



Kreditanstalt für Wiederaufbau (KfW) Green Bond Second Opinion

May 7, 2019

Kreditanstalt für Wiederaufbau (KfW) is the promotional bank of the Federal Republic of Germany and a corporation under public law. While promotional activities are KfW's primary mandate, KfW also aims for sustainable development. From KfW's EUR 76.5 billion total commitment volume in 2017, 43% (EUR 33.2 billion) were dedicated to climate action and environmental protection related projects.

Overall, KfW's updated **green bond framework** from May 2019 provides a clear and sound framework for investments into projects that align with the green bond Principles (2018). The green bond framework lists eligible projects within the **renewable energy** and **energy efficiency** categories that promote the transition to low carbon, climate resilient growth and sustainable development in Germany. **An amount equal to the net proceeds will only be used to finance new eligible projects.**

KfW has in place a sound management and governance structure, as well as regular and transparent reporting about green bond project achievements to investors and the public. The overall assessment of the governance structure to support the implementation of the green bond framework gives it a rating of **Excellent**.

An amount equal to the net proceeds will be allocated to provide favourable loans for renewable energy projects and favourable loans as well as subsidies for the construction of new energy efficient buildings that are at least 25% more energy efficient than German regulations. All eligible projects are part of KfW's standard loan programmes "Renewable Energy – Standard" and "Energy-Efficient Construction". Despite not excluding fossil fuel heating, the share deviates from the German average usage of fossil fuel as a primary heat source in new buildings and can create a market movement toward fossil free heat sources.

Based on the overall assessment of the project types that will be financed by the green bonds, governance and transparency considerations, KfW's green bond framework receives a **Medium Green** shading. The framework would benefit from excluding fossil fuel based heat sources from their "Energy-Efficient Construction" programme, adding additional requirements for eligible new building loans such as low carbon transport access as well as construction material considerations.

SHADES OF GREEN

Based on the project category shadings detailed below combined with consideration of KfW's governance structure, we rate the KfW green bond framework **Medium Green**.

GOVERNANCE

Based on a qualitative assessment of three key governance factors, CICERO Shades of Green finds the governance procedures in this framework to be **Excellent**.



GREEN BOND PRINCIPLES (2018)

Based on this review, this Framework is found in alignment with the principles.



°CICERO
Medium Green



Contents

1	Terms and methodology	3
	Expressing concerns with 'Shades of Green'	3
2	Brief description of KfW's green bond framework and related policies	4
	Environmental Strategies and Policies:	4
	Use of proceeds:	4
	Selection:	6
	Management of proceeds:	7
	Reporting:	7
3	Assessment of KfW's green bond framework and policies	8
	Overall shading:	8
	Eligible projects under the KfW green bond framework	8
	<i>Background</i>	10
	Governance Assessment:	11
	Strengths	11
	<i>Governance</i>	11
	<i>Project Categories</i>	11
	Pitfalls:	12
	<i>Governance</i>	12
	<i>Project Categories</i>	12
	<i>Impacts beyond the project boundary</i>	13
	<i>Rebound effects</i>	13
	Appendix 1:	14
	Referenced Documents List	14
	Appendix 2: About CICERO Shades of Green	16



1 Terms and methodology

This note provides CICERO Shades of Green's (CICERO Green) second opinion of the KfW's green bond framework dated **May 1, 2019**. This second opinion remains relevant to all green bonds issued under this framework for the duration of three years from publication of this second opinion, as long as the framework remains unchanged. Any amendments or updates to the framework require a revised second opinion. CICERO Green encourages the client to make this second opinion publicly available. If any part of the second opinion is quoted, the full report must be made available.

The second opinion is based on a review of the framework and documentation of the issuer's policies and processes, as well as information gathered during meetings, teleconferences and email correspondence with the issuer. Second opinions are restricted to an evaluation of the mechanisms or framework for selecting eligible projects at a general level. CICERO Green is not responsible for an institution's implementation of a framework, nor does it guarantee or certify the climate effects of investments in eligible projects.

Expressing concerns with 'Shades of Green'

CICERO Green second opinions are graded dark green, medium green or light green, reflecting a broad, qualitative review of the climate and environmental risks and ambitions of the bonds. The shading methodology aims to provide transparency to investors that seek to understand and act upon potential exposure to climate risks and impacts. Investments in all shades of green projects are necessary in order to successfully implement the ambition of the Paris agreement. The shades are intended to communicate the following:

CICERO Shades of Green



Dark green is allocated to projects and solutions that correspond to the long-term vision of a low carbon and climate resilient future. Fossil-fueled technologies that lock in long-term emissions do not qualify for financing. Ideally, exposure to transitional and physical climate risk is considered or mitigated.



Medium green is allocated to projects and solutions that represent steps towards the long-term vision, but are not quite there yet. Fossil-fueled technologies that lock in long-term emissions do not qualify for financing. Physical and transition climate risks might be considered.



Light green is allocated to projects and solutions that are climate friendly but do not represent or contribute to the long-term vision. These represent necessary and potentially significant short-term GHG emission reductions, but need to be managed to avoid extension of equipment lifetime that can lock-in fossil fuel elements. Projects may be exposed to the physical and transitional climate risk without appropriate strategies in place to protect them.



Brown is allocated to projects and solutions that are in opposition to the long-term vision of a low carbon and climate resilient future.

Examples



Wind energy projects with a strong governance structure that integrates environmental concerns



Bridging technologies such as plug-in hybrid buses



Efficiency investments for fossil fuel technologies where clean alternatives are not available



New infrastructure for coal

Sound governance and transparency processes facilitate delivery of issuer's climate and environmental ambitions laid out in the framework. Hence, the governance aspects are carefully considered and reflected in the overall shading of the green bond framework. CICERO Green considers four factors in its review of an issuer's governance processes: 1) the policies and goals of relevance to the green bond framework; 2) the selection process used to identify and approve eligible projects under the framework, 3) the management of proceeds and 4) the reporting on the projects to investors. Based on these factors, we assign an overall governance grade: Fair, Good or Excellent.



2 Brief description of KfW's green bond framework and related policies

KfW is the promotional bank of the Federal Republic of Germany and a corporation under public law. 80% of the bank is owned by the Federal Government and 20% is owned by the Federal States. KfW maintains around 80 local offices globally and has around 6300 employees. While promotional activities are KfW's primary mandate, KfW also aims for sustainable development. The group's main operating subsidiaries are KfW IPEX-Bank GmbH (KfW IPEX-Bank), which provides project and export financing, and DEG (Deutsche Investitions- und Entwicklungsgesellschaft mbH) which promotes the private sector in developing countries and emerging economies. The promotional and financing activities of KfW are divided into domestic and international business. In Germany, KfW supports SMEs, municipal and private clients and supports the implementation of the "Energiewende" (energy transition) encouraged by economic incentives as prescribed in the Renewable Energy Sources Act (Erneuerbare-Energien-Gesetz). In 2017, about 2/3 of KfW's business activities took place in Germany.

Environmental Strategies and Policies:

KfW has developed a comprehensive set of policies and targets, has established group wide sustainability guidelines (e.g., the "Nachhaltigkeitsrichtlinien" and the "Nachhaltigkeitsleitbild") and a dedicated group of 20 employees that assesses environmental and social impacts of KfW financing. As the promotional bank of the Federal Republic of Germany it supports the climate and development goals of the German government. The issuer has a Sustainability Program 2018 that identifies financing of climate action and environmental protection as aspect of significant impact and business relevance that form the group's core business. KfW informed us that physical and transition risks are always part of the technical/financial risk assessment on project level and that a tool to evaluate climate risks for KfW's financial position is currently under evaluation. KfW is a registered supporter of the TCFD and is currently implementing TCFD into its processes with first results to be expected in 2019. KfW's Sustainability Guiding Principles stipulate the key strategic objectives, e.g., the commitment ratio of more than 35% of its total annual promotional business volume has to be dedicated to climate action and environmental protection. From KfW's EUR 76.5 billion total commitment volume in 2017, 43% (EUR 33.2 billion) were dedicated to climate action and environmental protection related projects.

In 2014 KfW launched its green bond program "Green Bonds – Made by KfW" and ranks among the largest issuers in green bond volume, globally. Since 2014, KfW has issued EUR 14.5 billion worth of green bonds. Up to today, an amount equal to the net proceeds were purely allocated to projects in KfW's "Renewable Energies - Standard" loan programme. In 2018, 83% of projects finance was allocated to wind and 16% to solar energy projects. Only 1% accounted for biogas/biomass, hydro and other technologies. In respect to the future share, the issuer informed us that only small changes are expected on an annual basis and that the bio-related share is expected to stay negligible. In terms of regions, 87% of the projects were located in Germany, France, Sweden and the Netherlands.

Use of proceeds:

An amount equal to the net proceeds will be used to provide financing or co-financing to new renewable energy projects or new green building projects within KfW's existing loan programs "Renewable Energies – Standard" (programme no. 270) and "Energy-Efficient Construction" (programme no. 153). Through these loan programmes, KfW offers favorable interest rates to support investments into renewable energy and residential building



efficiency. The issuer informed us that the green bond proceeds allocation is driven by the total demand of the respective programmes and, thus, will likely be consisting of around 20% for “Renewable Energies – Standard” and around 80% for “Energy-Efficient Construction”.

KfW’s “Renewable Energies – Standard” programme financing is dedicated to renewable energies for electricity generation, combined electricity and heat cogeneration (“KKW-Anlagen”) and measures to integrate renewable energy into the energy system. According to an external evaluation of KfW’s contribution to the German renewable energy development by the research institute “Zentrum für Sonnenenergie- und Wasserstoff Forschung Baden-Württemberg”, KfW’s investments in 2016 accounted for 40.1% of the total investments in plants for power and heat production from renewable energy sources in Germany. The external evaluation concludes that KfW’s programmes are considered particularly important for renewable electricity production as 44% of the renewable plants installed in Germany in 2016 received KfW programme financing. Financed renewable energy projects in Germany have to comply with the German Renewable Energy Sources Act (“Erneuerbare-Energien-Gesetz – EEG 2017, as amended) that defines subsidies and regulations for renewable energy technologies as well as project planning and installation measures.

The “Energy Efficient Construction” programme supports building and acquisition of new energy efficient residential buildings with low energy consumption and reduced carbon emissions. According to another external evaluation of KfW’s 2016 investments within the programmes “Energy Efficient Construction” and other building related programmes by the research institute “Forschungszentrum Jülich”, these programmes can be assigned a significant positive multiplier effect on public households contributing to internalizing external climate effects, supporting energy efficiency and closing the so-called Energy Efficiency Gap¹ for financing energy efficiency measures. The working group of the research institutes “Institut Wohnen und Umwelt GmbH (IWU)” and „Fraunhofer-Institut für Fertigungstechnik und Angewandte Materialforschung (IFAM)” concludes that the programme „Energy-Efficient Construction” has contributed financing to about 50% of a total of 317.000 apartment units built in 2016 in Germany.

In the “Energy-Efficient Construction” programme KfW offers an incentive reduction of 5-15% on the total principal (total amount on which interests are paid) depending on achieved KfW energy efficiency building standards in addition to favorable interest rates. For example, in case of a EUR 100.000 loan for a KfW40plus house (the highest building standard in the KfW methodology), the borrower would only have to repay EUR 85.000. The maximum yearly primary energy demand and heat transmission loss of the new building are to be calculated in accordance with the German Energy Efficiency ordinance (“EnEV”). For this green bond framework eligible efficient buildings are buildings that comply with the three highest KfW residential building standards (including passive houses) as defined over the German EnEV regulation as “KfW efficient building” (“KfW-Effizienzhaus”). This is stipulating a percentage relative to a comparable “standard” new building⁴ that constitutes the maximum of new building’s primary energy demand (as a ballpark figure: this primary energy demand limit has an approximate heating demand of 50-60kWh/m² according to EnEV based calculations² compared to an average heat consumption for residential buildings in Germany of 132kWh/m² in 2016³):

- KfW40plus (“KfW-Effizienzhaus 40 Plus”): **46.6%⁴ less primary energy than** EnEV regulation and eligible for a **15%** reduction on the total principal. The “Plus” package also demands the following four additional

¹ Gillingham, K., Newll, R. G. & Palmer, K. 2009, Energy efficiency economics and policy. Annual Review of Resource Economics, 597-619.

² <https://www.verbraucherzentrale.de/wissen/energie/energetische-sanierung/energieeinsparverordnung-enev-13886>

³ <https://www.umweltbundesamt.de/daten/private-haushalte-konsum/wohnen/energieverbrauch-privater-haushalte>

⁴ http://www.enev-online.com/enev_2014_volltext/enev_2014_anlage_01_anforderungen_wohngebaeude.pdf



features: installation of a renewable energy based electricity generation device; installation of a stationary battery storage system; installation of a ventilation system with heat recovery; and a visualization of electricity generation and consumption via a user interface in the respective housing unit.

- KfW40 (“KfW-Effizienzhaus 40”): **46.6% less primary energy than** EnEV regulation and eligible for a **10%** reduction on the total principal
- KfW55 (“KfW-Effizienzhaus 55”): **26.6% less primary energy than** EnEV regulation and eligible for a **5%** reduction on the total principal

In 2017, 82.1% of the residential buildings within the programme “Energy-Efficient Construction” achieved KfW55, 9.0% achieved KfW40 and 8.3% achieved KfW40plus. An independent and accredited energy efficiency expert has to be engaged for professional consulting and energy efficiency planning processes before construction phase. The energy efficiency expert delivers an energy efficiency confirmation as an attachment to the loan application (“Bestätigung zum Antrag”) and a confirmation of successful implementation of KfW financed energy efficiency measures after project completion and the achievement of the targeted efficiency level (“Bestätigung der Durchführung”).

Under this framework investments in energy efficient buildings are only eligible in Germany. Renewable Energy projects can be located in Germany or outside Germany if German companies, citizens or joint ventures with substantial German stake are involved. The maximum loan is restricted to EUR 50 million for renewable energy projects and EUR 100.000 per housing unit (acquisition of respective land is excluded from KfW financing). KfW does not directly grant loans, but grants loans to borrowers through banks, local saving banks (“Sparkassen”) or insuring companies. Borrowers have to apply for KfW financing through these financial institutions before starting the project, i.e., before commencing construction phase.

KfW excludes

- financing of plants for the generation of power or heat using fossil fuels;
- financing of plants for heat storage that are linked to power or heat generated on the base of fossil fuels;
- financing of any equipment for the use of nuclear power;
- refinancing of existing projects.

Selection:

The selection process is a key governance factor to consider in CICERO Green’s assessment. CICERO Green typically looks at how climate and environmental considerations are taken into account when evaluating whether projects can qualify for green bond funding. The broader the project categories, the more importance CICERO Green places on the governance process.

A two-step approval process applies as for each borrower first an intermediary approves the loan and then KfW. Loans will be extended to borrowers not directly by KfW, but by intermediaries, such as commercial banks, local saving banks (“Sparkassen”) or insurance companies – these financial institutions apply their regular loan procedure and assume the liability for repayment and screens against the respective programmes’ eligibility criteria. The issuer informed us that intermediaries receive ongoing training and advice for all loan programmes and audits are performed by the loan departments on a regular basis. Random test cases are requested on a monthly basis and occasion-related tests are carried out (e.g., if a building is not used exclusively for residential purposes).

KfW reviews the loan application, reviews compliance with the respective programmes’ eligibility criteria and, outside of the EU or High-Income-OECD countries, screens eligible green projects according to KfW’s environmental and social risk management frameworks that stipulate general environmental and social due diligence procedures regarding project appraisals. While in Germany, in the EU and in other High-Income-OECD



countries, KfW does not conduct further environmental and social impact assessments due to the high level of regulations and standards, all other countries are subject to KfW's lending department's assessments of possible negative environmental and social impacts. KfW informed us that no further committee is needed due to the completely standardized loan application process and the adherence to KfW's sustainability standards as well as the strict local environmental laws.

Management of proceeds:

KfW has a dedicated, segregated internal register for each calendar year where amounts matching requests for disbursements for eligible green projects are allocated on a monthly basis. An amount equal to the net proceeds of a green bond issuance is allocated to this internal register. The European Central Bank's exchange reference rate applies to non-EUR denominated bonds. KfW expects full allocation of proceeds by end of the year of issuance.

KfW's green bonds can be increased ("tapped"), which will be treated like a new issuance, which might lead to differences in reporting of use of proceeds and impacts of the bonds. The issuer informed us that until full allocation of the proceeds they are part of KfW's general liquidity management and since the green bonds' annual funding share is below KfW's annual sustainable financing share, the issuer confirmed these proceeds cannot be used for fossil fuel related investments.

Reporting:

Transparency, reporting, and verification of impacts are key to enable investors to follow the implementation of green bond programs. Procedures for reporting and disclosure of green bond investments are also vital to build confidence that green bonds are contributing towards a sustainable and climate-friendly future, both among investors and in society.

KfW will effectively report in two separate reports once for each year of issuance since green bonds will be issued according to the annual volume of new eligible green projects that are to be disbursed during the same year. The issuer informed us that the reports will be compiled by sustainability experts from KfW's treasury and group strategy departments. KfW informed us that these experts are active/executive members of various environmental associations and groups (e.g., Green & Sustainable Finance Cluster, UNEP FI, VfU etc.) as well as actively involved in regular programme effectiveness evaluation procedures and previous green bond issuances. The allocation report is prepared on a portfolio basis for each calendar year and shows aggregate data (no project-by-project data). The impact report covers a range of core impact indicators for the respective year on a portfolio level (no project-by-project data) and is in accordance with the Harmonized Framework for Impact Reporting. The impact report will also outline the used methodologies and assumptions. The two reports contain:

- **Allocation report:** Amount of allocated proceeds issued in the respective calendar year; the amount of unallocated proceeds issued in the respective calendar year, as the case may be; the breakdown by eligible category of the cumulated requests for disbursements of the respective calendar year; the breakdown by country of the cumulated requests for disbursements of the respective calendar year.
- **Impact report:**
 - Renewable Energy: Annual greenhouse gas (GHG) emissions reduced/avoided (tCO₂e); annual renewable energy generation (MWh); capacity of renewable energy added (MW)
 - Energy Efficiency: Annual greenhouse gas (GHG) emissions reduced/avoided (tCO₂e); annual energy savings (MWh)

The reporting will be available on KfW's website. In addition, KfW's programmes relevant for this green bond are subject to yearly external monitoring evaluations to assess the programmes' effectiveness to support the Federal Republic of Germany's ambition to increase the share of renewable energy as well as energy efficiency.



3 Assessment of KfW’s green bond framework and policies


The framework and procedures for KfW green bond investments are assessed and their strengths and weaknesses are discussed in this section. The strengths of an investment framework with respect to environmental impact are areas where it clearly supports low-carbon projects; weaknesses are typically areas that are unclear or too general. Pitfalls are also raised in this section to note areas where issuers should be aware of potential macro-level impacts of investment projects.

Overall shading

Based on the project category shadings detailed below, and consideration of environmental ambitions and governance structure reflected in KfW’s green bond framework, we rate the framework **Medium Green**.

Eligible projects under the KfW green bond framework

At the basic level, the selection of eligible project categories is the primary mechanism to ensure that projects deliver environmental benefits. Through selection of project categories with clear environmental benefits, green bonds aim to provide investors with certainty that their investments deliver environmental returns as well as financial returns. The green bonds Principles (GBP) state that the “overall environmental profile” of a project should be assessed and that the selection process should be “well defined”.

Category	Eligible project types	Green Shading and some concerns
Renewable Energy 	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 2017, as amended). This covers in particular the following project types: <ul style="list-style-type: none"> • Photovoltaic panels; • Wind energy (including both onshore and offshore wind mills); • Hydropower (excluding plants with an installed power exceeding 20MW); • Electricity and heat generated in combined heat and power stations from solid biomass (only up to a 	Dark Green <ul style="list-style-type: none"> ✓ Solar and wind power is key to a low-carbon transition ✓ Potential concerns regarding emissions from bio energy as well as concerns related to feedstock sourcing locations (e.g., Indonesia) and feedstock material (e.g., palm oil) ✓ Potential concerns regarding supply-chain emissions of financed energy generation technology (e.g., solar cell production) ✓ Consider potential emissions geothermal projects ✓ KfW informed us that physical and transitional risks are part of the technical and financial risk assessment in all regions



	<p>size of 2MW), biogas or geothermal;</p> <ul style="list-style-type: none"> • Biogas energy; • Grids and plants for the storage of heat or power, feed-in by renewable energy. 	<p>according to local authorities/regulations approval processes. There are no additional screenings.</p> <p>✓ All construction projects can have adverse local environmental impacts and materials (e.g., cement, steel, etc) as well as equipment use could be fossil-fuel intensive. The issuer informed us that life cycle assessments are not part of KfW's standard process.</p> <p>✓ Construction regulations for power plants outside Germany do not follow German regulations but are subject to local regulations (EU and High-income OECD countries) or KfW's standard project due diligence process (World Bank's Environmental and Social Impact Assessment (ESIA))</p>
--	--	--

Energy Efficiency



Construction of new energy-efficient buildings, including passive houses, which use 75% or less primary energy compared to the requirements of the current German energy saving ordinance for new buildings (EnEV 2016). Such buildings are compliant with the so-called KfW55/KfW40/KfW40plus standards.

Light to Medium Green

- ✓ KfW requires eligible buildings to be at least 25% more energy efficient than German regulations as defined in the EnEV 2016
- ✓ KfW provides an incentive to achieve higher energy efficiency standards by offering 5-15% reduction of the total principle depending on achieved building standards
- ✓ Focusing on energy efficiency alone lacks broader environmental considerations (e.g., water consumption, local environmental impact, construction material, public transport access etc)
- ✓ Buildings can include fossil fuel heating systems, such as oil & gas heating that represent an emission lock-in effect
- ✓ In a low-carbon 2050 perspective, the energy performance of buildings is expected to be improved, with passive and energy-contributing housing technologies becoming mainstream and the energy performance of existing buildings greatly improved through refurbishments.

Table 1. Eligible project categories



Background

Germany's long-term emission development strategy, as defined in its Climate Action Plan 2050⁵, aims to become "extensively greenhouse gas-neutral by 2050" and to cut GHG emissions by at least 55% by 2030 compared to 1990 levels. According to the Climate Action Plan 2050, the German Energiewende (energy transition) is supposed to expand renewable energies in Germany and reduce the energy sector's emissions by 61-62% by 2030 compared to 1990. For the building sector, the government intends to reduce emissions by 66-67% by 2030 compared to 1990. Emissions through burning of fossil fuels from private households have decreased from 129 million metric tonnes in 1990 to 90 million tonnes in 2016 and the average heat consumption for residential buildings amounted to 132 kWh/m² in 2016³. In Germany, heating systems are on average 18 years old and in 2016, 26.1% of the installed heating for residential buildings was provided by oil, 49.4% by gas⁶. In terms of number of added heating devices in 2016 in Germany, according to the Bundesverband der Deutschen Heizungsindustrie e.V., 76% were gas based, 10.3% oil based, 3.3% biomass based and 11.5% were heat pumps.⁷ According to the IWU/IFAM report's sample assessment of new residential buildings supported by KfW's "Energy-Efficient Construction" programme in 2017, between 64% (KfW55) and 91% (KfW40plus) of the buildings were heated with electricity (mostly electric heat pumps), between 4% (KfW40plus) and 16% (KfW55) were heated with gas and between 3% (KfW40plus) and 15% (KfW55) were heated with district heating. None of the new residential buildings that were part of IWU/IFAM's sample assessment used oil as a heating source.

In 2017, global renewable electricity generation grew 6% and reached a quarter of global power output, thanks to the continued growth of solar PV and wind technologies. Despite these positive trends (especially with PV), additional efforts are needed in renewable power generation to meet the targets set out in the IEA's SDS. According to the IEA, the share of renewables in global electricity generation must reach 47% by 2030, up from 25% in 2017.⁸ According to the AG Energiebilanzen e.V., gross German power production in 2018 was mainly based on renewables (34.9%), coal and lignite (33.4%), natural gas (12.9%) and nuclear (11.8%)⁹. Renewable energy is supposed to grow to 40-45% by 2025 – in parts supported through the German Renewable Energy Sources Act (Erneuerbare-Energien-Gesetz – EEG 2017)¹⁰. The primary energy consumption in 2018 is based on oil and gas (58%), coal and lignite (22.1%), renewables (14%) and nuclear (6.4%) and has decreased compared to 2017 for all energy sources except for renewable energy sources.⁹

In a low carbon 2050 perspective, the energy performance of buildings is expected to be improved, with passive house technology becoming mainstream and the energy performance of existing buildings greatly improved through refurbishments. Efficiency of building envelopes needs to improve by 30% by 2025 to keep pace with increased building size and energy demand – in addition to improvements in lighting and appliances and increased renewable heat sources.¹¹ Energy efficiency improvements in buildings are thus important building blocks towards reaching the 2°C goal. In addition to energy efficiency, CICERO Green assess if there is any screening for potential impacts from more extreme weather events, such as flooding. Flood risk for properties, is of particular concern in vulnerable geographic regions such as close to rivers or lakes. We also factor in if there have been any considerations around transportation solutions and environmental impacts in the construction phase of the building (building material and waste considerations). CICERO Dark Green shading is in particular difficult to achieve in the building sector because buildings have a long lifetime. CICERO Dark Green shading in the building sector

⁵ <https://www.bmu.de/en/topics/climate-energy/climate/national-climate-policy/greenhouse-gas-neutral-germany-2050/>

⁶ <https://de.statista.com/statistik/daten/studie/162218/umfrage/beheizungsstruktur-des-wohnbestandes-in-deutschland-seit-1975/>

⁷ <https://www.baulinks.de/heizung/heizungsmarkt.php>

⁸ <http://www.iea.org/tcep/power/renewables/>

⁹ <https://ag-energiebilanzen.de/>

¹⁰ <https://www.erneuerbare-energien.de/EE/Redaktion/DE/Standardartikel/EEG/eeg-2017.html>

¹¹ <http://www.iea.org/tcep>

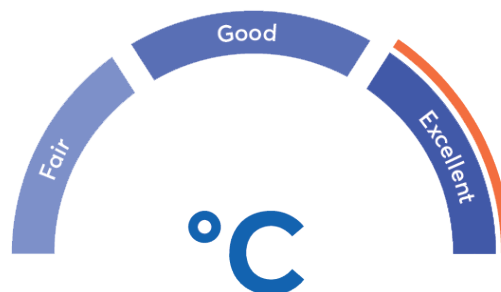


should therefore conform to strict measures and is reserved for the highest building standards, Zero-Energy buildings and passive houses that comply with a 2050 low-carbon perspective.

Governance Assessment

Four aspects are studied when assessing KfW's governance procedures: 1) the policies and goals of relevance to the green bond framework; 2) the selection process used to identify eligible projects under the framework; 3) the management of proceeds; and 4) the reporting on the projects to investors. Based on these aspects, an overall grading is given on governance strength falling into one of three classes: Fair, Good or Excellent.

KfW has in place a sound management and governance structure, as well as regular and transparent reporting about green bond project achievements to investors and the public. KfW has a variety of sustainability guidelines, screening procedures and ambitious targets regarding financial commitments to climate and environmental action. KfW has a transparent, efficient and standardized selection process in place and focuses on selected climate actions such as renewable energies as defined by the German Renewable Energy Sources Act (Erneuerbare-Energien-Gesetz) or energy efficiency. A two step selection process through KfW and an intermediary combined with KfW's standard procedures can effectively remove and avoid potentially controversial projects or projects that no longer meet the eligibility criteria. The overall assessment of the governance structure of KfW gives it a rating of **Excellent**.



Strengths

Governance

KfW has well-established governance and risk management procedures, extensive internal sustainability strategies and a large portion of its yearly commitments dedicated for environmental and climate action. As Germany's promotional bank, KfW is subject to annual external monitoring and assessments of the "Renewable Energies – Standard" and "Energy-Efficient Construction" programmes' effectiveness and impact on the environmental and climate goals set by the German government. This includes reporting on KfW's contribution to renewable energy uptake in Germany, development of achieved building energy standards, installed heating systems, fossil fuel involvement and a range of other climate relevant metrics. Since an amount equal to the net proceeds are directly used to finance loans via KfW's two programmes the selection and reporting process is also tied to the programmes transparent and standardized selection and reporting system. Two dedicated, separate green bond reports for each year of issuance ensure direct communication of allocation of green bond proceeds and impacts to investors.

Project Categories

In addition to renewable energy, KfW's updated green bond framework now also includes energy efficiency in newly constructed buildings. With KfW's transparent and standardized programmes KfW provides the financial groundwork necessary to support the German "Energiewende" (energy transition) in the green building as well as in the energy generation sector.

The "Energy-Efficient Construction" programme aims for large scale energy efficiency improvements across Germany targeting a large share of Germany's green building market. By exceeding Germany's energy efficiency regulations as stipulated by EnEV by more than 25%, KfW can effectively drive a large portion of the market toward ambitious increases in energy efficiency. The mandatory involvement of external and certified energy efficiency experts in the potential borrower's building design phase as well as the external certification after project



completion is a best practice example ensuring compliance with the eligibility criteria of the programme. According to an independent monitoring report by IWU/IFAM, installed heat sources are largely based on electricity. It is a strength, that while the average of newly installed heat sources in Germany is by 76% based on gas, only 16% of the new buildings supported by KfW are based on gas. Despite the involvement of fossil fuel heat sources, this can be seen as a clear strength as it significantly deviates from the German average usage of fossil fuel as a primary heat source in new buildings and effectively can create a market movement toward fossil free heat sources.

It is a clear strength that the “Renewable Energy – Standard” programme is aligned with the German Renewable Energy Sources Act (Erneuerbare-Energien-Gesetz – EEG 2017, as amended). Wind energy, the largest portion of KfW’s current green bond portfolio, is a key renewable energy source to achieve the German Energiewende. The combination of energy efficiency and renewable energy in KfW’s green bond framework is especially relevant for KfW’s green ambition as 2/3 of KfW supported new buildings are heated with electricity while Germany’s current electricity grid emissions are 417gCO₂/kWh¹², which is higher than for natural gas. KfW, therefore, supports the progress toward a 2050 solution where heating is fossil free and the grid is decarbonized.

CICERO Green views the update of KfW’s green bond framework from 2015 and the inclusion of energy efficiency as a project category in the framework as a clear strength. Considering the ambition to support the achievement of Germany’s climate goals, the relevance and scale of KfW as a financing source for low-carbon infrastructure and possible spill-over effects for the German market, the level of energy efficiency ambition exceeding local regulations by more than 25%, this framework qualifies as bridging toward a low-carbon society in the German regional context and, therefore, for a CICERO Medium Green shading.

Weaknesses

We find no material weaknesses in KfW’s green bond framework.

Pitfalls

Governance

The adaptation to climate change is vital for infrastructure investments. KfW informed us that life cycle assessments are not part of KfW’s standard processes and that resilience assessments are performed by intermediaries in Europe and High-Income OECD countries as part of their standard processes without any specific requirements from KfW. CICERO encourages the issuer to consider a closer assessment of resilience and adaptation efforts in all regions and be transparent on climate risk exposure to investors through TCFD reporting.

Project Categories

With regards to the renewable energy project category, CICERO Green notes that KfW can also finance geothermal or bio-based energy production. The German Renewable Energy Sources Act explicitly subsidizes these technologies to achieve the German Energiewende. However, these technologies bare risks in terms of local water quality, pollutants from geothermal fluids, GHG emissions, feedstock sourcing locations and general feedstock material considerations (e.g., palm oil etc). KfW informed us that controversial projects such as palm oil plantations cannot be financed. An additional project exclusion list as well as sector guidelines will enter into force in July 2019. Geothermal energy can be a significant source of emissions, with some plants generating higher GHG emissions than fossil fuel equivalents. In order to be considered net environmentally positive, standards call

¹² https://www.climate-transparency.org/wp-content/uploads/2019/01/BROWN-TO-GREEN_2018_Germany_FINAL.pdf



for new and existing geothermal projects to have direct emissions of less than 100g CO₂/kwh¹³. However, in Germany the risks associated with geothermal energy are mitigated by strict environmental regulations and oversight as well as the low number of financed projects in KfW's current green bond portfolio. The framework would benefit from a more detailed due diligence process in order to avoid potential negative environmental effects as well as by requiring application of German project standards globally.

With regards to the energy efficiency project category, CICERO Green notes that KfW lacks broader environmental considerations regarding construction of new energy efficient buildings. Except for the KfW40plus certification, KfW does not have any additional requirements on new buildings beyond energy efficiency targets. While energy efficiency improvements are considered crucial to achieve the 2 degree target from the Paris Agreement, they do not guarantee a low climate impact. Remote building locations, inappropriate building materials and climate resilience screening (e.g., flooding, erosion, etc) can manifest as clear pitfalls. KfW informed us that physical and transitional risks are part of the technical and financial risk assessment in all regions according to local authorities/regulations approval process and that there are no additional screenings. This especially important, as extreme weather events, in combination with sea level rise in coastal areas, in addition to increases in heavy precipitation and flooding in urban areas, have already been observed and are expected to increase across the range of climate scenarios explored in the IPCC 4th Assessment Report.^{14,15}

KfW does not exclude financing of fossil fuel related heating infrastructure for residential buildings, which can lead to a substantial risk of emission lock-in due to the long lifetime of newly constructed and energy efficient buildings. These do represent important short-term emission reductions, but do not ultimately transition to alternative fuel sources, and could have associated rebound effects. Despite the fact that oil has not been a relevant heat source in 2017 and gas has been a heat source for less than 16% of financed new residential buildings, they both represent a potential risk of lock-in of emissions. By focusing solely on energy efficiency targets, the actually achieved heating system GHG emissions can vary from energy plus zero emission buildings to energy efficient buildings with an oil based energy consumption of up to 45kWh/m² and substantial GHG emissions.

In order to address some of these pitfalls, KfW's framework could, e.g., benefit from excluding fossil fuel based heat sources from their "Energy-Efficient Construction" programme or promote alternative heat sources (e.g., heat pumps), adding additional requirements for eligible new building loans such as public transport access and electric charging facilities as well as construction material considerations.

Impacts beyond the project boundary

Due to the complexity of how socio-economic activities impact the climate, a specific project is likely to have interactions with the broader community beyond the project borders. These interactions may or may not be climate-friendly, and, thus, need to be considered with regards to the net impact of climate-related investments.

Rebound effects

Efficiency improvements may lead to rebound effects. When the cost of an activity is reduced there will be incentives to do more of the same activity. From the project categories in Table 1, an example are more energy efficient fossil fuel heating systems, which generally could lead to an overall increase of fossil fuel based energy consumption. KfW should be aware of such effects and aim to avoid green bond funding of projects where the risk of rebound effects is particularly high.

¹³ <https://www.climatebonds.net/standard/geothermal>

¹⁴ Shades of Climate Risk, CICERO 2017 (<https://cicero.oslo.no/en/climateriskreport>)

¹⁵ Flood Risk for Investors, CICERO 2018 (<https://www.cicero.oslo.no/en/posts/news/half-of-flooding-damage-left-uninsured>)



Appendix 1: Referenced Documents List

Document Number	Document Name	Description
0	KfW green bond framework May, 2019	KfW's green bond framework
1	Promoting perspectives – empowering people: GRI Report 2017 including non-financial statement	KfW's GRI Report 2017
2	Sustainability Guideline: Assessment of Environmental, Social and Climate Performance: Principles and Processes, April 2016	Guide to assess KfW's measure regarding environmental, social and climate impacts
3	Merkblatt Erneuerbare Energien: KfW-Programm Erneuerbare Energien „Standard“, May 2018	Defines eligible and excluded projects and investors within KfW's Renewable Energy program "Standard"
4	Merkblatt Energieeffizient Bauen: Bauen, Wohnen, Energie sparen, November 2018	"Merkblatt" defining eligible projects for energy efficiency for green buildings
5	Anlage zum Merkblatt Energieeffizient Bauen: Technische Mindestanforderungen, April 2018	Annex to the "Merkblatt" defining the technical minimum requirements for energy efficiency for green buildings
6	Infoblatt Energieeffizient Bauen und Sanieren – Wohngebäude: Liste der Technischen FAQ, October 2018	List of frequently asked questions (FAQ) regarding energy efficient buildings and refurbishment of residential buildings
7	Gesetz für den Ausbau erneuerbarer Energien (Erneuerbare-Energien-Gesetz - EEG 2017)	German Renewable Energy Sources Act



8	Energieeinsparverordnung (EnEV 2016)	German energy saving ordinance describing the minimum requirements on energy use
9	Evaluierung der inländischen KfW-Programme zur Förderung Erneuerbarer Energien in den Jahren 2015 und 2016, November 2017	Evaluation of KfW-program to promote renewable energies in Germany for 2015 and 2016
10	STE Research Report: Wirkungen der KfW-Programme „Energieeffizient Bauen“, „Energieeffizient Sanieren“, „IKK/IKU – Energieeffizient Bauen und Sanieren“ und „KfW-Energieeffizienzprogramm – Energieeffizient Bauen und Sanieren“ auf öffentliche Haushalte im Förderjahr 2016, January 2018	Evaluation of KfW-programmes “Energy Efficient Construction” and others to promote 2016
11	Monitoring der KfW-Programme „Energieeffizient Sanieren“ und „Energieeffizient Bauen“ 2016 by IWU/IFAM, February 2018	Monitoring of KfW-programmes “Energy Efficient Refurbishment” and “Energy Efficient Construction” 2016 by IWU/IFAM
12	Green Bonds: Working Towards a Harmonized Framework for Impact Reporting, December 2015	Impact reporting guideline developed by a group of multilateral development banks
13	KfW im Überblick – Zahlen und Fakten	Overview, facts and figures of KfW activities
14	Nachhaltigkeitsleitbild der KfW Bankengruppe, February 2019	KfW’s Sustainability Concept



Appendix 2: About CICERO Shades of Green

CICERO Shades of Green (CICERO Green) is a subsidiary of the climate research institute CICERO. CICERO is Norway's foremost institute for interdisciplinary climate research. We deliver new insight that helps solve the climate challenge and strengthen international cooperation. CICERO has garnered attention for its work on the effects of manmade emissions on the climate and has played an active role in the UN's IPCC since 1995. CICERO staff provide quality control and methodological development for CICERO Green.

CICERO Green provides second opinions on institutions' frameworks and guidance for assessing and selecting eligible projects for green bond investments. CICERO Green is internationally recognized as a leading provider of independent reviews of green bonds, since the market's inception in 2008. CICERO Green is independent of the entity issuing the bond, its directors, senior management and advisers, and is remunerated in a way that prevents any conflicts of interests arising as a result of the fee structure. CICERO Green operates independently from the financial sector and other stakeholders to preserve the unbiased nature and high quality of second opinions.

We work with both international and domestic issuers, drawing on the global expertise of the Expert Network on Second Opinions (ENSO). Led by CICERO Green, ENSO contributes expertise to the second opinions, and is comprised of a network of trusted, independent research institutions and reputable experts on climate change and other environmental issues, including the Basque Center for Climate Change (BC3), the Stockholm Environment Institute, the Institute of Energy, Environment and Economy at Tsinghua University and the International Institute for Sustainable Development (IISD).

