A company of LBBW

Berlin Hyp

ESG Bond Report 2023

Report on Green, Social & Sustainability-Linked Bonds issued by Berlin Hyp

27 March 2024

A partnership built on trust

Finanzgruppe

Foreword of the Board of Management

Dear Ladies and Gentlemen,

We are pleased to present our ESG Bond Report for the year 2023 to you today. The report gives you an overview of the green and social bonds issued by Berlin Hyp, including the use of proceeds, as well as the impact generated. We also report on the development of our strategic KPI for our Sustainability-Linked Bond.

The reporting year presented a number of challenges for markets. Weak global trade, geopolitical uncertainties, inflation that was still far too high for large parts of the year on both sides of the Atlantic and the effects of the central banks' tighter monetary policy had a noticeable impact on the real estate markets and caused transaction volumes to slump.

Our green new business performed well in this challenging market environment. We were able to generate more than EUR 800 million in loans for new green buildings. As part of our transparency initiative, we also completed the collection of energy certificates for the entire loan portfolio and were able to classify a significant number of buildings, whose status was previously unknown, as green. We have therefore achieved our goal of increasing the proportion of green buildings in the entire loan portfolio to one third by 2025 ahead of schedule. We are proud of this. We are also proud of the inspiring projects that we are able to finance. A good example of this is the modern and energy-efficient "F.A.Z. Tower" in Frankfurt am Main, which we financed with a green loan for HanseMerkur Grundvermögen. We present the property in this report and talk to Malte Andes, Deputy Chairman of the Management Board of HanseMerkur Grundvermögen.

The housing market remains a major social issue. Rents continued to rise sharply in many places in the reporting year. In contrast, the construction of new residential properties once again fell short of the German government's plan. It is therefore all the more pleasing that we were able to expand our Social Finance portfolio by 4.5 percent even in such an environment and thus continue to actively contribute to the provision of affordable housing. The number of affordable housing units financed by us broke through the 100,000 barrier for the first time.

The renewed increase in the use of fossil fuels as a result of Russia's war in Ukraine is now particularly noticeable in the German energy mix and is leading to rising conversion factors. Nevertheless, we were able to reduce the carbon intensity of our loan portfolio by 7.36 percent compared to the base year 2020 defined in the Sustainability-Linked Bond Framework. This puts us slightly above our target path.

Against the backdrop of all the challenges in 2023 described above, one thing remains particularly positive in my mind: our new ESG bond issuances. Of seven syndicated transactions, we were able to structure six as ESG bonds – four as green bonds and two as social bonds. This means that Berlin Hyp now has more ESG bonds in circulation than it has conventional benchmark bonds.

I hope you enjoy reading this report!

Yours sincerely

Maria Teresa Dreo-Tempsch

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A sustainable investment

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A – Portfolio Highlights 2023

Volume Green Finance Portfolio
10,766 € million

thereof EU-Taxonomy loans (valued)
147 € million

Green new business (valued)
815 € million

Number of green buildings
625

Green Buildings area
8,163,281 m^2

CO_2 savings per € million
6.66 – 14.66 tCO_2/a

CO_2 emissions (Share / Total)
95,656 / 166,444 tCO_2/a

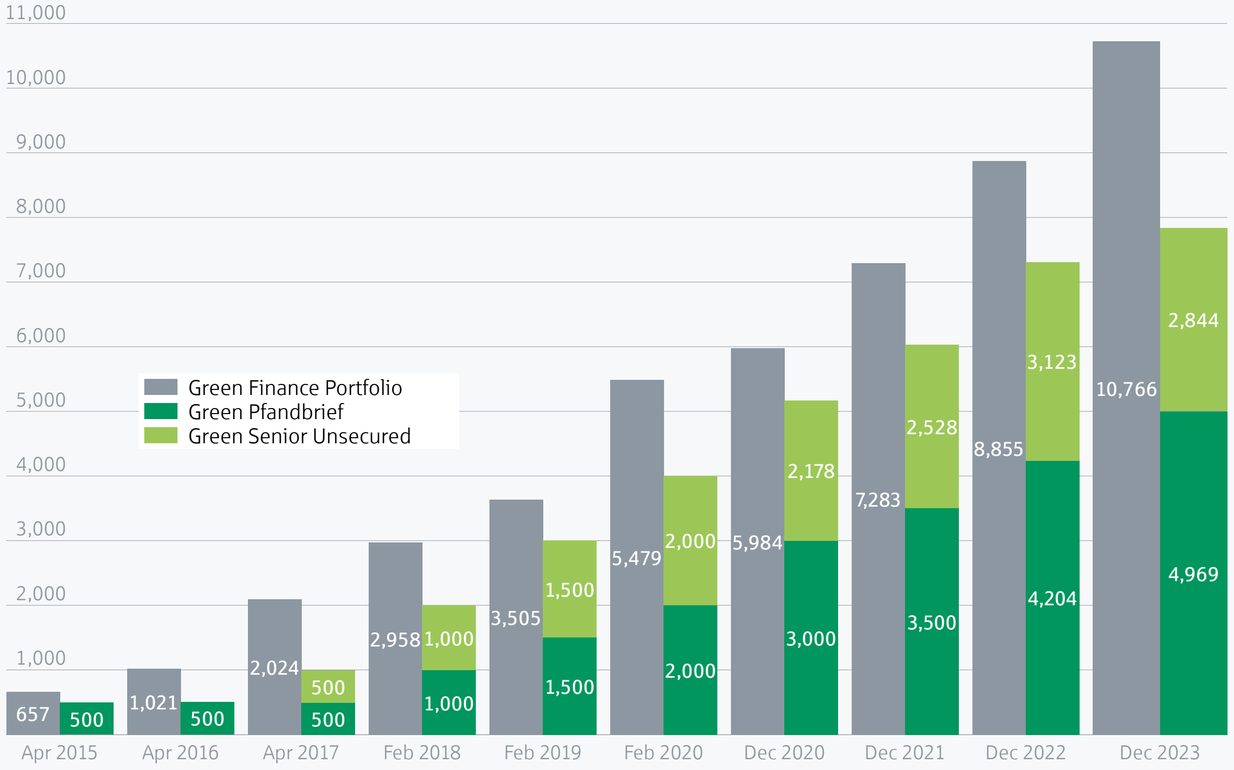
Average energy demand
93 kWh/m^2a

B.1 – Allocation Report: Green Finance Portfolio

Green Building Share of Berlin Hyp's Loan Portfolio Exceeds ⅓

Development of the Green Finance Portfolio € million

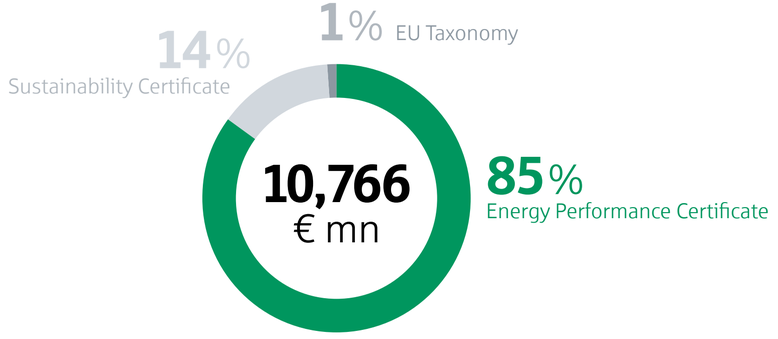
	Total
Total by 31 December 2022	8,855
Valued new business for green buildings	815
Difference from subsequently identified green buildings	1,096
Total by 31 December 2023	**10,766**



In the reporting period from January 1, 2023 to December 31, 2023, the Green Finance Portfolio grew by a total of € 1,911 million to € 10,766 million (previous year: € 8,855 million). The valued new business amounted to € 815 million. Of this new business, 77 green buildings are entirely new to the Green Finance Portfolio. These buildings are presented line-by-line in the appendix. An additional € 1,096 million came from subsequently identified green buildings. The Green Finance Portfolio includes financing for 625 green buildings (PY: 386). The comparatively high difference mainly results from the reclassification of green buildings due to the integration of new eligibility criteria (primarily EPC Level A and top 15 percent) in the Green Bond Framework 2023.

At € 6,601 million, around 61 percent of the portfolio is part of the mortgage cover pool. Measured against the Bank's overall portfolio, around 34 percent (PY: 28 percent) of all financing was classified as green as at the reporting date. The Bank has therefore achieved its goal of increasing the green building share of its portfolio to ⅓ by 2025 ahead of schedule. The financing volume for loans that qualify under the full EU taxonomy criteria increased slightly compared to the previous year and amounted to € 147 million at the end of the year (PY: € 89 million). 14 percent of the Green Finance Portfolio are based on very good sustainability certificates and 85 percent meet the strict energy threshold criteria.

Breakdown of Green Finance Portfolio According to Eligibility Criteria

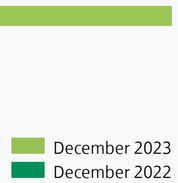


B.1 – Allocation Report: Green Finance Portfolio

Green office financing expanded in particular in Germany

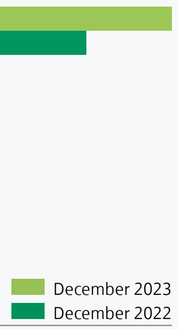
B.1 Countries

€ million	Dec 2023	%	Dec 2022
Germany	6,109	57	4,837
France	972	9	1,069
Great Britain	81	1	0
Luxembourg	77	1	76
Netherlands	2,043	19	1,664
Poland	1,390	13	1,091
Czech Republic	94	1	118
Overall result	**10,766**	**100**	**8,855**



B.2 Type of Use

€ million	Dec 2023	%	Dec 2022
Office Buildings	7,317	68	6,355
Retail Buildings	1,513	14	1,010
Logistic	525	5	303
Logistic – Light Industrial	103	1	140
Management-/ Social Buildings	419	4	309
Multi-family dwellings	889	8	737
Overall result	**10,766**	**100**	**8,855**

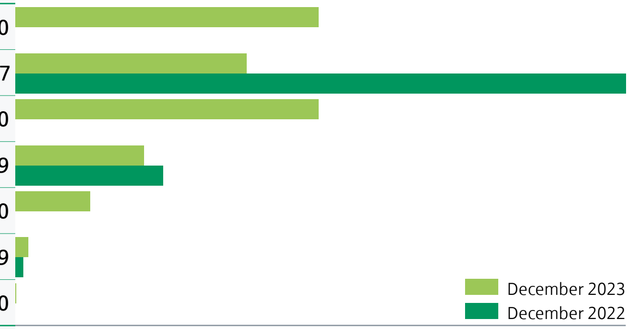


B.3 Maturity Structure

€ million	Dec 2023	%	Dec 2022
≤ 6 months	1,069	10	591
6 months to 1 year	1,044	10	490
1 year to 1.5 years	593	6	741
1.5 years to 2 years	1,044	10	569
2 years to 3 years	1,500	14	1,110
3 years to 4 years	1,437	13	1,213
4 years to 5 years	1,159	11	965
5 years to 10 years	2,819	26	3,124
over 10 years	101	1	53
Overall result	**10.766**	**100**	**8.855**

B.4 Eligibilty Criteria according to the Green Bond Framework 2023*

€ million	Dec 2023	%	Dec 2022
Best in Class – Top 15%	3,502	33	0
Berlin Hyp – EPC Threshold	2,670	25	7,057
EPC Level ≥ A	2,091	19	0
Berlin Hyp – Sustainability Certificates	1,488	14	1,709
NZEB –10%	861	8	0
EU Taxonomy – incl. DNSH	147	1	89
30% Improvement PED	8	0	0
Overall result	**10,766**	**100**	**8,855**



*With the Framework Update 2023, Berlin Hyp expanded the eligibility criteria for energy-efficient buildings to include the technical screening criteria of the EU taxonomy requirements for buildings / construction activities with regard to their energy efficiency. This has resulted in shifts in the allocation within the green building portfolio.

B.1 – Allocation Report: Green Finance Portfolio

Outstanding Green Bonds with a volume of € 7.8 billion

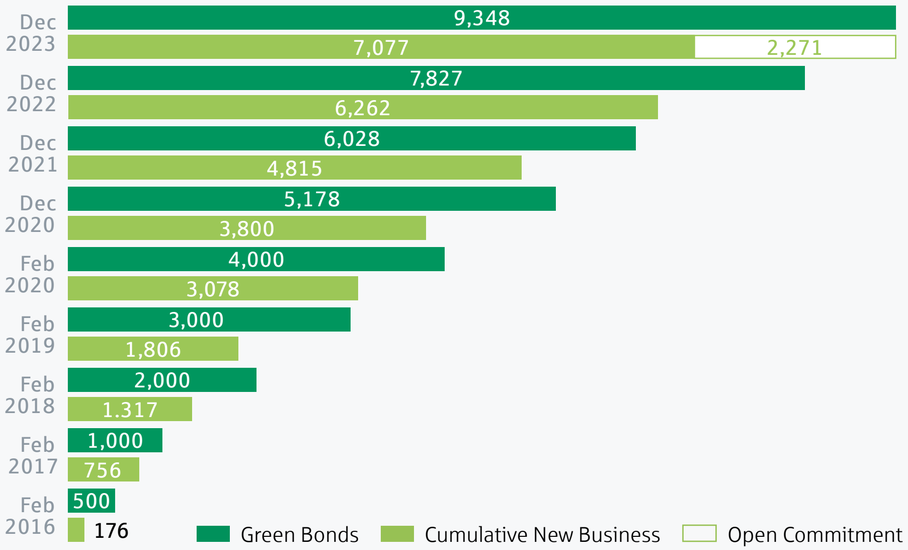
Outstanding Green Bonds as at 31 December 2023

ISIN	Asset class	Issue date	Maturity	Currency	Issue volume in € million
DE000BHY0GS9	Senior	24.10.2017	25.10.2027	EUR	500
DE000BHY0GB5	Senior	17.04.2018	18.04.2028	EUR	500
DE000BHY0GC3	Mortgage Pfandbrief	22.10.2018	22.10.2025	EUR	500
DE000BHY0GL4	Mortgage Pfandbrief	17.07.2019	19.07.2027	EUR	500
DE000BHY0GA7	Senior	04.11.2019	05.11.2029	EUR	500
601092700	Senior	30.04.2020	30.04.2030	EUR	27
DE000BHY0GD1	Mortgage Pfandbrief	07.07.2020	07.07.2028	EUR	500
DE000BHY0GX9	Mortgage Pfandbrief	02.09.2020	02.09.2030	EUR	500
CH0561923852	Senior	11.09.2020	11.09.2028	CHF	169
CH0598928742	Senior	10.03.2021	10.03.2031	CHF	115
DE000BHY0GE9	Mortgage Pfandbrief	24.03.2021	24.01.2028	EUR	500
CH1135555592	Senior	04.10.2021	04.10.2029	CHF	183
DE000BHY0GN0	Senior	25.01.2022	25.01.2027	EUR	500
CH1163572915	Senior	21.02.2022	21.02.2025	CHF	95
CH1202242249	Mortgage Pfandbrief	04.08.2022	04.08.2026	CHF	204
DE000BHY0GK6	Mortgage Pfandbrief	25.08.2022	25.08.2025	EUR	1,000
DE000BHY0GM2	Mortgage Pfandbrief	10.01.2023	10.01.2033	EUR	500
DE000BHY0GQ3	Mortgage Pfandbrief	19.01.2023	19.01.2038	EUR	15
CH1244731795	Senior	27.02.2023	27.02.2026	CHF	152
DE000BHY0GT7	Mortgage Pfandbrief	24.05.2023	24.05.2030	CHF	750
CH1300277733	Senior	08.11.2023	08.11.2027	CHF	105
Total					**7,813**

B.2 – Allocation Report: New Lending

New Green Bonds issued with a volume of € 1.5 billion

Fulfilment Commitment in € million



Newly Issued Green Bonds 2023

New Issuance Green Bonds in 2023

Rank	Value date	Maturity	Currency	Size in € mn
Pfandbrief	10.01.2023	10.01.2033	EUR	500
Pfandbrief	19.01.2023	19.01.2038	EUR	15
Senior	27.02.2023	27.02.2026	CHF	152
Pfandbrief	24.05.2023	24.05.2030	EUR	750
Senior	08.11.2023	08.11.2027	CHF	105

Outstanding Green Commercial Paper

Rank	Value date	Maturity	Currency	Size in € mn
CP	09.05.2023	09.01.2024	EUR	15
CP	21.08.2023	21.02.2024	EUR	25
CP	02.11.2023	02.02.2024	EUR	30
CP	07.12.2023	07.03.2024	EUR	50
CP	07.12.2023	08.04.2024	EUR	5
CP	21.12.2023	21.05.2024	EUR	5

Berlin Hyp aims to gradually converge with the EU Taxonomy by phasing out internally defined threshold values for determining the suitability of borrowers and properties for the Green Finance portfolio with the eligibility criteria defined in the EU Taxonomy. To determine the energy profile of properties, Berlin Hyp increasingly uses the EU Taxonomy criteria, i.e. the top 15 percent of the national or regional building stock, or energy performance certificates with a minimum energy efficiency class A.

Since the issuance of the first Green Pfandbrief in 2015, Berlin Hyp has pursued a best-effort approach. The Bank strives to do its utmost to invest the issuance proceeds of its Green Bond in new green loans during their term. This is in addition to using the issue proceeds to refinance eligible green assets already originated in advance.

In the reporting period, Berlin Hyp issued a total of two Euro denominated green benchmark bonds with a volume of € 1,250 million and two green bonds denominated in Swiss Francs with a volume of 250 million Swiss Francs. These were divided into two Pfandbriefe (denominated in Euros) and two senior preferred bonds (denominated in Swiss Francs).

With 19 outstanding benchmark bonds, Berlin Hyp thus remains the most active issuer of green bonds in Europe in the commercial bank segment. In addition, as at the reporting date, the Bank has six green commercial papers outstanding in the amount of € 130 million, which were issued in Euros.

In the reporting year, green new business of € 815 million was achieved. The chart on the left-hand side shows that € 7,077 million have already been invested in new loans for green buildings. This contrasts with the issued green bond volume in the amount of € 9,348 million, which, in addition to outstanding bonds, also includes green bonds that have already matured. Accordingly € 2,271 million are currently required to fulfill the commitment from all green bonds issued.

C – Impact Reporting

Results and evaluation

The impact of Berlin Hyp's Green Bonds was again calculated by Drees & Sommer. The methodology corresponds to that of previous years and is presented in the appendix, along with the data used. Two benchmarks were used to calculate the CO_2 emissions avoided. First the current energy reference value for various property classes according to the requirements of the Energy Saving Regulation (EnEV reference values), already known from our previous Green Bond Reports, and secondly, an average energy reference value for German properties.

Comparison with EnEV reference values

Compared to the EnEV reference values, annual savings of 635 GWh (PY: 524 GWh) are achieved. Heat energy accounts for 307 GWh of this. The average heat energy demand of the buildings is 58 kWh/m²a and is thus 42 percent below the average weighted EnEV reference value of 100 kWh/m²a. With regard to the electricity energy demand, annual savings of 328 GWh are achieved. The average electricity energy demand is 36 kWh/m²a and thus 56 percent below the average weighted EnEV reference value of 81 kWh/m²a. The resulting CO_2 savings amount to a total of 143,306 t per year.

Comparison with average energy reference value (Germany)

In relation to the average energy efficiency value, the financed green buildings achieved annual heat energy savings of 462 GWh. The heating energy demand of the buildings amounts to 58 kWh/m²a and is thus 52 percent below the average value (122 kWh/m²a). A comparison with the previous year's values is not made here, as the basis for comparison has changed. With regard to the electricity energy demand, annual savings of 99 GWh are achieved. The average electricity energy demand is 36 kWh/m²a and thus 27 percent below the average reference value of 50 kWh/m²a. This results in absolute CO_2 savings of 108,200 t per year.

Investment Impact

The total CO_2 emissions of the portfolio amount to 166,444 tCO_2, or 95,656 tCO_2 proportionally for Berlin Hyp's initial financing share. In terms of calculation and depending on the benchmark selected, between 6.66 and 14.66 tCO_2 are saved per year with each million Euro nominal invested into one of Berlin Hyp's Green Bonds. Thus, the CO_2 savings per million Euro invested have slightly increased compared to the previous year (EnEV benchmark). This is due, among other things, to the increase in some conversion factors for electricity.

Carbon Savings vs. Benchmark

Avoided tCO_2 /€ mn /year	100-percent allocation to the financing of Berlin Hyp	Proportionally allocated to Berlin Hyp's initial financing share
Comparison with current EnEV reference values	**14.66** (PY: 13.57)	**8.05** (PY: 7.55)
Comparison with average energy reference value (Germany)	**11.57** (PY: 11.35)	**6.66** (PY: 6.53)

An Allocation and Impact Reporting Excel template can be found on our website at: www.berlinhyp.de/en/investors/green-bonds

Please see appendix for more information about the methodology.

D – Financing Reference

Green Loan for ‘F.A.Z. Tower‘ in Frankfurt

Sustainable Business Portfolio

Berlin Hyp is providing a green loan of € 92 million to HanseMerkur Grundvermögen (HMG) to finance the ‘F.A.Z. Tower’, a new office building in Frankfurt (Main

Berlin Hyp provides HanseMerkur Grundvermögen a loan in the amount of € 92 million to finance the 18-storey ‘F.A.Z. Tower’, a newly constructed office building in Frankfurt’s new district Europaviertel. The modern high-rise office building was completed in the fall of 2022 and meets the latest standards in terms of design and ecology.

The property is leased on a long-term basis to the Frankfurter Allgemeine Zeitung (F.A.Z.).

The new F.A.Z. headquarter now covers an office space of almost 24,000 m² and impresses with its special architecture. Retail and catering areas on the first floor emphasise the urban character of the building and increase the quality of stay.

The building is not only characterised by its excellent energy efficiency, but also received the DGNB Gold certification for its building operation. Berlin Hyp subsidised the loan via a green loan. This makes the financing suitable for a Green Bond.

Customer	HanseMerkur Grundvermögen
Asset class	Office / commercial building
Function Berlin Hyp	Sole Lender
Financing volume	€ 92 million
Loan period	Five years

D – Financing Reference

Interview with Malte Andes, deputy chairman of the board of HanseMerkur Grundvermögen

HanseMerkur manages a real estate portfolio worth six billion euros. How important is the topic of ESG for your portfolio and what strategy are you pursuing?
Our investment focus is on modern and sustainable real estate. It is clear to us that the future belongs to sustainable real estate. Investors and users alike are attaching increasing importance to this aspect. The consideration of ESG aspects in real estate serves both the environment and the climate and is also an essential prerequisite for the economic success of an investment. For us, ESG management is also active risk management.

You want to develop a comprehensive decarbonisation strategy for your real estate portfolio by 2025. What measures do you think will have the greatest impact?
In principle, HanseMerkur Grundvermögen has a young and modern real estate portfolio. With the existing energy quality, we are already well on track towards climate neutrality. The greatest effects here can be achieved through energy measurement. This includes components such as a smart meter network, (self-generated) renewable energy or the decarbonisation of energy suppliers.

The F.A.Z. Tower was completed in 2022. What features characterise the property with regard to ESG?
The F.A.Z. Tower is a modern and energy-efficient building which is DGNB Gold certified. The property has a sustainable energy supply concept, including concrete core activation, as well as modern equipment such as electric sun protections incl. sun sensors, wind and rain monitors. The heating/cooling ceiling sails ensure a heating and cooling function with individual room control in the rental areas. Heating is provided from the city's primary district heating system and, where possible, by using the building's own waste heat.

HMG and Berlin Hyp have concluded a bonified green loan for the financing of the F.A.Z. Tower. What role can banks play in supporting you with the current challenges?
Banks traditionally play a pioneering role in risk assessment. This can help prioritise specific topics in the regulatory jungle.

The criteria for green objects are increasingly based on the EU taxonomy. In your opinion, what are the biggest challenges for the real estate industry to see taxonomy-compliant buildings/ financing on a larger scale in the future?
The EU taxonomy is still being developed. The further formulation of the taxonomy criteria should be practical and open to alternative technologies and approaches. Effort and benefits should be in a reasonable relationship.

You want to focus more on digital data management and green lease contracts. Which topics are particularly in focus?
In our portfolio, the focus is on the smart meter rollout (remotely readable measuring systems) as well as digital ESG data management and digital ESG reporting. In the context of future green lease rental agreements, tenants are to be more closely involved, e.g. in user behavior, in the purchase of renewable energy, low-emission tenant improvements, etc.

State-of-the-art construction methods, the use of alternative building materials and sustainability certificates have become of central importance for the assessment of sustainable buildings. What other trends do you see in the ESG segment in the real estate sector in the coming years?
It is not yet clear which ESG criteria will be taken into account in the valuation. The documentation and reporting of CO_2 footprints, materials, processes, etc. will increase. Topics such as life cycle analysis and the CO_2 footprint of existing properties, project developments and refurbishments will become more important. The "cradle-to-cradle" principle of the circular economy will also increasingly gain in significance in the real estate industry.

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Berlin Hyp's Social Bonds

A sustainable investment

www.berlinhyp.de/en/investors/social-bonds

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Social Bond

A – Portfolio Highlights 2023

Requirements for maximum rent and environmental standard clearly undercut

Volume Social Finance Portfolio
2,918 € million

Average gross cold rent
7.90 €/m²

Deviation to maximum eligible gross cold rent
–33.0 %

Number of estimated beneficiaries
250,720
86 per € million invested

Number of financed eligibile housing units
100,859
35 per € million invested

Financed area
6,186,084 m²
2,120 per € million invested

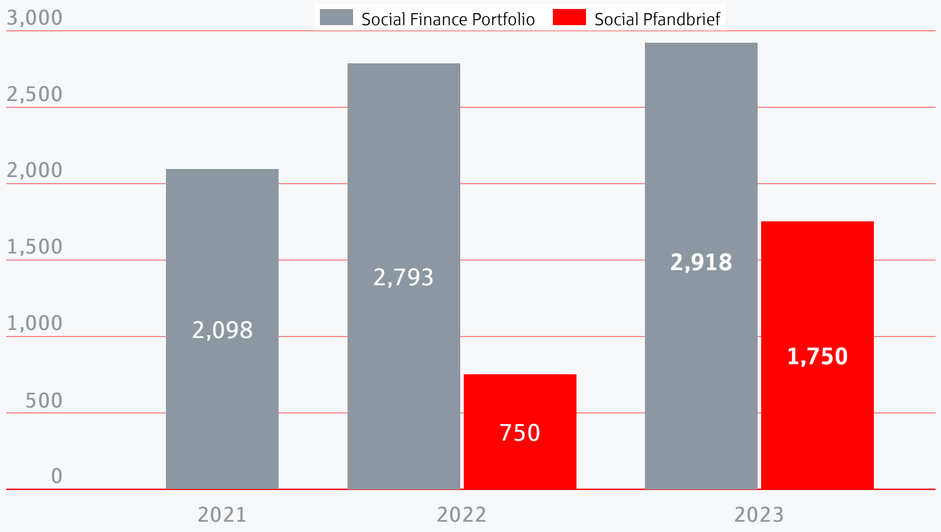
Average final energy demand
102.5 kWh/m²a
32 percent below minimum requirement

B – Allocation Report

Promotion of affordable housing in Germany and the Netherlands

Development Social Finance Portfolio

€ million	Total
Total by 31 December 2022	2,793
Valued new business for new social buildings	115
Difference from subsequently identified social buildings and redemptions	10
Total by 31 December 2023	**2,918**



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As a commercial real estate financier, Berlin Hyp would like to contribute to eliminating the shortage of affordable housing by promoting its availability as part of its lending activities. The corresponding loans are refinanced via social bonds. The Bank is thus expanding its existing ESG strategy.

The Social Finance portfolio consists of eligible loans for buildings with affordable housing provided by municipal housing companies, housing cooperatives or private housing companies and project developers in Germany or the Netherlands. To qualify as an affordable housing building, the property in question must pass Berlin Hyp's Housing Benefit Act Test. This is based on current social legislation and takes geographical differences into account. Berlin Hyp uses this test to address households that are decoupled from wage development and / or whose income is above the basic social security level, but who may spend more than 30 percent of their net income on housing costs without state support.

Since Berlin Hyp believes that climate protection and social compatibility go hand in hand, eligible social assets must also meet minimum energy requirements. Only buildings within the energetically best 70 percent of the national residential building stock are eligible for the Social Finance portfolio.

With this programme, the Bank aims to contribute to SDGs 1, 10 and 11. ESG rating agency ISS-ESG has positively confirmed the impact in all three categories.

Since the publication of the first Social Bond Framework in 2022, the Bank has issued three Social Mortgage Pfandbriefe with the total amount of € 1.75 billion.

Outstanding Social Bonds

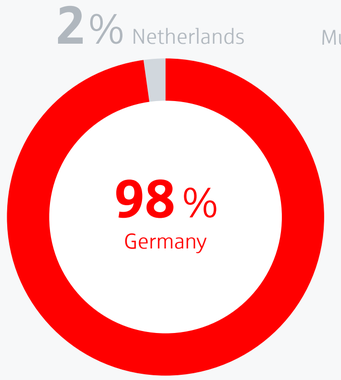
ISIN	Asset Class	Value Date	Maturity	Size in € million
DE000BHY0SB0	Mortgage Pfandbrief	10.05.2022	10.05.2032	750
DE000BHY0SP0	Mortgage Pfandbrief	10.01.2023	11.05.2026	500
DE000BHY0SC8	Mortgage Pfandbrief	23.08.2023	23.08.2028	500

B – Allocation Report

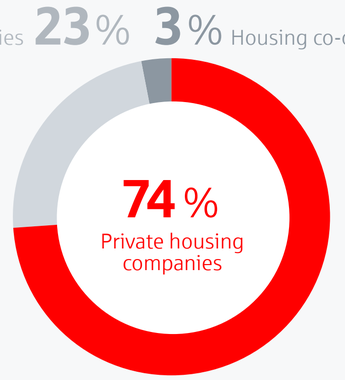
Growth of the Social Finance Portfolio by five percent compared to previous year

A total of 1,273 loans are in Berlin Hyp's Social Finance portfolio. This corresponds to a total volume of € 2,918 million. Compared to the previous year, the volume of the Social Finance Portfolio grew by five percent. In addition to new business, this can also be attributed to improved energy performance, some of which is due to the transparency initiative of Berlin Hyp, whereby proxy values have been replaced by actual energy performance certificates. 96 percent of the loan volume is in the Bank's mortgage cover pool. The distribution of the Social Finance portfolio by customer groups has remained relatively stable compared to the previous year. The focus of the portfolio is on Germany. The Netherlands accounts for two percent of the financing volume. With 49 percent, most loans in the portfolio have a remaining term of five to ten years.

Geographic Distribution

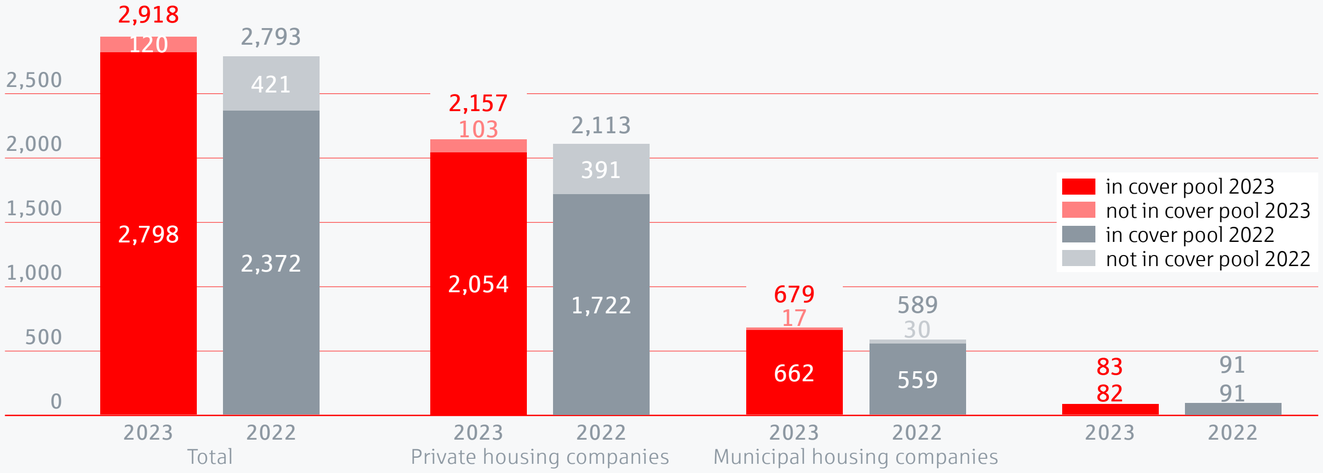


Customer Type



Maturity structure	€ mn	%
≤ 6 months	22	1
6 months to 1 year	108	4
1 year to 2 years	268	9
2 years to 3 years	95	3
3 years to 4 years	284	10
4 years to 5 years	415	14
5 years to 10 years	1,446	49
over 10 years	280	10
Overall result	**2,918**	**100**

Outstanding Volume in the Social Finance Portfolio € million



C – Impact Reporting

Average difference of minus 33 percent to the maximum permissible rent

Proceeds from Berlin Hyp's social bonds are used exclusively to (re)finance loans for the acquisition, renovation or construction of buildings with affordable housing, thereby promoting its provision. In order to be considered affordable, financed flats may not exceed a maximum rent, as defined in the Social Bond Framework. This is derived from current social legislation. Based on the test criteria, the area-weighted average gross cold rent of the Social Finance Portfolio is € 7.90 per m². This means that the refinanced properties are on average 33 percent below the permitted maximum rent. In addition, the minimum energy standard (final energy demand max. 151,1 kWh/m²a) was also significantly undercut. Properties in the Social Finance portfolio have an average final energy demand of 102.45 kWh/m²a, 32 percent less than the minimum requirement.

The 1,273 loans in Berlin Hyp's Social Finance Portfolio finance a total of almost 101,000 affordable flats. This corresponds to a total living space of more than 6.2 million m². Based on the concept of appropriate living space described in the Social Bond Framework, the addressed household members could be determined. The number of persons provided with affordable housing thus amounts to about 251,000.

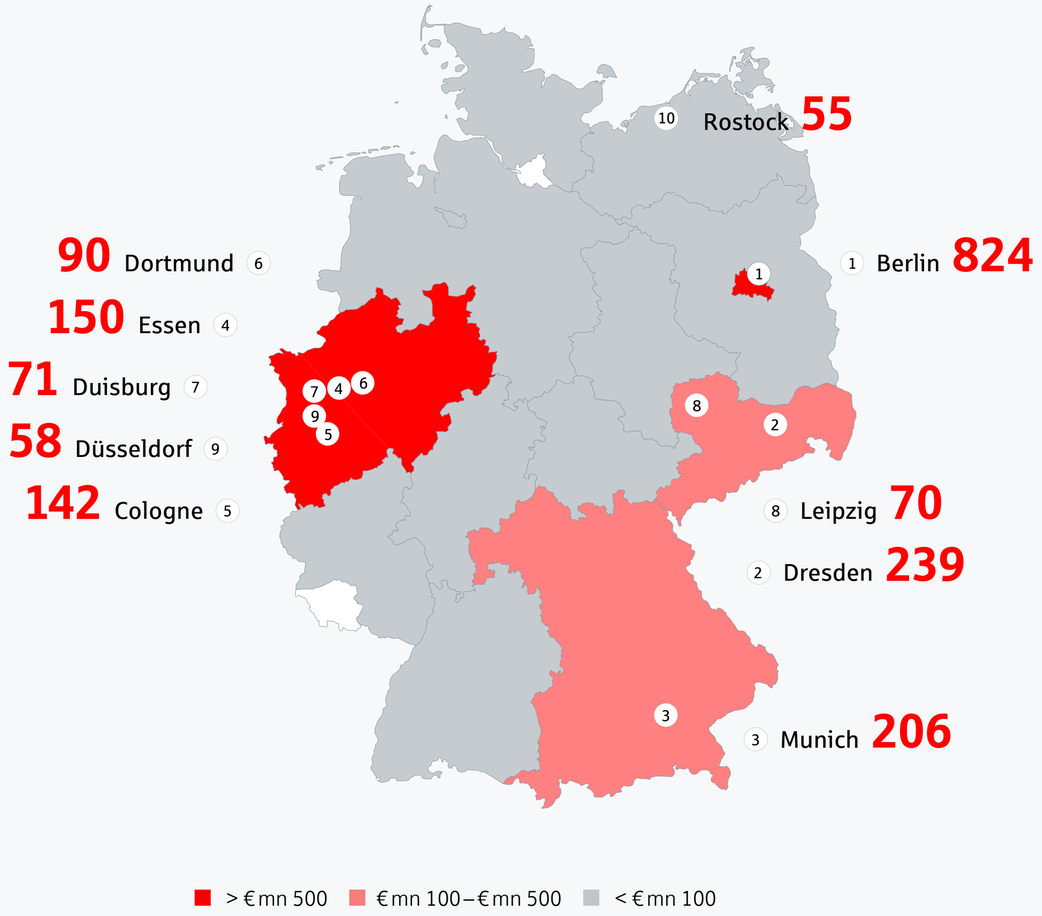
Impact Indicators

	Social indicators			Green indicators
Social Bond Principle Category				
	Financed housing units (apartments)	Total area financed	Number of estimated beneficiaries	Average final energy demand
Affordable Housing	100,859	6,186,084 m²	250,720	102.45 kWh/m²a
	35 per € million invested	2,120 m² per € million invested	86 per € million invested	32 % below minimum requirement resp. 30 % below the national average (146 kWh/m²a)

C – Impact Reporting

Financing focused on affordable housing in metropolitan regions

Geographical Distribution – Top 10 German cities by financing volume in the Social Finance Portfolio (in € million)

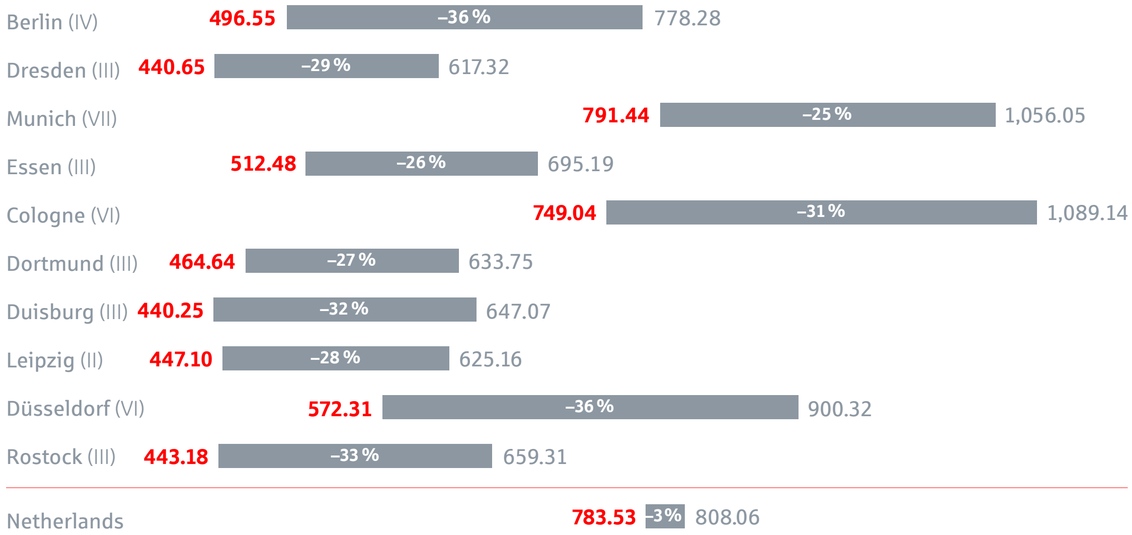


The local and regional effects of the top 10 cities in terms of financing volume of the German portfolio are concentrated in Berlin (€ 824 million), followed by the Rhine-Ruhr metropolitan region of North Rhine-Westphalia (€ 511 million) as well as Dresden (€ 239 million), Munich (€ 206 million), Leipzig (€ 70 million) and Rostock (€ 55 million). The total volume corresponds to 65 percent of the German Social Finance Portfolio.

In the Netherlands, the total volume amounts to € 55 million and is used to finance student housing in Utrecht. The average rents in the top 10 financing regions in Germany are on average 33 percent lower than the maximum rent allowed, and three percent lower in the Netherlands.

Average rent in the Social Finance Portfolio vs. average maximum rent allowed

(gross rent in Euro per flat)



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Berlin Hyp

Berlin Hyp's Sustainability-Linked Bonds

Investments aligned with the Paris climate targets

www.berlinhyp.de/en/investors/sustainability-linked-bonds

Finanzgruppe

Berlin Hyp Sustainability-Linked Bond

A – Portfolio Highlights 2023

Total carbon intensity reduction
7.4 %

Carbon intensity
31.3 kg CO_2 / m^2

Total carbon emissions
1,019,496,051 kg CO_2 / a

Total portfolio area
32,552,251 m^2

Average energy demand
129.4 kWh / m^2 a

Total energy demand of portfolio
4,213,187,444 kWh / a

Transparency ratio EPC
94.1 %

B – Strategic ESG Target

Reduce the CO_2 intensity of the entire loan portfolio by 40 percent between 2020 and 2030

Compared to the base year, the CO_2 intensity of the portfolio* fell by 7.36 percent in the 2023 reporting year. The reduction achieved is therefore still above the planned reduction path.

The development of the KPI is influenced by two factors: firstly, the quality of the financed buildings and secondly, the development of the conversion factors, which are used to convert the buildings' energy requirements/ consumption into CO_2. The conversion factors in turn depend on the composition of the energy mix in the respective countries or regions. If the proportion of fossil fuels within the energy mix decreases, the conversion factors decrease.

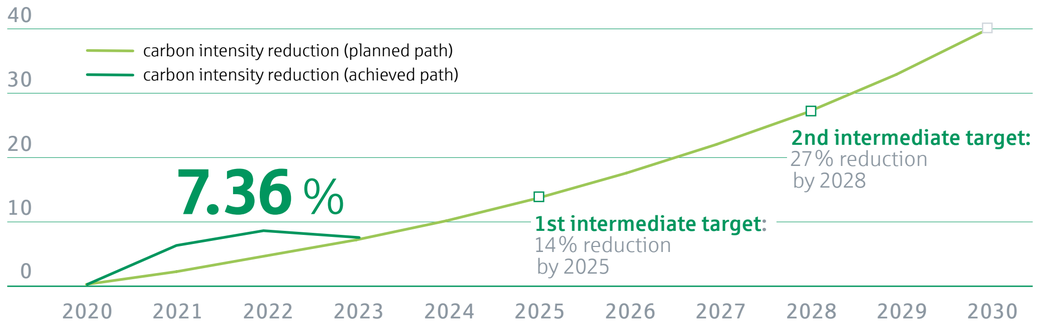
The reduction in CO_2 intensity achieved has worsened compared to the previous year. There are several reasons for this. Firstly, due to Berlin Hyp's transparency initiative, previously used proxy values were replaced by actual, lower EPC values.

Moreover, the heat conversion factors deteriorated compared to 2022 in almost all countries in the portfolio, with the exception of Belgium. The poorer conversion factors are primarily the result of poorer district heating CO_2 factors. In addition, the electricity conversion factors for Germany deteriorated. However, the effect is less pronounced than expected, as in the last year, overall, less electricity was consumed in Germany. At the same time, the share of renewable energies generated increased, exceeding the share of non-renewable energies in the energy mix.

The effect of the conversion factors can be seen when looking at the total CO_2 emissions of the portfolio. If the conversion factors for 2022 had been used in comparison to those for 2023, total CO_2 emissions would have been almost 24 million kg lower.

The conversion factors used can be found in the appendix.

KPI: reduction of carbon intensity in percent



*Ratio of the aggregated CO_2 emissions of all properties financed by Berlin Hyp to the total financed area

C – Portfolio Overview

Energy values for 94 percent of the portfolio – in percent of the financed area

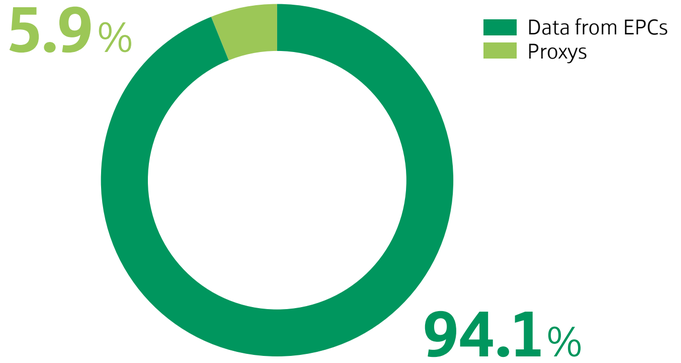
Berlin Hyp is constantly working on integrating sustainability into its business processes.

The Bank has set itself the goal of creating full transparency regarding the energy efficiency of the buildings it finances in the loan system by the end of 2023. Berlin Hyp financed buildings with a total area of 32.6 million m^2 as at the reporting date of 31 December 2023. Energy Performance Certificates were available for buildings that account for more than 94 percent of this area.

When calculating the transparency ratio, properties for which there is no obligation to collect energy data (e.g. listed buildings, undeveloped land or properties under construction) were excluded for the first time.

With an energy demand/consumption of 4,213 GWh/a, the emissions of the portfolio aggregate to a total of 1.019 million tCO_2/a. The average energy demand/consumption of the buildings is thus 129.4 kWh/m^2a for heating energy and electricity.

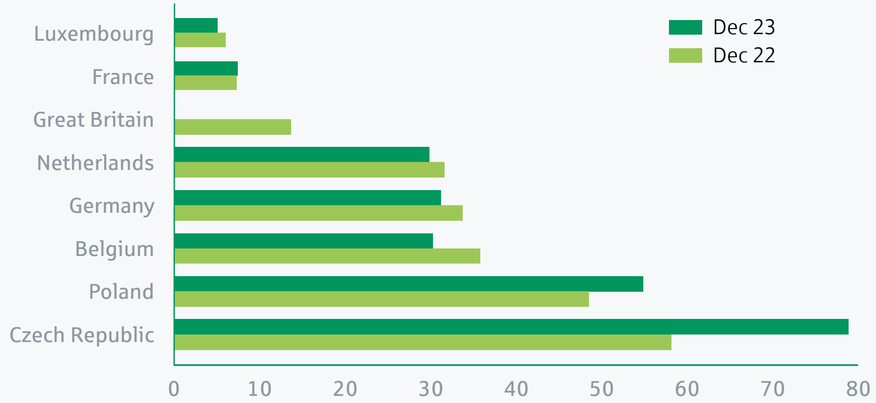
In the past financial year, financing for green buildings was expanded by 21.6 percent to € 10,766 million.



C – Portfolio Overview

Comment on adjustment factor

Carbon Intensity by Country



Carbon Intensity by Type of Use

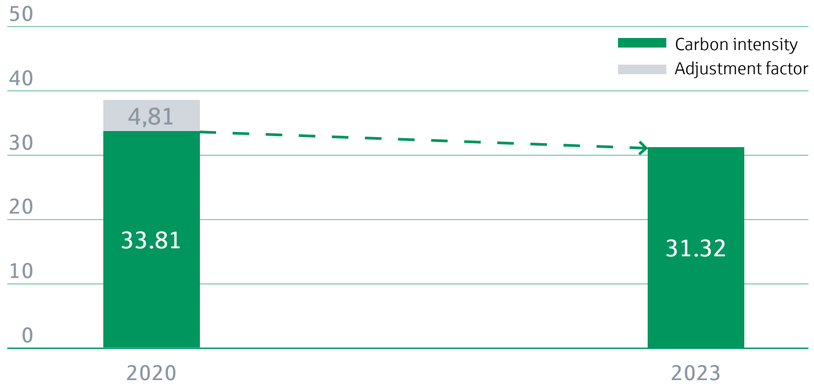
In order to calculate the total carbon emissions for the base year 2020, Berlin Hyp has used proxy values for buildings lacking precise EPC data. During the past years, numerous EPCs for newly financed buildings and for others already in the portfolio were obtained and recorded in the banks loan monitoring system.

As a result, the transparency ratio in relation to the financed area increased to 94.1 percent (2022: 65.4 percent) in total.

As outlined in the Sustainability-Linked Bond Framework, changes in carbon intensity resulting from a more accurate dataset are not taken into account for measuring the development of the KPI.

In the specific case, this means that 154,690 tCO_2 resulting from the additional transparency must not be included in the KPI measurement. Accordingly, the carbon intensity of the initial year 2020 was subsequently reduced by 4.81 from 38.62 to 33.81 $kgCO_2/m^2a$.

Carbon Intensity $kgCO_2/m^2a$



– 7.36 %

Appendix

Berlin Hyp

Finanzgruppe

Appendix – Social Bond Report

Methodology Social Reporting (all calculations refer to social bond-eligible assets that are not part of the Green Building Portfolio)

The Housing Benefit Act Test in Practice – a Case Study

A private housing company finances a multi-family house built in 2001 in Berlin via Berlin Hyp. The object has a total living area of 1,100 m^2 and 16 residential units. The average apartment size is therefore 68.75 m^2. Based on the concept of appropriate living space, this corresponds to an average household size of three persons. The annual net rental income for the property is € 133,000. Since the Housing Benefit is calculated on the basis of the gross basic rent, the net basic rent is multiplied by a factor of 1.15. This results in an annual gross basic rent of € 152,950. Divided among the individual housing units, this results in a monthly gross basic rent per apartment of € 796.61. Since Berlin is in rent level 4, the maximum gross basic rent for a three-person household is € 811.36. The property in this case study is therefore considered affordable.

To be Social Bond eligible, the property must also meet Berlin Hyp's environmental minimum safeguard, i.e. have a final energy demand of no more than 151.1 kWh/m^2a. The object has a final energy demand of 95 kWh/m^2a.

Lastly, it is examined whether the private housing provider is pursuing a holistic socially responsible strategy. This requires a public and credible social commitment. The company under consideration makes a public commitment to promoting affordable housing and livable neighborhoods and also publishes an annual progress report on the implementation of its sustainability strategy along economic, ecological and social objectives, which are tracked using key performance indicators. The property therefore meets all the necessary eligibility criteria and is Social Bond eligible according to Berlin Hyp's Social Bond Framework.

Number of estimated beneficiaries = Sum of household members based on the concept of appropriate living space

$$\text{Number of estimated beneficiaries per € million invested} = \frac{\text{Sum of household members}}{\text{Social Finance Volume}}$$

Number of financed eligible housing units = Total number of housing units

$$\text{Number of financed eligible housing units per € million invested} = \frac{\text{Total number of housing units}}{\text{Social Finance Volume}}$$

$$\text{Average gross cold rent} = \frac{\text{Sum } (m^2 \text{ of Asset i} \times \text{monthly gross cold rent per } m^2 \text{ of Asset i})}{\text{Summe of total living space}}$$

A detailed explanation of the concept of appropriate living space and a step-by-step guide of the Berlin Hyp Housing Benefit Act Test can be found in the Appendix of Berlin Hyp's Social Bond Framework, at: www.berlinhyp.de/en/investors/social-bonds

Concept of an Appropriate Living Space

The Appropriate Living Space per number of household members is determined by the so called Indicative Area in the Housing Benefit System ("Richtfläche in der Wohngeldsystematik"). It determines that for a one-person household the Appropriate Living Space is 48 square meters, for a two-person household it is 62 square meters, and for each additional person per household it is 12 square meters.

Appendix – Green Bond Report

New Green Buildings (I)

Type of use	Country	Granting of loan	Loan (€ million)	Certificate	Type of project	Rental area (m^2)	Energy demand heating (kg CO_2/m^2 a)	Energy demand electricity (kg CO_2/m^2 a)	CO_2 savings vs. EnEV (kg CO_2/m^2 a)	CO_2 savings vs. average Germany (kg CO_2/m^2 a)	LTV (%)
Management/Social	Germany	30.11.2011	2.46	Energy certificate	Funding	5,501	48	0	26	40	45.2
Office	Germany	24.03.2023	15.60	Energy certificate	Funding	7,675	65	35	27	6	59.5
Residential	Germany	20.06.2023	2.45	Energy certificate	Funding	4,368	57	0	1	21	58.0
Office	Germany	20.10.2016	0.04	Energy certificate	Funding	35,960	67	8	54	33	49.4
Office	Germany	20.10.2016	0.49	Energy certificate	Funding	29,464	94	5	49	28	49.4
Office	Germany	20.10.2016	0.60	Energy certificate	Funding	35,246	68	8	54	33	49.4
Logistics	Germany	28.06.2018	0.70	Energy certificate	Funding	183,495	53	11	4	22	51.5
Office	Germany	20.10.2016	0.75	Energy certificate	Funding	58,707	96	2	40	19	49.4
Office	Germany	10.05.2019	6.00	Energy certificate	Funding	24,035	99	19	43	22	57.9
Office	Germany	11.12.2020	14.06	Energy certificate	Development	42,091	53	27	30	9	0.0
Management/Social	Germany	28.03.2023	32.50	Energy certificate	Funding	9,772	89	42	9	17	63.7
Retail	Netherlands	30.09.2020	0.02	Energy certificate	Funding	1,739	122	27	-9	1	48.9
Retail	Netherlands	30.09.2020	0.01	Energy certificate	Funding	3,049	29	286	-1	10	48.9
Retail	Netherlands	30.09.2020	0.04	Energy certificate	Funding	2,445	83	23	0	11	48.9
Retail	Netherlands	30.09.2020	0.01	Energy certificate	Funding	1,295	54	38	6	17	48.9
Retail	Netherlands	30.09.2020	0.02	Energy certificate	Funding	1,746	104	37	–6	5	48.9
Retail	Netherlands	30.09.2020	0.02	Energy certificate	Funding	1,549	141	61	–16	–5	48.9
Retail	Netherlands	30.09.2020	0.01	Energy certificate	Funding	1,470	173	32	–28	–14	48.9
Retail	Netherlands	30.09.2020	0.03	Energy certificate	Funding	5,348	92	75	–5	6	48.9
Office	Netherlands	30.09.2020	0.04	Energy certificate	Funding	2,194	58	41	22	19	48.9
Retail	Netherlands	30.09.2020	0.01	Energy certificate	Funding	1,264	16	20	19	33	48.9

Appendix – Green Bond Report

New Green Buildings (II)

Type of use	Country	Granting of loan	Loan (€ million)	Certificate	Type of project	Rental area (m^2)	Energy demand heating (kg CO_2/m^2 a)	Energy demand electricity (kg CO_2/m^2 a)	CO_2 savings vs. EnEV (kg CO_2/m^2 a)	CO_2 savings vs. average Germany (kg CO_2/m^2 a)	LTV (%)
Retail	Netherlands	26.03.2021	0.04	Energy certificate	Funding	1,665	101	35	–5	6	55.0
Retail	Netherlands	26.03.2021	0.04	Energy certificate	Funding	1,596	126	18	–10	1	55.0
Retail	Netherlands	26.03.2021	0.05	Energy certificate	Funding	1,791	118	53	–10	1	55.0
Retail	Netherlands	26.03.2021	0.04	Energy certificate	Funding	1,805	89	50	–3	8	55.0
Retail	Netherlands	26.03.2021	0.03	Energy certificate	Funding	1,554	121	36	–10	1	55.0
Retail	Netherlands	26.03.2021	0.14	Energy certificate	Funding	5,532	72	30	–2	9	55.0
Retail	Netherlands	26.03.2021	0.03	Energy certificate	Funding	1,252	121	44	–10	1	55.0
Retail	Netherlands	26.03.2021	0.32	Energy certificate	Funding	2,946	145	29	–15	–4	55.0
Retail	Netherlands	26.03.2021	0.13	Energy certificate	Funding	2,149	78	41	0	11	55.0
Retail	Netherlands	26.03.2021	0.07	Energy certificate	Funding	1,706	129	26	–11	0	55.0
Retail	Netherlands	26.03.2021	0.11	Energy certificate	Funding	1,797	77	39	1	12	55.0
Retail	Netherlands	26.03.2021	0.08	Energy certificate	Funding	1,855	143	33	–15	–4	55.0
Retail	Netherlands	26.03.2021	0.07	Energy certificate	Funding	1,812	72	37	2	13	55.0
Retail	Netherlands	26.03.2021	0.07	Energy certificate	Funding	1,985	122	34	–10	1	55.0
Retail	Netherlands	26.03.2021	0.08	Energy certificate	Funding	1,445	83	47	–1	10	55.0
Retail	Netherlands	26.03.2021	0.07	Energy certificate	Funding	1,282	130	42	–12	–1	55.0
Retail	Netherlands	26.03.2021	0.05	Energy certificate	Funding	1,173	117	47	–9	2	55.0
Retail	Netherlands	26.03.2021	0.09	Energy certificate	Funding	3,289	88	47	–2	8	55.0
Office	Netherlands	26.03.2021	0.02	Energy certificate	Funding	1,356	122	56	6	3	55.0
Retail	Netherlands	26.03.2021	0.02	Energy certificate	Funding	1,092	82	27	0	11	55.0
Retail	Netherlands	26.03.2021	0.03	Energy certificate	Funding	1,163	85	39	–1	10	55.0

Appendix – Green Bond Report

New Green Buildings (III)

Type of use	Country	Granting of loan	Loan (€ million)	Certificate	Type of project	Rental area (m^2)	Energy demand heating (kg CO_2/m^2 a)	Energy demand electricity (kg CO_2/m^2 a)	CO_2 savings vs. EnEV (kg CO_2/m^2 a)	CO_2 savings vs. average Germany (kg CO_2/m^2 a)	LTV (%)
Retail	Netherlands	26.03.2021	0.04	Energy certificate	Funding	1,318	108	54	–7	3	55.0
Office	Germany	07.06.2021	2.80	Energy certificate	Funding	7,954	114	27	35	14	77.7
Office	France	09.07.2021	0.38	Energy certificate	Funding	3,626	19	14	17	11	54.5
Office	Germany	29.11.2021	10.97	Energy certificate	Funding	4,870	109	22	34	12	193.7
Office	Poland	15.12.2021	1.88	BREEAM Outstanding	Development	55,388	17	35	44	32	0.0
Residential	Netherlands	29.09.2021	1.99	Energy certificate	Funding	1,946	28	0	9	35	58.9
Residential	Netherlands	29.09.2021	0.95	Energy certificate	Funding	2,650	57	0	1	26	58.9
Retail	Germany	01.03.2022	0.44	Energy certificate	Funding	1,381	181	41	16	12	55.3
Retail	Germany	01.03.2022	0.39	Energy certificate	Funding	1,499	63	27	24	28	55.3
Retail	Germany	01.03.2022	0.25	Energy certificate	Funding	2,629	69	31	21	29	55.3
Office	Poland	12.11.2019	1.19	BREEAM Excellent	Funding	12,550	0	0	46	34	82.0
Logistics – Light Industrial	Poland	09.06.2022	10.87	BREEAM Excellent	Funding	146,110	90	55	–50	–80	68.4
Office	Germany	29.06.2022	1.39	Energy certificate	Funding	5,443	87	6	50	29	46.5
Office	Germany	29.06.2022	4.38	Energy certificate	Funding	16,188	36	15	73	52	46.5
Residential	Germany	22.11.2022	10.70	Energy certificate	Development	11,550	59	0	0	6	0.0
Office	Germany	02.05.2023	92.07	Energy certificate	Funding	25,232	58	43	29	8	52.9
Office	Poland	24.01.2023	88.00	BREEAM Outstanding	Funding	73,907	52	35	43	31	92.7
Retail	Poland	16.12.2022	0.98	Energy certificate	Funding	4,909	32	36	23	37	72.6
Retail	Germany	02.03.2022	1.21	Energy certificate	Funding	1,437	45	26	23	19	49.4
Retail	Germany	02.03.2022	1.17	Energy certificate	Funding	1,504	112	28	12	19	49.4
Retail	Germany	02.03.2022	0.65	Energy certificate	Funding	1,087	21	177	–24	–17	49.4

Appendix – Green Bond Report

New Green Buildings (IV)

Type of use	Country	Granting of loan	Loan (€ million)	Certificate	Type of project	Rental area (m^2)	Energy demand heating (kg CO_2/m^2 a)	Energy demand electricity (kg CO_2/m^2 a)	CO_2 savings vs. EnEV (kg CO_2/m^2 a)	CO_2 savings vs. average Germany (kg CO_2/m^2 a)	LTV (%)
Logistics	Germany	31.01.2023	59.00	DGNB Gold	Funding	69,778	52	7	6	24	64.6
Logistics	Germany	28.02.2023	1.97	Energy certificate	Funding	12,825	15	8	16	42	66.3
Logistics	Germany	28.02.2023	2.00	Energy certificate	Funding	18,263	37	17	5	24	66.3
Retail	Germany	13.12.2022	6.16	Energy certificate	Funding	4,985	36	11	38	46	50.0
Office	France	23.05.2023	59.77	Energy certificate	Funding	9,185	54	41	10	4	45.8
Office	Netherlands	21.08.2023	29.00	Energy certificate	Funding	11,868	2	0	4	1	56.5
Retail	Germany	22.06.2023	1.50	Energy certificate	Funding	2,121	79	23	22	29	125.9
Office	Netherlands	21.12.2023	13.80	Energy certificate	Funding	7,938	76	31	18	15	48.9
Office	Netherlands	21.12.2023	5.73	Energy certificate	Funding	5,798	98	35	13	10	48.9
Office	Netherlands	21.12.2023	3.15	Energy certificate	Funding	2,227	75	36	18	15	48.9
Office	Netherlands	21.12.2023	60.40	Energy certificate	Funding	24,893	31	89	26	23	48.9
Office	Netherlands	21.12.2023	3.91	Energy certificate	Funding	2,582	71	43	19	16	48.9
Office	Netherlands	21.12.2023	21.70	Energy certificate	Funding	17,091	109	22	11	8	48.9
Office	Netherlands	21.12.2023	21.31	Energy certificate	Funding	18,872	31	81	16	14	48.9

Appendix – Impact Reporting

Methodological principles

The methodology is based on a two-step process.

I. An estimate of energy savings per building that includes the following elements:

a: **Determine the energy performance of each building**
Final energy demand for heat and electricity in kWh/m²a

b: **Choice of the energy efficiency reference value**
Final energy demand for heat and electricity in kWh/m²a

c: **Calculation of energy savings (a–b)**
Final energy demand savings for heat and electricity in kWh/m²a

II. An assessment of carbon intensity of avoided energy using specific carbon emissions factors through the following:

d: **Determination of the CO_2 intensity of the different energy sources for heating and differentiation of the CO_2 intensity of the each country-specific electricity mix and the district heating supply as well as closer differentiation of the district heating supply in Germany by region**[1]
(kg CO_2/kWh final energy demand)

e: **Calculation of CO_2 savings intensity**
(c*d) (kgCO_2/m²a)

f: **Calculation of total CO_2 savings**
(e*rentable area of the building) (kgCO_2/m²a)

g: **Initial market value of the property** (€ million)
(initial loan amount/initial loan-to-value (LTV))

h: **Outstanding nominal value of loans in the Green Finance Portfolio** (€ million)

i: **Berlin Hyp's share as a percentage of the initial market value of the asset** (initial LTV) (%)

j: **Calculation of financed CO_2 savings**
(f*i) (kgCO_2/m²a)

[1] For buildings whose heating is produced by environmental energy, a CO_2 factor of 0g/kWh is applied. For the calculation of the savings, the local district heating factor is used for the benchmark value. This applies to a total of four buildings.

Appendix – Impact Reporting

Energy efficiency benchmarks

Benchmark 1

Current energy reference values according to EnEV

With the help of the reference values in the following table, the calculated energy savings of the Green Buildings in Berlin Hyp's Green Finance Portfolio are measured against the current standards in Germany. As a result, the energy efficiency reference values for heat for the current standards lie between 30 kWh/m² for logistics properties and 135 kWh/m² for office buildings. The standards for the electricity parameters range from 35 kWh/m² and 105 kWh/m²a.

The specific heat reference value for housing is taken from the dena Building Report of 2016. This value corresponds to the limit values of the EnEV 2016 for new buildings.[2]

As the residential framework does not take electricity demand into account, the reference value electricity for residential is not considered.

Type of building	Spec. heating energy demand (kWh/m²a)	Spec. electricity demand building electricity (kWh/m²a)
Residential	60	–
Office	135	105
Trade	70	85
Hotel	105	65
Logistics	30	35
Production	110	65

Benchmark 2

Average energy efficiency of existing German properties

For an in-depth understanding of different building categories within a national market, various sources need to be consulted.

Data availability for residential buildings in Germany is at a very good level. There are comprehensive studies that provide uniform information on the national building stock and present this in varying depths. For residential buildings the issuing of energy performance certificates for new buildings is obligatory and labels are issued depending on the energy performance, which enables a classification into different classes.

For non-residential buildings, the data situation is mixed, as there are many different sources that do not define or select the building stock or the categorisations in a uniform way. Therefore, assumptions and the combination of different sources are sometimes required in order to determine a comprehensible data basis. The publicly available data sources continue to develop in their qualitative preparation. Since 2002, it has also been compulsory for non-residential buildings to produce an energy performance certificate for new buildings, but even today there is still no classification and assignment of labels. The following table shows the management summary of the benchmarks for Germany. The data basis was collected as of 2023.

Type of building	Spec. heating energy demand (kWh/m²a)	Spec. electricity demand building electricity (kWh/m²a)
Residential	146	–
Office	136	50
Trade	117	75
Hotel	145	85
Logistics	82	50

[2] Deutsche Energie Agentur (ed.): dena-Gebäudereport Statistics and Analyses on Energy Efficiency in Existing Buildings (2016)

Appendix – Carbon Intensity in the Real Estate Sector

Overview emission factors

The emission factor for environmental energy is 0 kg CO_2/kWh final energy demand and comes from the Building Energy Act.

Energy source[3]	$kgCO_2$/kWh Final energy demand
Heating oil	0.306
Natural gas	0.240
Liquid gas	0.281
Wood	0.0
Biogas	0.0
Bio-oil	0.0

Electricity by country[4]	$kgCO_2$/kWh Final energy demand
Germany	0.388
France	0.054
Netherlands	0.296
Poland	0.757
Czech Republic	0.642
Belgium	0.122
Great Britain	0.220
Luxembourg	0.074

District heating by region in Germany[5]	$kgCO_2$/kWh Final energy demand		$kgCO_2$/kWh Final energy demand
Baunatal	0,011	Mainz	0
Berlin	0,056	Mannheim	0,223
Böblingen	0,139	Munich	0,156
Dessau-Roßlau	0	Münster	0
Dinslaken	0,138	Oberhausen	0,073
Dresden	0	Oederan	0,15
Duisburg	0,166	Offenbach	0,121
Düsseldorf	0	Olching	0,002
Eching	0,174	Potsdam	0
Essen	0,178	Rostock	0,133
Frankfurt	0,065	Saarbrücken	0
Halle	0,169	Sandersdorf	0
Hamburg	0,064	Schönfeld	0,144
Hanau	0	Schwerin	0,18
Hannover	0,076	Staufenberg	0
Heidelberg	0,157	Stuttgart	0,174
Karlsruhe	0,078	Teltow	0,153
Köln	0	Ulm	0,013
Langen	0,121	Velten	0,182
Lehrberg	0	Völklingen	0
Leipzig	0,189	Wismar	0,025
Lübeck	0,1	Wolfsburg	0,143
Magdeburg	0,063		

Unknown heating sources	$kgCO_2$/kWh Final energy demand		Sources
	Residential	Commercial	
Germany	0.217	0.261	Eurostat energy statistics excel (2023 edition)
France	0.098	0.106	Eurostat energy statistics excel (2023 edition)
Netherlands	0.185	0.183	StatLine – Energy balance sheet; supply and consumption, sector (cbs.nl)
Poland	0.267	0.528	Statistics Poland/Topics/ Environment. Energy/Energy
Czech Republic	0.236	0.409	Eurostat energy statistics excel (2023 edition)
Belgium	0.183	0.169	StatBel 2021 – beStat Tables for each energy
Great Britain	0.204	0.201	Digest of UK Energy Statistics (DUKES): energy – GOV.UK (www.gov.uk)
Luxembourg	0.183	0.120	LUSTAT Data Explorer · Final energy consumption according to the different uses and energy forms (statec.lu)

3 Joint Research Centre of the European Commission (Hrsg.): „CoM Default Emission Factors for the Member States of the European Union“, http://data.jrc.ec.europa.eu/dataset/jrc-com-ef-comw-ef-2017

4 www.aib-net.org/sites/default/files/assets/facts/residual-mix/2021/AIB_2021_Residual_Mix_Results_1_1.pdf

5 Data from the regional energy supply companies

Appendix – Carbon Intensity in the Real Estate Sector

Emission factors for district heating outside Germany

In order to determine the CO_2 emissions from district heating for buildings outside Germany, the emission factor must be known or, as in this case, determined. For this purpose, the country-specific data of the heat and electricity energy production, as well as the total CO_2 emissions from the year 2020[6] of the International Energy Agency are used. Given that carbon emissions are calculated as the total of emissions out of electricity and heating, the values only attributable to heating energy must first of all be determined for each country as follows:

$$CO_2 - \text{intensity (heat)} = \text{percentage of heat emissions} \times CO_2 - \text{emissions}_{tot}$$

The percentage share of heating energy emissions compared to total emissions equates to the percentage share of heating energy generated compared to overall energy generated with regard to energy production efficiency. This is calculated on the basis of existing energy data.

Using these heating energy emissions values, the emission factor can now be calculated in relation to the heating energy generated by the respective country:

$$CO_2 - \text{factor (heat)} = \frac{CO_2 - \text{intensity (heat)}}{\text{heat output}}$$

This results in the emission factors for district heating outside Germany used in the report, which are essential for impact reporting.

Country	Heat energy produced[7] (TWh)	Electricity produced[7] (TWh)	Emsissions total[8] ($MtCO_2$)
France	48.11	433.07	36.02
Netherlands	23.44	109.16	43.22
Poland	69.48	143.69	145.84
Czech Republic	25.04	59.98	45.77
Belgium	5.30	81.36	14.69
Great Britain	14.62	286.04	67.63
Luxembourg	1.52	6.39	0.24

District heating by country	$kgCO_2/kWh$ Final energy demand
France	0.031
Netherlands	0.145
Poland	0.332
Czech Republic	0.255
Belgium	0.068
Great Britain	0.090
Luxembourg	0.013

6 No more recent data available

7 www.iea.org/data-and-statistics/data-product/world-energy-balances-highlights

8 www.iea.org/data-and-statistics/data-product/greenhouse-gas-emissions-from-energy-highlights

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