Green Bonds – Made by KfW

Impact achieved by KfW's green bond issuances 2023

November 2025

Content

Basic Information
Reporting period: calendar year 2023
Framework applied: KfW Green Bond Framework 2022

Approach: Impact reporting based on aggregated data basis for each calendar year. "Green Bonds – Made by KfW" issued in one calendar year show the same impact per unit financed which remains unchanged over the bond lifetime.
Reporting Framework: Harmonized Framework for Impact Reporting (ICMA), June 2021 edition

Continuing Our Journey
Towards a Greener Future

Dear investors and interested readers,

For over a decade, our "Green Bonds – Made by KfW" have been channeling capital into environmentally friendly technologies and infrastructure projects. Throughout this time, we have set important market standards in transparency and impact assessment, significantly contributing to the growth of the green bond segment.

In today's complex geopolitical environment, the importance of preserving nature as the foundation of life is as pressing as ever. While there are more and more discussions around the importance of sustainability, the threat of climate change continues to escalate daily.

KfW remains firmly committed to the climate goals by promoting environmentally friendly technologies that support a climate-neutral future and and to the preservation of biodiversity. Sustainable finance, and green bonds in particular, play a crucial role as key instruments for directing capital flows toward these goals.

Our ambitions remain high, especially regarding impact reporting. We continuously strive to improve transparency, data quality, and the clarity and consistency of our reporting. This commitment is embodied in the implementation of a group-wide impact management system based on multiple impact indicators, designed to transparently demonstrate the effects of our financing and promotional activities at the overall bank level. Building on this, KfW recently published its first Impact Insight Report, offering key information on the expected impacts of KfW's new business across the group for the 2024 financial year.

With this Green Bond Impact Report, we are completing the reporting cycle for "Green Bonds – Made by KfW" issued in the financial year 2023. These green bonds are based on the second update of the KfW Green Bond Framework (Version 2022).

Green bonds issued from 2024 onwards are based on the third update of the framework (KfW Green Bond Framework 2024) which introduced two additional project categories: "Biodiversity" and "Corporate Investments for Climate Change Mitigation" - as well as selected international financings.

The ongoing evolvement of our green bond framework reflects KfW's dynamic approach to environmentally friendly financing in a variety of ways. Investors appreciate this momentum, as well as the bank's consistent issuance activity and the combination of maximum security and high liquidity that is characteristic of our bonds.

Tim Armbruster
Treasurer of KfW

The following Impact Report for "Green Bonds – Made by KfW" issued in 2023 refers to a total of 22 green bonds (including 7 re-openings) with aggregate net proceeds of EUR 12.9 billion. The report encompasses all relevant information on the issuances and on the allocation of the net proceeds and provides information on the environmental and social impact achieved in the respective year. The impact is calculated based on evaluation results of the underlying loan programmes of the categories "Renewable Energy", "Energy Efficiency" and "Clean Transportation" provided by independent research institutes.

Enjoy reading!

Yours sincerely,

Tim Armbruster
Treasurer of KfW

Environmental and social impact
Green Bonds at a glance

Green Bonds 2023:
EUR 12.9 billion net proceeds

Expected reduction of GHG emissions:
2.5 million tons of CO2-e p.a.

"Green Bonds – Made by KfW" issued in 2023 contributed to the SDGs 7 "Affordable and Clean Energy", 11 "Sustainable Cities and Communities", and 13 "Climate Action" and thus support a more sustainable future.
Home – United Nations Sustainable Development

2023		Absolute impact accounting for KfW's financing share	Impact per EUR 1 million investment
Annual greenhouse gas emissions reduced/avoided (CO_2-equivalents)		**2,507,866** tons	**195** tons
Annual final energy savings		**457,602** MWh	**35.5** MWh
Annual renewable electricity generation		**4,511,547** MWh	**350** MWh
Renewable energy capacity added		**2,514** MWel	**0.20** MWel
Number of jobs created and/or preserved		**155,026** person years	**12** person years
Reduction of air pollutants	Annual NO_x emissions reduced	**65.4** tons	**5.077** kg
	Annual PM emissions reduced	**0.8** tons	**0.065** kg
	Annual CO emissions reduced	**16.7** tons	**1.292** kg
	Annual NMVOC emissions reduced	**1.6** tons	**0.121** kg

Green Bonds – Made by KfW

Continuous evolvement and expansion of KfW's Green Bond Framework

As one of the leading issuers of green bonds globally, KfW aims to actively promote awareness of climate protection through its capital market activities by connecting its sustainable lending business to the refinancing side. KfW became an issuer in the green bond market in 2014. With its strong commitment to transparency and impact assessment, KfW is confident that it has established benchmarks in the market and has played a significant role in the substantial growth that the market has witnessed since then.

Since 2014, KfW's Green Bond Framework has continuously evolved. With the latest version of KfW's Green Bond Framework, effective from January 1, 2024, net proceeds from "Green Bonds - Made by KfW" can be allocated to green projects within selected KfW loan programmes in the categories of "Renewable Energy", "Green Buildings", "Clean Transportation", "Biodiversity" and "Corporate Investments for Climate Change Mitigation".

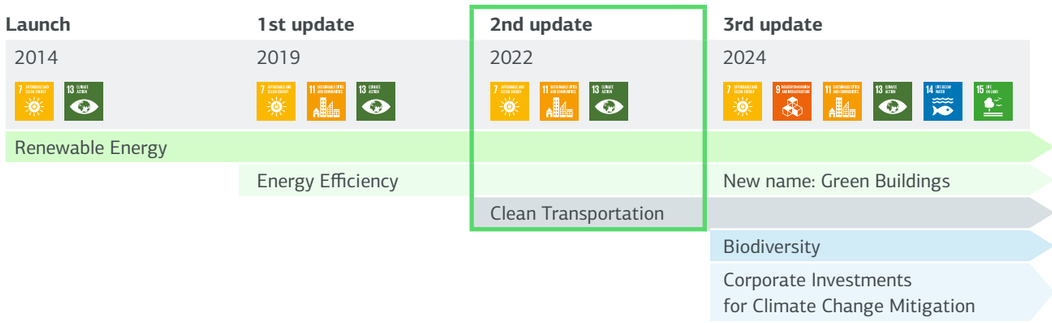
This report focuses on the impact of green bonds issued in 2023 (KfW Green Bond Framework 2022) and the financing of green projects under KfW's loan programmes in the categories "Renewable Energy", "Energy Efficiency" and "Clean Transportation".

Second Opinion by CICERO Shades of Green, now part of S&P Global

°CICERO Medium Green

Framework 2022 (assessed by CICERO):
- In line with ICMA GBP (June 2021)
- Shades of Green: medium green
- Governance: **excellent**

Continuous evolvement and expansion of KfW's Green Bond Framework



KfW Green Bond Framework 2022 relevant for this Impact Report

Relevant KfW loan programmes
2023: "Renewable Energies – Standard" (no. 270); Federal Funding for Efficient Buildings' (BEG)" (no. 261, 263, 264), "Sustainable Mobility for Municipalities" (no. 267) and "Susainable Mobility for Corporates" (no. 268, 269).

Transparent impact reporting

Measurable climate protection effects for investors

KfW reports the amount and the allocation of disbursements under the respective loan programmes in accordance with the framework 2022 on a yearly basis until full allocation.

The loan programme “Renewable Energies – Standard” is evaluated by the Center for Solar Energy and Hydrogen Research Baden-Württemberg (ZSW), the relevant loan programmes related to “Federal Funding for Efficient Buildings (BEG)” are evaluated by the economic research centre Prognos, the Research Institute for Thermal Insulation Munich (FIW), the ITG Institute for Building Systems Engineering Dresden Research and Application GmbH (iTG), as well as the institute for energy and environmental research Heidelberg (ifeu). Relevant loan programmes of the category “Clean Transportation” are evaluated by the ifeu institute. All of the above research institutes are based in Germany.

Following the institutions’ assessment of the impact of the projects for each year, KfW releases its corresponding impact report. The impact analysis for “Green Bonds – Made by KfW” is based on the standards established by the International Capital Markets Association (ICMA) – specifically, the Green Bond Principles – along with the associated Harmonized Framework for Impact Reporting.

KfW’s impact report is prepared for each calendar year and shows aggregate data (no project-by-project data). All loan commitments (or signed loan amounts) for eligible green projects KfW made between 1 January and 31 December of the same year are linked to the cumulated net proceeds of all “Green Bonds – Made by KfW” issued in the same calendar year. Consequently, all “Green Bonds – Made by KfW” issued in a given calendar year reflect the same impact per unit financed, which remains unchanged throughout the bond’s lifetime. The quantitative performance indicators for impact measurement are based on loan commitments (or signed loan amounts), while the allocation of proceeds is determined by disbursements. Due to full or partial waivers from borrowers, the disbursements may be lower than the loan commitments. Additionally, the calendar year in which disbursements occur may differ from the year in which commitments are made, potentially leading to a mismatch. KfW is aware of this possible mismatch which, in KfW’s view, is limited and therefore, will not be taken into account.

Reporting aligned with

The Green Bond Principles

Green projects

KfW establishes specific formal eligibility criteria for its various loan programmes. Loans are provided either indirectly to the ultimate borrower through financing partners or, in the case of municipal financing only, directly to the ultimate borrower. In both scenarios, KfW evaluates each individual loan application to ensure it meets the eligibility requirements of the relevant loan programme.

The framework applicable for this Impact Report 2023 encompasses the following loan programmes:

Eligible categories	**Framework 2022** Loan programmes
Renewable Energy	“Renewable Energies – Standard“ (no. 270)
Energy Efficiency	“Federal Funding for Efficient Buildings’ (BEG)” (no. 261, 263, 264)
Clean Transportation	“Sustainable Mobility for Municipalities” (no. 267) and „Sustainable Mobility for Corporates“ (no. 268, 269)

General note

KfW’s loan programmes are subject to continuous further development. This means that adjustments may be made to the eligibility criteria, group of beneficiaries, or other aspects within a reporting period.

KfW generally excludes certain projects from financing or specifies conditions to be met. Details can be found in the KfW Bankengruppe exclusion lists (see Appendix p. 27-28).

Comprehensive criteria

for environmental and social eligiblility assessment under the respective loan programmes

KfW's promotional loan programme [no. 270] "Renewable Energies – Standard"

Eligibility and exclusions

What for? The programme provides financings for the construction, expansion and acquisition of plants generating power or heat from renewable energy sources that comply with the requirements defined by the German Renewable Energy Sources Act (Erneuerbare-Energien-Gesetz – EEG). These sources include wind energy, solar energy (photovoltaics), hydropower, biomass, biogas and geothermal energy. Furthermore, grids and plants for the storage of heat are supported.

For whom? Funds are available for private individuals and non-profit organisations which feed the generated electricity/heat into the grid, at least in part, self-employed professionals and farmers, as well as German and non-German enterprises majority-owned by private individuals or municipalities. Investments outside Germany are eligible for German companies, German citizens and joint ventures with a substantial German stake.

Up to 100 % of the investment costs are eligible for financing with a cap at EUR 50 million.

Exclusions

The following plants and projects are excluded:

- Hydropower plants with an installed power exceeding 20 MW
- Plants for the generation of power or heat using fossil fuels as well as plants for heat storage that are directly linked to power or heat generated on the base of fossil fuels
- Projects using any form of trust structures or self' dealing
- Equipment for the use of nuclear power

KfW's promotional loan programmes [no. 261] "BEG residential building loan efficiency house [no. 263] "BEG non-residential building loan" and [no. 264] "BEG municipalities loan"[1]

Eligibility and exclusions

What for? The programme provides financings for investment measures include the energy-efficient refurbishment and first-time acquisition of completed existing non-residential buildings that achieve the energy standard of an "EE efficiency house" or "Efficiency House NH" after completion of the refurbishment measures. An "EE efficiency house" class is achieved if renewable energies and/or unavoidable waste heat provide at least 65 percent of the energy required to heat and cool the building. An "Efficiency House NH" class is achieved if an efficiency house is labeled with a sustainability certificate which confirms that the measure complies with the requirements of the "Sustainable Building" quality seal. Generally, projects must meet the environmental and social requirements and standards applicable in Germany.

For submission of the financing application, the involvement of an energy efficiency expert for KfW's promotional products is mandatory.

For whom?

Nos. 261 / 263: All investors (e.g., homeowners, contractors, companies, non-profit organisations, municipalities) are eligible to apply.
No. 264: Funds are available for local authorities, legally dependent own enterprises of local authorities, municipal associations, special-purpose associations that can be treated as local authorities.
No. 261: Up to 100 % of the investment costs are eligible for financing with a cap at EUR 120,000 for new construction and renovation measures and EUR 150,000 for renovation measures to achieve an "EE efficiency house".
Nos. 263 / 264: Up to EUR 2,000 per square meter of net floor space, up to a maximum of EUR 10 million per project.

Exclusions

The subsidy programme cannot be used to finance transfers of assets against payment or other transfers of assets that go beyond the acquisition of a residential unit for own use (e.g., for pure transfers of assets between companies and/or persons). In the case of a new building, heat generation based on oil as an energy source is excluded.

1 Loan programme no. 262 was discontinued by the Federal Ministry for Economic Affairs and Energy in 2022.

KfW's promotional loan programmes [no. 267-269] "Sustainable Mobility"

Eligibility and exclusions

What for? The programme "Sustainable Mobility", with the standard variant (no. 268) and the individual variant (no. 269), supports companies with investments in ambitious climate protection measures in the field of mobility in Germany. The programme "Sustainable Mobility" (no. 267) expands KfW's funding activities into the underlying infrastructure to enhance sustainable and clean mobility, for municipalities. Eligible for funding are investments in projects that exhibit zero direct CO_2-emissions, in low-emission vehicles (as per definition) and in related infrastructure. In addition, investments in information and communication technologies in the field of mobility are supported.

The requirements for the measures fulfill the substantial contribution criteria of the EU Taxonomy Regulation[2] for climate change mitigation activities.

2 Regulation (EU) 2020/852 of the European Parliament and of the Council the EU Taxonomy.

For whom?

1. Companies and sole proprietorships in the commercial sector, the majority of which are privately owned private individuals
2. Companies with at least 50 % public-legal participation
3. Non-profit applicants
4. Corporations, institutions and foundations under public law with a majority municipal background

Up to 100 % of the investment costs are eligible for financing. The funding volume for the standard variant is limited at EUR 50 million, whereas the individual variant can be individually adjusted with a minimum loan amount of EUR 25 million. Funding programme 267 offers loans in the amount of max. EUR 150 million per year.

Exclusions

- Paid or other asset transfers
- Debt rescheduling or refinancing of already started or finished projects
- Projects in areas in which public borrowers carry out economic activities contrary to EU state aid law

2023
Issuance summary and use of proceeds

KfW issued 22 “Green Bonds – Made by KfW” in 2023, raising net proceeds in the amount of EUR 12.9 billion, which were fully allocated by year-end.

KfW received requests for disbursements in the categories of renewable energies (KfW loan programme “Renewable Energies - Standard”), energy efficiency (KfW loan programme “‘Federal Funding for Efficient Buildings’ (BEG)”) and clean transportation (KfW loan programmes “Sustainable Mobility for Municipalities” and “Sustainable Mobility for Corporates”) in an amount of EUR 15.9 billion. Thus, an amount equal to the net proceeds from all KfW green bonds issued in 2023 was fully allocated as of December 31, 2023.

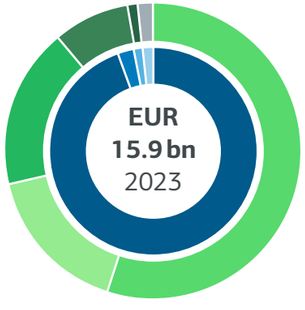
The majority (71.5 %) of all requests for disbursement were related to projects in the category of Energy Efficiency, particularly residential buildings. In addition, 27.1 % of the projects fell under the category of Renewable Energies (17.6 % wind energy, 8.4 % solar energy and 1.1 % other renewable energies), while 1.5 % were related to Clean Transportation. A total of 95.7 % of the funds were invested in projects located in Germany. The remainder of the projects is located in France (1.7 %), Italy (0.7 %), the Netherlands (0.5 %), Finland (0.5 %), Spain (0.3 %), United Kingdom (0.3 %), Sweden (0.2 %), Austria (0.2 %), Poland (0.03 %) and Ireland (0.01 %). Net proceeds in foreign currencies were converted into EUR at the ECB’s exchange reference rate on the respective pricing date.

22 Green Bonds
in 9 currencies (EUR, AUD, NOK, GBP, CAD, CNY, SEK, USD, HKD)

EUR 12.9 billion
Net proceeds

14.3 %
of KfW’s total funding (EUR 90.2 bn)

Full Allocation
Disbursements in an amount of EUR 15.9 bn



Requests for disbursements under the eligible loan programmes

- Residential buildings: 55.2 %
- Other buildings: 16.3 %
- Wind energy: 17.6 %
- Solar energy: 8.4 %
- Other renewable energies: 1.1 %
- Clean transportation: 1.5 %
- Germany: 95.7 %
- France: 1.7 %
- Italy: 0.7 %
- Other OECD: 2.0 %

“KfW remains firmly committed to promoting environmentally friendly technologies that support a climate-neutral future and the preservation of biodiversity.”

Tim Armbruster
Treasurer of KfW

2023
Impact Renewable Energy

The independent non-profit research institute Center for Solar Energy and Hydrogen Research Baden-Württemberg, Germany, (ZSW) evaluated the environmental and social impact of projects financed under KfW's programme "Renewable Energies – Standard" based on new commitments in 2023.

In 2023, the volume of commitments under KfW's loan programme "Renewable Energies – Standard" totalled almost EUR 5.4 billion and triggered investments of approx. EUR 7.7 billion – representing an average share of KfW financing amounting to 70.4 %. Thereof, a volume of EUR 1.1 billion and investments of EUR 2.0 billion, were attributable to renewable energy plants built outside Germany. The average investment per commitment amounted to EUR 3.8 million.

Commitments under KfW's programme "Renewable Energies – Standard" in 2023

Number of loan commitments	2,028
Volume of loan commitments (EUR m)	5,412
Thereof outside Germany (EUR m)	1,066
Investments financed (EUR m)	7,692
Thereof outside Germany (EUR m)	1,960
Average loan volume per commitment (EUR)	2,669,000
Average investment financed per commitment (EUR)	3,793,000
Average share of financing	70.4 %

Installed electrical power supported in 2023

Plant type	**MW_{el}**
Wind energy onshore	2,966.6
Photovoltaic energy	2,819.7
Hydropower	0.2
Total	**5,786.5**
Annual electricity generation	**9.8 TWh_{el}**

In 2023, KfW's programme "Renewable Energies – Standard" co-financed plants with a total electrical power of approx. 5.8 GWel, of which 73 % were attributable to plants built in Germany and 27 % to plants built outside Germany. The table provides a detailed picture of the installed electrical power by plant type.

The estimated annual electricity production of the supported plants built in Germany amounts to 7.6 TWh_{el} per year over the twenty-year-lifetime of the plants. The plants financed outside Germany produce an estimated 2.1 TWh_{el} of electricity per year.

The projects co-financed under KfW's "Renewable Energies – Standard" programme in 2023 had the following environmental and social impact:

	Overall		**KfW share**	
	Germany	**Outside Germany**	**Germany**	**Outside Germany**
Annual greenhouse gas emissions reduced/avoided due to plants supported	**4.50** million tons CO_2-equivalents	**0.48** million tons CO_2-equivalents	**3.43** million tons CO_2-equivalents	**0.26** million tons CO_2-equivalents
Renewable energy capacity added	**4,203.4** MW_{el}	**1,583.1** MW_{el}	**3,056.0** MWel	**844.1** MW_{el}
Annual renewable electricity generation	**7.6** TWh	**2.1** TWh	**5.8** TWh	**1.2** TWh
Number of jobs created and/or preserved	**69,190** person years	**23,070** person years	**52,300** person years	**12,600** person years

2023
Impact Energy Efficiency

Prognos, a leading economic research centre based in Munich, Germany, together with the Research Institute for Thermal Insulation Munich (FIW), Germany, the ITG Institute for Building Systems Engineering Dresden Research and Application GmbH (iTG), Germany, and the institute for energy and environmental research Heidelberg (ifeu), Germany, evaluated the environmental and social impact of projects financed under KfW's programme "Federal Funding for Efficient Buildings" (BEG)" based on new commitments in 2023.

In 2023, the volume of commitments under KfW's loan programme "'Federal Funding for Efficient Buildings (BEG)" totalled almost EUR 6.5 billion and triggered investments of approx. EUR 10.6 billion – representing an average share of KfW financing amounting to 60.7 %. The programme exclusively finances construction projects in Germany. The average investment per commitment amounted to EUR 0.6 million.

The projects co-financed under KfW's "Federal Funding for Efficient Buildings (BEG)" in 2023 had the following environmental and social impact:

Commitments under KfW's programme "Federal Funding for Efficient Buildings (BEG)" in 2023

Number of loan commitments	17,351
Volume of loan commitments (EUR m)	6,448
Investments financed (EUR m)	10,616
Number of promoted housing (in residential units)	62,668
Average loan volume per commitment (EUR)	372,000
Average investment financed per commitment (EUR)	611,800
Average share of financing	60.7 %

	Overall	**KfW share**
	Germay	**Germany**
Annual greenhouse gas emissions reduced/avoided due to energy-efficient construction supported	**130,693** tons CO_2-equivalents	**79,385** tons CO_2-equivalents
Annual final energy savings	**527,426** MWh	**320,365** MWh
Number of jobs created and/or preserved	**130,470** person years	**79,249** person years

2023
Impact Clean Transportation

The institute for energy and environmental research (ifeu), an independent non-profit environmental research institute based in Heidelberg, Germany, evaluated the environmental impact of projects financed under KfW's programme "Sustainable Mobility" based on new commitments in 2023.

In 2023, the volume of commitments under KfW's loan programme "Sustainable Mobility" totalled over EUR 0.1 billion and triggered investments of approx. EUR 0.3 billion – representing an average share of KfW financing amounting to 41.1 %. The programme exclusively finances mobility projects in Germany.

The environmental impact was calculated and taken into account where it was clearly definable. This applies to 56 of the 60 loan commitments or 90.7 % of the commitment volume (EUR 110 million). The positive environmental impact of the remaining 4 loan commitments was not taken into account as it was neither clearly definable nor could it be clearly calculated.

The projects co-financed under KfW's "Sustainable Mobility" in 2023 had the following environmental impact:

	Overall	KfW share
Annual greenhouse gas emissions reduced/avoided	**17,127** tons CO_2-equivalents	**10,429** tons CO_2-equivalents
Annual NO_x emissions reduced/ voided	**65** tons	**38** tons
Annual PM emissions reduced/avoided	**0.8** tons	**0.5** tons
Annual CO emissions reduced/avoided	**16** tons	**10** tons
Annual NMVOC emissions reduced/avoided	**2** tons	**1** ton

Commitments under KfW's programme "Sustainable Mobility" in 2023

Number of loan commitments	60
Volume of loan commitments (EUR m)	110
Investments financed (EUR m)	267
Average share of financing	41.1 %

Methodology and assumptions
used for impact calculation of “Green Bonds – Made by KfW”

KfW calculated the impact of its green bonds issued in 2023 based on the numbers provided by the external evaluators of the underlying promotional programmes:

Loan programme (loan programme number)	Evaluated by
Renewable Energies – Standard (270)	Center for Solar Energy and Hydrogen Research Baden-Württemberg (ZSW), Germany
Federal Funding for Efficient Buildings (BEG) (261, 263, 264)	Prognos, Germany, the Research Institute for Thermal Insulation Munich (FIW), Germany, the ITG Institute for Building Systems Engineering Dresden Research and Application GmbH (iTG), Germany, and the institute for energy and environmental research Heidelberg (ifeu), Germany
Sustainable Mobility for Municipalities (267) and Sustainable Mobility for Corporates (268, 269)	The institute for energy and environmental research Heidelberg (ifeu), Germany

The impact is quantified for financed renewable energy plants inside and outside Germany, supported energy-efficiency related construction and sustainable mobility projects in Germany only.

All KPIs are calculated on the basis of KfW’s average financing share of the total impact as well as the share of allocation of green bond proceeds to each programme.

The next section gives a brief overview of the methodology used by the external evaluators to estimate the positive impact of “Green Bonds – Made by KfW”.

"Renewable Energies – Standard"

Annual GHG emissions reduced/avoided in tons CO_2-e – IFI approach
The "International Financial Institution Framework for a Harmonised Approach to Green-house Gas Accounting" (IFI approach) provides a framework for determining greenhouse gas savings from investment projects.[1] This is intended to enable better comparability of the reduction in greenhouse gas emissions achieved in different projects. The Technical Working Group of the International Financial Institutions (IFI TWG) has agreed guidelines for various areas of application, including renewable energy, water supply and transport projects. The IFI TWG also provides country-specific "default" CO_2 emission factors that can be used to determine avoided emissions for various applications. These emission factors are updated at regular intervals, the most recent version available is the IFI Dataset (version 3.2)[2], published in April 2022. Emission factors are given for different emission profiles, of which "firm energy" (applicable to hydro energy, biogas and solid biomass) and "intermittent energy" (applicable to solar and wind energy) are relevant here. No "default" emission factors are available for the heating sector.

The current IFI guidelines focus on individual (large) projects for which detailed data is available. Due to the large number of installations funded by KfW and for reasons of data availability, a detailed assessment at the level of individual projects is unrealistic. Instead, an analysis at the level of the application areas, which are sufficiently homogeneous so that typical parameters can be uniformly assumed, appears appropriate. For the evaluation, the most recent IFI Grid emission factors are applied.[2] As the default grid emission factors only include direct emissions at the site of power production, the IFI guidelines stipulate that life cycle emissions are also to be considered in the project assessment. For this reason, country-specific life cycle upstream emission factors for electricity grid emissions, and emissions associated with transmission and distribution losses provided by the International Energy Agency (IEA) are applied. These upstream emission factors, however, cover CO_2-equivalent emissions (i.e. including CH_4 and N_2O), whereas the IFI default grid factors only consider CO_2 emissions. Adding up both to a certain extent implies a blur. Neglecting emission avoidance of CH_4 and N_2O in the IFI default factors tends to underestimate the real emission avoidance, which appears acceptable aiming at a conservative estimate.

For life cycle emission factors for the relevant electricity generation technologies, ZSW refers to the IPCC Special Report on Renewable Energy Sources and Climate Change Mitigation (SRREN).[3] For the avoided emission calculations, the 50th percentile values have been used. This data set is commonly accepted and still in use, e.g., by the IRENA in the Avoided Emissions Calculator.[4]

Annual renewable electricity generation
Energy carrier-specific full load hours were determined for reference plants, e.g. onshore wind power plants. The renewable electricity generation estimated in this way was extrapolated taking into account the renewable energy capacity added.

Number of jobs created / and or preserved in person years
The calculated employment effects consider the production, construction and operation of the financed facilities. The number of jobs created and/or preserved is not available for projects outside Germany. KfW's KPI calculation is based on the assumption that the employment effects achieved inside Germany also apply as proxy to renewable energy plants financed outside Germany.

1 See IFI Approach to GHG Accounting for Renewable Energy Projects, available at IFI TWG – List of methodologies | UNFCCC

2 See Harmonized IFI Default Grid Factors 2021 v3.2, available at Harmonized IFI Default Grid Factors 2021 v3.2 | UNFCCC

3 See Moomaw, W., P. Burgherr, G. Heath, M. Lenzen, J. Nyboer, A. Verbruggen, 2011: Annex II: Methodology. In IPCC Special Report on Renewable Energy Sources and Climate Change Mitigation [O. Edenhofer, R. Pichs-Madruga, Y. Sokona, K. Seyboth, P. Matschoss, S. Kadner, T. Zwickel, P. Eickemeier, G. Hansen, S. Schlömer, C. von Stechow (eds)], Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA; available at www.ipcc.ch/site/assets/uploads/2018/03/Annex-II-Methodology-1.pdf

4 See www.irena.org/Data/View-data-by-topic/Climate-Change/Avoided-Emissions-Calculator. Last accessed 12 January 2024

"Federal Funding for Efficient Buildings (BEG)"

Annual GHG emissions reduced/avoided in tons CO_2-e / Annual final energy savings
Model-based impact assessment: The impact assessment as part of the evaluation is based on a specific building model that is used to simulate the subsidized building stock. In addition to the funding data, other data is also used. This includes, for example, empirical data from the survey of grant recipients on the condition of the building (in the case of refurbishments, in particular the initial condition before the measure), energy sources used, etc. The modeling is based on individual intended uses, which serve as the foundation for the building model. In this way, an attempt is made to represent reality as accurately as possible. On a methodological basis and due to the empirical data used, this may result in deviations from other, methodologically equally legitimate approaches to determining impact (e.g. via emission reduction factors).

As part of the evaluation by Prognos, the total savings triggered by the "Federal Funding for Efficient Buildings" (BEG) funding programme are determined, regardless of the sector in which they occur. Emissions are accounted for at the point of origin - the building (polluter pays balance). If fossil fuels are used in the building, only the direct emissions are taken into account, without emissions from the upstream chain (e.g. transportation). Emissions that are caused by electricity and district heating and therefore do not occur directly in the building are also accounted for using this method. As they are direct effects of the funding programme and the funds used, they are included in contrast to the sector-specific calculation in accordance with the Climate Protection Act.

The methodology used is therefore consistent with the BMWK's methodological guidelines for evaluations and NAPE (Nationaler Aktionsplan Energieeffizienz) reporting, as in place in 2023.

Number of jobs created / and or preserved in person years
The investments made as part of the BEG funding programme have an impact on several sectors within the value chain. Both the "direct" effects in the associated capital goods manufacturing sectors and the "indirect effects" are taken into account. The latter arise when companies in one sector are also dependent on intermediate goods from companies in other sectors in the course of production.

As a result, the investments made due to the BEG lead to value added effects, whereby the gross value added is mainly generated in the construction of new residential buildings. Due to the company structure in the construction industry, the majority of this takes place in small and medium-sized companies.

The calculated gross value added effects are accompanied by corresponding employment effects. The level of these effects can be estimated using sector-specific labor productivity indicators.

For details see: BEG Evaluation Reports

“Sustainable Mobility”

Annual GHG emissions reduced/avoided in tons CO_2-e
Relative greenhouse gas (CO_2, CH_4 and N_2O) emissions due to financed vehicles and transport infrastructure in Germany were calculated by the institute for energy and environmental research Heidelberg (ifeu), Germany.

Relative emissions are the difference between the absolute emissions of the financed project and a business-as-usual scenario.[1] In both scenarios, direct (tank-to-wheel) and upstream (well-to-tank) emissions as well as emissions from manufacturing vehicles were considered. For infrastructure projects, emissions from the construction of the infrastructure itself were also included if relevant.

The business-as-usual scenarios were designed according to the principle of conservatism, i.e. they account for expected future changes, for example by taking as reference the projected future fleet of vehicles that is supposed to run during the lifespan of the financed project. Based on physical activity data (e.g. annual mileage), relative emissions were calculated for the whole lifetime of the vehicle/infrastructure and then divided by its lifetime (10 to 35 years depending on the type of vehicle/infrastructure) to obtain annual relative GHG emissions.

Aside from the data provided by the applicant to the funds, ifeu used default values (e.g. emissions factors), which in majority were taken from the transport emission model TREMOD.[2]

Annual air pollutant emissions reduced/avoided
Relative air pollutant (NO_x, particular matter, CO and non-methane volatile organic compounds) emissions were calculated similarly to relative GHG emissions with the difference that only direct (tank-to-wheel) emissions were considered, as the negative effect of air pollutants mostly occurs locally.

Methodology paper
KfW and the ifeu institute have published the detailed methodology on assessing the environmental impacts of KfW’s financing in the area of Clean Transportation.

1 A business-as-usual scenario describes what would happen without KfW’s financing of a project.

2 The emission calculation model TREMOD maps motorised traffic in Germany with regard to its transport performance, mileage, energy consumption and the associated greenhouse gas and air pollutant emissions for the period 1960 to 2023 and in a trend scenario up to 2050. TREMOD has been developed by ifeu on behalf of the German environmental agency (UBA) since the 1990s.

2023 Overview
Issuances, use of proceeds and impact

Issuances including re-openings in 2023

KfW Green Bond	ISIN	Coupon p.a.	Valuta	Maturity	Volume in millions	Net Proceeds in EUR millions
EUR 2023/2033	XS2586942448	2.75 %	14 Feb 23	14 Feb 33	EUR 3,000	2,969
CNY 2023/2026	XS2590582529	2.90 %	24 Feb 23	24 Feb 26	CNY 1,500	205
NOK 2023/2027	XS2563353957	3.37 %	24 Mar 23	02 Dec 27	NOK 1,500	134
HKD 2023/2024	XS2615922585	3.60 %	26 Apr 23	26 Apr 24	HKD 200	23
AUD 2023/2028	AU3CB0299477	3.80 %	24 May 23	24 May 28	AUD 650	397
EUR 2023/2030	XS2626288760	2.75 %	24 May 23	15 May 30	EUR 3,000	2,990
CNY 2023/2027	XS2645250718	2.45 %	06 Jul 23	06 Jul 27	CNY 275	35
GBP 2023/2031	XS2649518953	4.88 %	13 Jul 23	03 Feb 31	GBP 500	582
HKD 2023/2024	XS2650736460	4.50 %	17 Jul 23	17 Jul 24	HKD 200	23
HKD 2023/2024	XS2666985424	4.65 %	15 Aug 23	15 Aug 24	HKD 300	35
NOK 2023/2024	XS2671017874	4.25 %	20 Oct 23	30 Jan 29	NOK 3,000	262
NOK 2023/2029	XS2671017874	4.25 %	22 Aug 23	30 Jan 29	NOK 2,000	173
SEK 2023/2030	XS2677607132	3.50 %	06 Sep 23	24 Sep 30	SEK 1,000	84
CAD 2023/2028	XS2689093388	4.25 %	19 Sep 23	19 Sep 28	CAD 500	342
AUD 2023/2028	AU3CB0299477	3.80 %	20 Sep 23	24 May 28	AUD 450	264
EUR 2023/2031	XS2698047771	3.25 %	04 Oct 23	24 Mar 31	EUR 3,000	2,992
SEK 2023/2028	XS2703616255	3.63 %	13 Oct 23	31 Oct 28	SEK 2,000	172
NOK 2023/2029	XS2671017874	4.25 %	22 Aug 23	30 Jan 29	NOK 1,000	88
CNY 2023/2026	XS2590582529	2.90 %	01 Nov 23	24 Feb 26	CNY 250	33
EUR 2023/2032	XS2475954900	1.38 %	09 Nov 23	07 Jun 32	EUR 1,000	873
AUD 2023/2028	AU3CB0299477	3.80 %	15 Nov 23	24 May 28	AUD 200	118
USD 2023/2026	XS2721032758	4.81 %	17 Nov 23	17 Nov 26	USD 100	94

Allocation: All bonds are fully allocated

Distribution by category	
Energy efficiency	71.5 %
Renewable energy	27.1 %
Clean Transportation	1.5 %

Distribution by region	
Germany	95.7 %
Other OECD	4.3 %

	Absolute impact accounting for KfW's financing share	Impact per EUR 1 million investment
Annual greenhouse gas emissions reduced/ avoided (CO_2-equivalents)	**2,507,866** tons	**195** tons
Annual final energy savings	**457,602** MWh	**35.5** MWh
Annual renewable electricity generation	**4,511,547** MWh	**350** MWh
Renewable energy capacity added	**2,514** MWel	**0.20** MWel
Number of jobs created and/or preserved	**155,026** person years	**12** person years
Reduction of air pollutants:		
Annual NO_x emissions reduced	**65.4** tons	**5.077** kg
Annual PM emissions reduced	**0.8** tons	**0.065** kg
Annual CO emissions reduced	**16.7** tons	**1.292** kg
Annual NMVOC emissions reduced	**1.6** tons	**0.121** kg

Appendix

The independent economic research institutes ZSW, Prognos, FIW München, iTG Dresden and ifeu provided the respective evaluations which build the basis for this report:

ZSW: Dr. Bickel, P., Kelm, T.: Assessment of environmental and social impacts of the KfW loan programme “Renewable Energies – Standard” for the year 2023, Evaluation commissioned by KfW Group, Stuttgart, July 2024

Prognos AG/FIW München/iTG Dresden/ifeu: Dr. Heinrich, S., Langreder, N., Grodeke, A., Hoch, M., Jessing, D., Wachter, P., Maiwald, F., Empl, B., Dr. Winiewska, B.: Evaluation des Förderprogramms „Bundesförderung für effiziente Gebäude (BEG)“ in den Teilprogrammen BEG Einzelmaßnahmen (BEG EM), BEG Wohngebäude (BEG WG) und BEG Nichtwohngebäude (BEG NWG) im Förderjahr 2023

a) Förderwirkungen BEG WG 2023
b) Förderwirkungen BEG NWG 2023
c) Förderwirkungen BEG EM 2023

Im Auftrag des Bundesministeriums für Wirtschaft und Klimaschutz (BMWK), Basel/München/Dresden, Februar 2025

ifeu - institute for energy and environmental research Heidelberg: Allekotte, M., Colson, M., Spathelf, F.: “Methods Paper: Calculation of the Environmental Impact of KfW’s Clean Transport Projects”, Heidelberg, Mai 2025, in addition: case-based evaluation of Clean Transportation projects and aggregation of impact values on behalf of KfW. The case-based evaluation is publicly not available.

Exclusion List of KfW Group

Version 2, published on 14 December 2023

I. Exclusions

In the following areas KfW Group does not offer financing for new projects or purposes:[1]

1. Production or trade in any product or activity subject to national or international phase-out or prohibition regulations or to an international ban, for example
   - **i)** certain pharmaceuticals, pesticides, herbicides and other toxic substances (under the Rotterdam Convention, Stockholm Convention and WHO “Pharmaceuticals: Restrictions in Use and Availability”),
   - **ii)** ozone depleting substances (under the Montreal Protocol),
   - **iii)** protected wildlife or wildlife products (under CITES / Washington Convention),
   - **iv)** prohibited transboundary trade in waste (under the Basel Convention).
2. Investments which could be associated with the destruction[2] or significant impairment of areas particularly worthy of protection (without adequate compensation in accordance with international standards).
3. Production or trade in controversial weapons or critical components thereof (nuclear weapons and radioactive ammunition, biological and chemical weapons of mass destruction, cluster bombs, anti-personnel mines, enriched uranium).
4. Production or trade in radioactive material. This does not apply to the procurement of medical equipment, quality control equipment or other application for which the radioactive source is insignificant and/or adequately shielded.
5. Production or trade in unbound asbestos. This does not apply to the purchase or use of cement linings with bound asbestos and an asbestos content of less than 20 %.
6. Destructive fishing methods or drift net fishing in the marine environment using nets in excess of 2.5 km.
7. Nuclear power plants (apart from measures that reduce environmental hazards of existing assets) and mines with uranium as an essential source of extraction.
8. Prospection, exploration and mining extraction of coal; the production of gas by carbonisation of coal, transport and storage infrastructure essentially used for coal; power plants, heating stations and cogeneration facilities fired with coal, as well as associated stub lines.[3, 4]
9. Non-conventional prospection, exploration and extraction of oil from bituminous shale, tar sands or oil sands.
10. Prospection, exploration and extraction of natural gas (upstream), new construction of natural gas grids and pipelines, vessels for the laying of natural gas pipelines, LNG liquefying terminals as well as production facilities for grey hydrogen (steam reforming of fossil fuels, without the use of CCS).[5, 6]

II. Supplementary Requirements

In selected sectors, KfW Group ties its direct financial commitment for concrete new projects to the following qualitative conditions:[1]

1. Outside the EU and the OECD high income countries, large agricultural or forestry enterprises producing palm oil or wood must either comply with recognised international certification systems (RSPO or FSC) or equivalent regulations to ensure sustainable cultivation conditions or must be in the process of achieving compliance.
2. Large dam and hydropower projects use the recommendations of the World Commission on Dams (WCD) as orientation.[7]

1 Deviations can result from mandated transactions (Zuweisungsgeschäft) in accordance with § 2 (4) of the Law Concerning KfW, or from instructions of the relevant federal ministries.

2 “Destruction” means (i) the destruction or severe deterioration of the integrity of an area caused by a major and prolonged change in the use of land or water, or (ii) the alteration of a habitat which leads to the inability of the affected area to perform its function.

3 Investments in power transmission grids with significant coal-based power feed-in will only be pursued in countries and regions with an ambitious national climate protection policy or strategy (NDC), or where the investments are targeted at reducing the share of coalbased power in the relevant grid.

4 The exclusion does not apply to refineries for biobased products. In the case of refineries for predominant material use, investments in site concentrations (without net extension) and in the prolongation of the technical lifetime are not excluded. Reprocessing (re-refining) and energetic use of waste oil are still eligible for financing.

5 Measures for the reduction of greenhouse gas emissions or for increase of efficiency are generally eligible for financing provided that they do not take place in the prospection, exploration and extraction of oil and gas (upstream) and do not result in capacity extensions of more than 10 %. Financing of carbon capture and storage is also eligible for financing.

6 The exclusion of new construction of natural gas grids and pipelines does not include gas grids and pipelines for cooking purposes.
In accordance with the German government’s sector guidelines for export credit guarantees (Section Energy, Fossil energy sources: natural gas), further projects to develop new natural gas projects, as well as transport and storage facilities can be financed in special individual cases (after conducting an evidence-based review) until the end of 2025. Criteria to be met are the need for national security or geostrategic supply security interests, as well as compatibility with the 1.5 degree target and the ensurance of the avoidance of lock in effects.

7 Dams with a height of at least 15 meters measured from the foundation or dams with a height between 5 and 15 meters with a reservoir volume of more than 3 million cubic meters.

Exclusion List of KfW Group

Version 1, published on 1 July 2019

I. Exclusions

In the following areas KfW Group does not offer financing for new projects or purposes:[1]

1. Production or trade in any product or activity subject to national or international phase-out or prohibition regulations or to an international ban, for example
   - **i)** certain pharmaceuticals, pesticides, herbicides and other toxic substances (under the Rotterdam Convention, Stockholm Convention and WHO “Pharmaceuticals: Restrictions in Use and Availability”),
   - **ii)** ozone depleting substances (under the Montreal Protocol),
   - **iii)** protected wildlife or wildlife products (under CITES / Washington Convention)
   - **iv)** prohibited transboundary trade in waste (under the Basel Convention).
2. Investments which could be associated with the destruction[2] or significant impairment of areas particularly worthy of protection (without adequate compensation in accordance with international standards).
3. Production or trade in controversial weapons or critical components thereof (nuclear weapons and radioactive ammunition, biological and chemical weapons of mass destruction, cluster bombs, anti - personnel mines, enriched uranium).
4. Production or trade in radioactive material. This does not apply to the procurement of medical equipment, quality control equipment or other application for which the radioactive source is insignificant and/or adequately shielded.
5. Production or trade in unbound asbestos. This does not apply to the purc hase or use of cement linings with bound asbestos and an asbestos content of less than 20 %.
6. Destructive fishing methods or drift net fishing in the marine environment using nets in excess of 2.5 km.
7. Nuclear power plants (apart from measures that reduce environmental hazards of existing assets) and mines with uranium as an essential source of extraction.
8. Prospection, exploration and mining of coal; land-based means of transport and related infrastructure essentially used for coal; power plants, heating stations and cogeneration facilities essentially fired with coal, as well as associated stub lines.[3]
9. Non-conventional prospection, exploration and extraction of oil from bituminous shale, tar sands or oil sands.

II. Sectoral Guidelines

In selected sectors, KfW Group ties its direct financial commitment for concrete new projects to the following qualitative conditions:[1]

1. Outside the EU and the OECD high income countries, large agricultural or forestry enterprises producing palm oil or wood must either comply with recognised international certification systems (RSPO or FSC) or equivalent regulations to ensure sustainable cultivation conditions, or must be in the process of achieving compliance.
2. Large dam and hydropower projects use the recommendations of the World Commission on Dams (WCD) as orientation.[4]
3. Projects for non-conventional prospection, exploration and extraction of gas will disclose in accordance with international standards,
   - that no material groundwater drawdown or contamination is to be expected,
   - that measures for resource protection (in particular water) and recycling are taken,
   - that suitable technology is used for safe drilling, which includes integrated bore piping and pressure testing.

1 Deviations can result from mandated transactions (Zuweisungsgeschäft) in accordance with § 2 (4) of the Law Concerning KfW, or from instructions of the relevant federal ministries.

2 “Destruction” means (i) the destruction or severe deterioration of the integrity of an area caused by a major and prolonged change in the use of land or water, or (ii) the alteration of a habitat which leads to the inability of the affected area to perform it s function.

3 Investments in power transmission grids with significant coal-based power feed-in will only be pursued in countries and regions with an ambitious national climate protection policy or strategy (NDC), or where the investments are targeted at reducing the shar e of coalbased power in the relevant grid. In developing countries, heating stations and cogeneration facilities (CHP) essentially fired with coal can be co -financed in individual cases based on a rigid assessment, if there is a particularly high sustainability contribution, major environmental hazard s are reduced, and if there demonstrably is no more climate-friendly alternative.

4 Dams with a height of at least 15 meters measured from the foundation or dams with a height between 5 and 15 meters with a reservoir volume of more than 3 million cubic meters.

KFW

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