector meet the climate action goals set out in the Paris Agreement. For this reason, the Bank voluntarily signed the Partnership for Carbon Accounting Financials (PCAF) Commitment Letter in 2021, thus pledging to increase transparency on the financed carbon emissions in its commercial real estate financing portfolio. In 2024, the Bank published a comprehensive report in accordance with the PCAF standard for the first time, based on portfolio data from financial year 2023. To provide continued transparency, Aareal Bank is now publishing an updated PCAF Report, which covers the Bank’s financed portfolio in financial year 2024.

In 2024, the carbon emissions resulting from Aareal Bank’s commercial real estate financing portfolio decreased by 32,484 tonnes, resulting in a total of 607,197 tonnes of carbon emissions, based on the Bank’s share of finance provided.

The carbon intensity per € million loan also decreased from 19.9 tCO<sub>2</sub>e/€ million in 2023 to 18.4 tCO<sub>2</sub>e/€ million in 2024, while the Bank’s borrowings in this time period increased from approximately € 32 billion to approximately € 33 billion.

The average data quality score of the financed properties remained stable in 2023 and 2024, with a value of 3.2. In 2024, 60 % of financed properties were awarded data quality scores ranging between 1 and 3 (the best possible results). In 2023, only 55 % of buildings achieved scores in this range.

Standardised methodologies for calculating and reporting carbon emissions enable financial institutions to better understand, and then efficiently manage, the environmental impacts of their credit portfolios. Not only does this promote the transparency and comparability of climate-related data, it also enables progress towards global climate goals as well as the transformation to a low-carbon economy.

The PCAF standard used in this report, “[Global GHG Accounting and Reporting Standard Part A – Financed Emissions](#)”, has developed into a global accounting and reporting framework for greenhouse gas emissions in the financial sector. It comprises requirements and recommendations for measuring financed carbon emissions in a total of seven asset classes, including the commercial real estate sector, which is particularly relevant to Aareal Bank.<sup>1)</sup> The PCAF accounting methodology enables globally uniform, consistent measurement and reporting of greenhouse gas emissions relating to financial transactions. For Aareal Bank, portfolio analyses based on the PCAF standard serve as the basis for developing a long-term decarbonisation plan for those carbon emissions that can be influenced indirectly through financing activities.

## 2 Methodology

The methodological principles and data foundations used in preparing this report were developed in financial years 2023 and 2024 as part of an internal project involving both internal and external stakeholder groups, with the goal of creating transparency on Aareal Bank’s commercial real estate financing portfolio.

Aareal Bank has been working closely with its clients for several years to gather structured ESG-related data on financed properties as part of its green finance activities. This information is subjected to an organised quality assurance process and is regularly recorded in the Bank’s internal IT systems. Collected data includes both general building features such as building type, location, year of construction and floor area, and energy-related information such as energy values, Energy Performance Certificate (EPC) labels, the year in which energy efficiency improvements were made and green building certificates. The global focus of Aareal Bank’s commercial real estate financing portfolio and disparities between international standards mean that the structure and scope of data sources are heterogeneous in some cases. As a result, it is not always possible to document or compare carbon emissions directly.

For this reason, Aareal Bank worked together with external property and data specialists in 2024 to develop a robust calculation model for determining the carbon footprints of the buildings in the Bank’s commercial real estate financing portfolio using available data. This model is closely aligned with the PCAF standard, which was reviewed by the Greenhouse Gas (GHG) Protocol.

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<sup>1)</sup> PCAF (2022). The Global GHG Accounting and Reporting Standard Part A: Financed Emissions. Second Edition, p. 89.

It conforms with the GHG Protocol requirements set forth in the Corporate Value Chain (Scope 3) Accounting and Reporting Standard for Category 15 investment activities.

This science-based calculation model involved combining available building-specific inputs with information from a range of additional, internationally recognised databases to calculate the carbon emissions. Suitable data sources such as the PCAF European Building Emission Factor Database and the US Building Performance Database (BPD) were used for the calculation. The databases used contain a variety of information relating to operational carbon emissions for buildings with different types of use in both the non-residential and residential categories. The information is broken down by country, region and building type, among others.

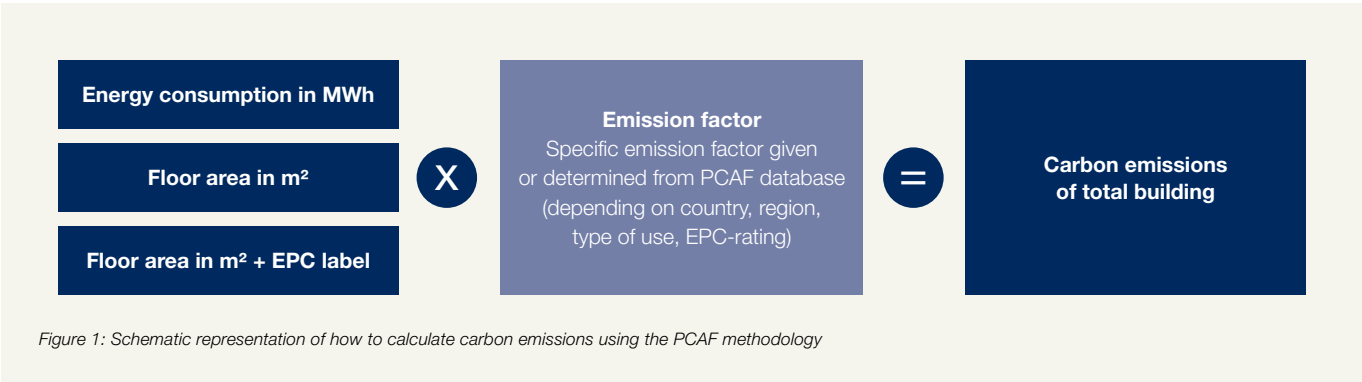
Different emission factors are included in the calculations, depending on the scope and the degree of detail of the specific property details available (floor area, energy efficiency, energy requirements/energy consumption). The better the quality of the available inputs, the greater the accuracy of the carbon emissions calculation. This is why the best possible available input data is always used in the calculations.

The PCAF standard sets out a five-point scale for assessing and improving the objective comparability of the data quality of calculated carbon emissions. A carbon dataset is calculated for each financed building together with a PCAF data quality score that can range from 1 (the best possible quality of the data foundation) to 5 (the lowest quality of the data foundation).

Table 1: Overview of the fundamentals of the PCAF data quality score<sup>2)</sup>

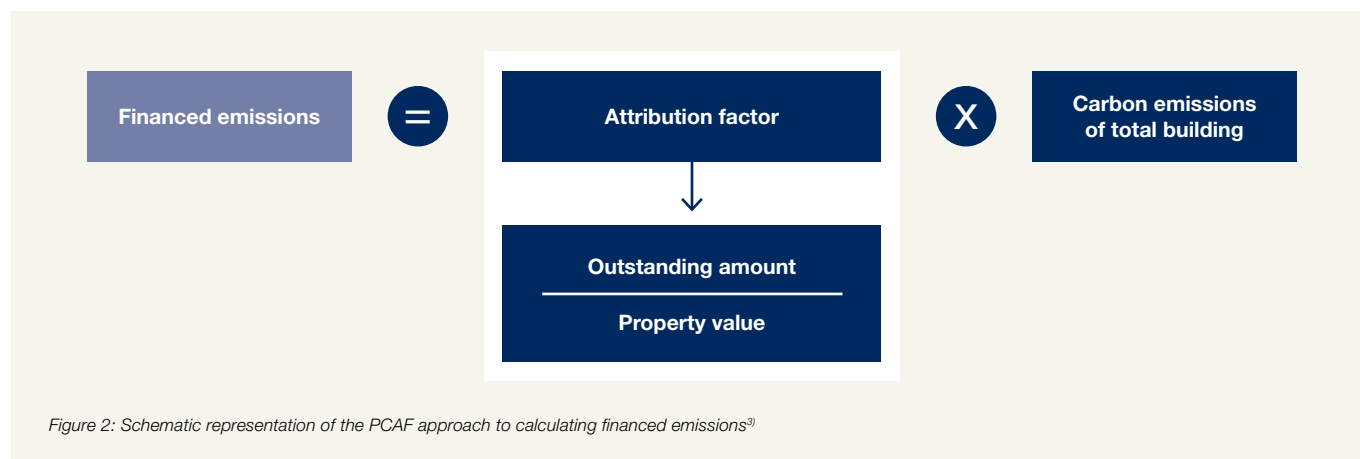
Available data	Calculation	Data quality score (1-5)
Carbon emissions for building in <b>t/m²</b>	The energy consumption for the building is calculated using the specific carbon emission factors supplied by the power company (electricity, heating, etc.).	1
Energy consumption for the building in <b>MWh/m²</b>	The energy consumption for the building is multiplied by the country-specific and use-specific carbon emission factors.	2
Building area in <b>m² + EPC or comparable energy-related information</b>	EPC-specific carbon emission factors (broken down by the country and the type of use) are multiplied by the building area.	3
Building area in <b>m²</b>	Average carbon emission factors per country and type of use are multiplied by the building area.	4
<b>Number</b> of buildings	The energy consumption estimated using the building type and location-specific statistical data is multiplied by the average emission factors per country and type of use for the entire building.	5

The following figure shows an example of the differentiation options when selecting suitable carbon emission factors at different levels using the PCAF European building emission factor database.



<sup>2)</sup> Own illustration in accordance with PCAF (2022). The Global GHG Accounting and Reporting Standard Part A: Financed Emissions. Second Edition.

Once the carbon emissions for the building have been calculated, the financed emissions are determined using the approach shown below:



Financed emissions are calculated by multiplying a building's carbon emissions by its attribution factor. The attribution factor for each building is calculated by dividing the outstanding amount of the loan ("outstanding amount") by the value of the property at the time the loan was originated ("property value at origination").

The PCAF standard enables financed emissions to be assigned to different financing types and sources ("PCAF financing type & source"), with the following being used for Aareal Bank's loan portfolio:

- PCAF: "Corporate finance" | Loans (debt) → Real estate Commercial real estate
- PCAF: "Consumer finance" | Loans (debt) → Real estate Mortgages

#### PCAF Commercial Real Estate (CRE):

If the property value cannot be determined at the time the loan is originated, financial institutions use the last available property value and predefine this value for the following years in which carbon accounting is performed, i.e. the denominator remains constant from the first year of carbon accounting onwards. If a CRE loan is modified (e.g. if the loan amount is increased, rolled over, refinanced or extended) and if a new property value is determined in the course of the transaction, the property value on origination must be updated to reflect the property value at the time of the change.<sup>4)</sup>

#### PCAF Mortgages:

When calculating the financed emissions, the annual emissions for a building are attributed to the financial institution using a loan to value ratio. In other words, the amount attributed corresponds to the ratio between the outstanding loan amount at the time of carbon accounting and the property value at origination. If the property value at origination cannot be determined, financial institutions use the last available property value and predefine this value for the following years in which carbon accounting is performed, i.e. the denominator remains constant. The attribution approach assumes the residential property owner also acquires pro rata ownership of the building's carbon emissions.<sup>5)</sup>

<sup>3)</sup> PCAF (2022). The Global GHG Accounting and Reporting Standard Part A: Financed Emissions. Second Edition, p. 40.

<sup>4)</sup> PCAF (2022). The Global GHG Accounting and Reporting Standard Part A: Financed Emissions. Second Edition, p. 89.

<sup>5)</sup> PCAF (2022). The Global GHG Accounting and Reporting Standard Part A: Financed Emissions. Second Edition, p. 96.

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### 3 Report on PCAF results for the commercial real estate financing portfolio

As at the 31 December 2024 reporting date, Aareal Bank's commercial real estate financing portfolio contained a total of 1,721 properties and borrowings of approximately € 33 billion for the purposes of the PCAF Report.<sup>6)</sup> The list included residential and non-residential buildings in more than 20 countries.

PCAF data quality scores were assigned to the properties in Aareal Bank's portfolio in collaboration with external property and data specialists in line with the methodological principles defined in the PCAF standard.

According to the calculations made in line with the PCAF standard, Aareal Bank's commercial real estate financing portfolio contributed 607,197 tonnes of CO<sub>2</sub>e emissions in the financial year 2024, based on Aareal Bank's share of the finance provided. The average PCAF data quality score when all properties in the portfolio are weighted equally was 3.2. No distinctions by loan volumes or floor area were made when calculating this value.

#### 3.1 Breakdown of results by geography and type of use

The following conclusions can be drawn based on Aareal Bank's calculated financed emissions:

In terms of geography, the largest proportions of financed carbon emissions, based on an independent examination of the PCAF data quality scores, are to be found in the following markets: Poland (approx. 29 %, data quality score: 3.1), USA (approx. 27 %, data quality score: 4.0), and the United Kingdom (approx. 11 %, data quality score: 3.2).

The building use types with the largest absolute proportion of financed emissions in Aareal Bank's loan portfolio included logistics properties (approximately 33 % of total financed carbon emissions, data quality score: 3.2), hotels (25 % of total financed emissions, data quality score: 3.6) and 18 % to retail properties (data quality score: 3.5) and Offices (data quality score: 3.2) respectively.

The carbon intensity per € million loan amount was calculated to be approximately 18.4 tCO<sub>2</sub>e/€ million (data quality score: 3.2) for Aareal Bank's commercial real estate financing portfolio as a whole. Logistics properties had a comparatively high calculated carbon intensity per € million loan value (39.1 tCO<sub>2</sub>e/€ million, data quality score: 3.2), as did retail properties (22.3 tCO<sub>2</sub>e/€ million, data quality score: 3.5). This is due to the comparatively higher space intensity per € million loan volume. In contrast, the carbon intensity per € million loan amount was below average in the office (12.4 tCO<sub>2</sub>e/€ million, data quality score: 3.2) and hotel (12.9 tCO<sub>2</sub>e/€ million, data quality score: 3.5) property classes due to the comparatively low space intensity.

The following graphics provide a more detailed overview of the breakdown of total financed carbon emissions per geography and property class, as well as carbon intensities per € million and the associated PCAF data quality scores.

The asset category "others" comprises building types that do not correspond to standard assetclasses, e.g. mixed-use buildings such as the combination of laboratories and offices as well as senior living or medical centres.

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<sup>6)</sup> In individual cases, properties were excluded from the list, e.g. if no building information was available, or they could not be fitted into the logical structure of the PCAF calculations.

**Percentage breakdown of financed emissions (tCO<sub>2</sub>e/year) by property type of total financed emissions**

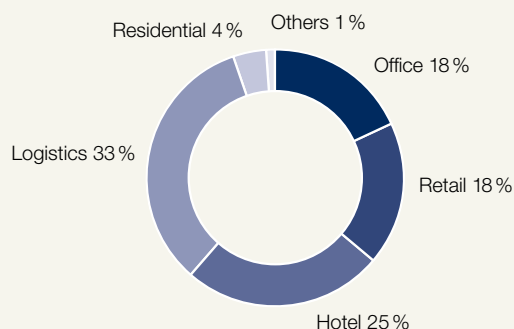


Figure 3: Percentage breakdown of financed emissions by type of use

**Emissions intensity by property type (tCO<sub>2</sub>e/€ mn)**

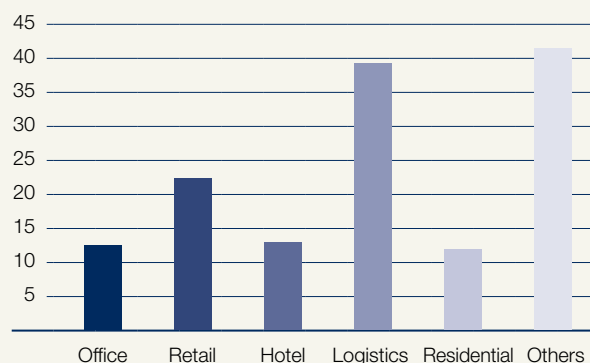


Figure 4: Emissions intensity in tonnes CO<sub>2</sub>e/€ mn by type of use

**Table 2: Financed carbon emissions and PCAF data quality scores by type of use**

Overview by property type	Financed volume	Number of properties	Financed carbon-emissions absolute	Carbon-intensity	PCAF Data Quality Score
	€ mn		tCO <sub>2</sub> e/a	tCO <sub>2</sub> e/€ mn	1-5
Office	8,948	172	110,607	12.4	3.2
Retail	5,019	262	111,893	22.3	3.5
Hotel	11,776	272	152,181	12.9	3.5
Logistics	5,189	386	203,100	39.1	3.2
Residential	1,904	614	22,584	11.9	2.8
Others	165	15	6,833	41.4	4.1
<b>Total</b>	<b>33,001</b>	<b>1,721</b>	<b>607,197</b>	<b>18.4</b>	<b>3.2</b>

**Breakdown of carbon intensity by countries (in tCO<sub>2</sub>e/€ mn)**

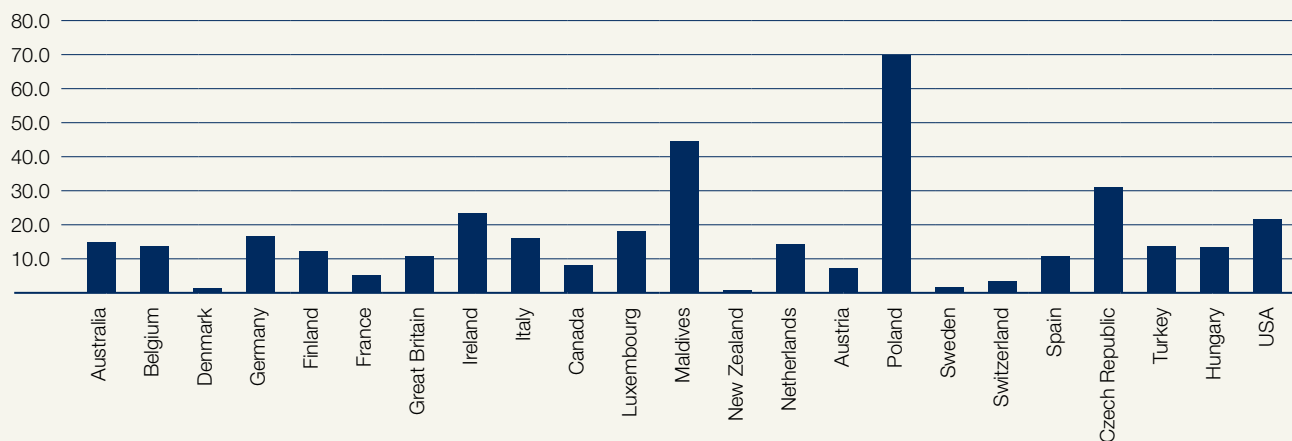


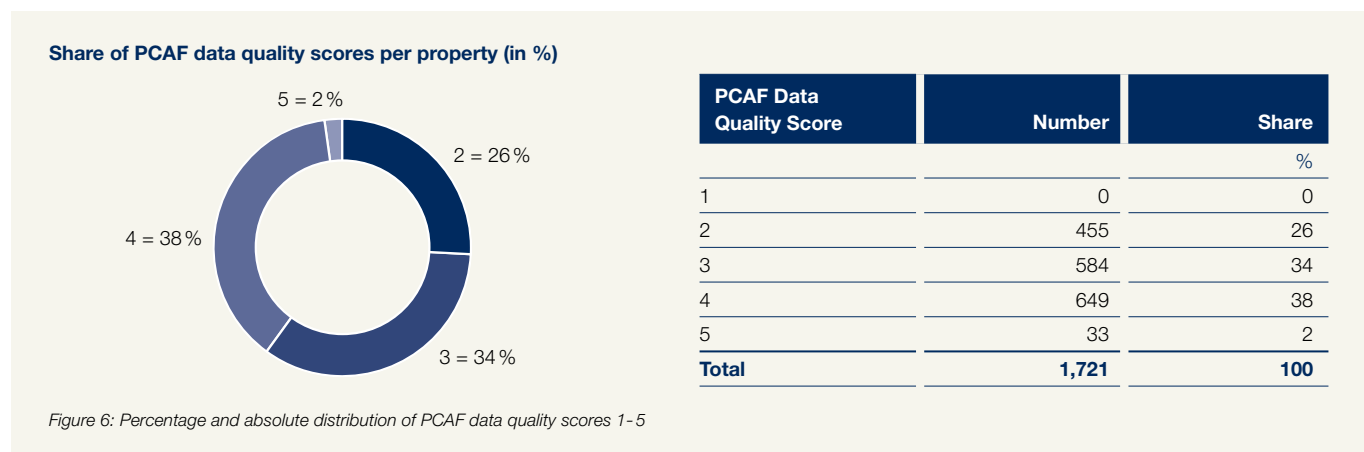
Figure 5: Carbon intensity in tonnes CO<sub>2</sub>e/€ mn by country

Table 3: Financed carbon emissions and PCAF data quality scores by countries

Country	Financed volume	Number of properties	Financed carbon emissions absolute	Carbon-intensity	PCAF Data Quality Score (weighted by property)
	€ mn		tCO <sub>2</sub> e/a	tCO <sub>2</sub> e/€ mn	1-5
Australia	817	40	12,114	14.8	4.3
Belgium	472	16	6,329	13.4	3.5
Denmark	287	4	379	1.3	2.5
Germany	2,686	718	44,446	16.5	2.8
Finland	576	78	6,837	11.9	3.8
France	3,317	117	16,403	4.9	3.0
Great Britain	6,271	183	66,318	10.6	3.2
Ireland	163	2	3,775	23.2	3.0
Italy	1,196	82	19,003	15.9	3.4
Canada	914	10	7,254	7.9	4.0
Luxembourg	127	7	2,270	17.8	2.3
Maldives	510	11	22,628	44.4	4.0
New Zealand	32	1	24	0.7	5.0
Netherlands	1,874	83	26,611	14.2	3.7
Austria	355	9	2,457	6.9	3.1
Poland	2,538	113	177,544	69.9	3.1
Sweden	806	23	1,215	1.5	2.2
Switzerland	237	9	726	3.1	3.6
Spain	1,874	67	19,653	10.5	3.2
Czech Republic	157	4	4,823	30.7	2.5
Turkey	51	2	686	13.5	4.0
Hungary	18	1	235	13.3	2.0
USA	7,722	141	165,469	21.4	4.0
<b>Total</b>	<b>33,001</b>	<b>1,721</b>	<b>607,197</b>	<b>18.4</b>	<b>3.3</b>

### 3.2 Data quality results

As described in the “Methodology” section, PCAF data quality scores were used when calculating the financed emissions in the commercial real estate financing portfolio. The average PCAF data quality score for the total of 1,721 properties examined was 3.2.





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In line with the adopted methodology, PCAF data quality scores ranging from 1 to 3 have high informative value, while scores 4 and 5 have relatively low informative value. A detailed description of the scores can be found in Chapter 2 Methodology. The reason for the high heterogeneity within the available data is not only varying market practices in different countries but also diverging requirements for providing transparency, e.g. the accessibility of energy-related information. The properties included in the analysis had an average PCAF data quality score of 3.2, which shows that despite the previously described challenges, Aareal Bank has a well-established data management system. In total, 60 % of the PCAF data quality scores fell between the range of 1 and 3 in the 2024 analysis. This was an improvement over the 55 % of properties that had data quality scores within this range in financial year 2023.

### 3.3 Outlook and future developments

Aareal Bank aims to continuously improve the availability and quality of the data required for climate accounting. The Bank recognises the real importance of a robust, continuously growing data pool for reliably developing long-term climate strategies and for achieving the decarbonisation targets derived from these. In coming years, Aareal Bank plans to set more rigorous energy- and climate-related data requirements for clients. In addition to assessment instruments that are required by law such as EPC labels, sources used to increase data transparency may include building energy databases and specialised third-party energy reports. Furthermore, Aareal Bank is working on continuing to integrate information within its internal IT systems so as to enhance efficiency and to leverage the resulting opportunities to reach strategic targets for decarbonising its business model. These measures will further enhance the overall informative value of carbon intensity data in Aareal Bank's commercial real estate financing portfolio and will help Aareal Bank increase transparency on its financed carbon emissions moving forward.

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