

GLOBAL ECONOMIC GOVERNANCE

National Development Banks and Sustainable Infrastructure; the case of KfW

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INTRODUCTION

KfW was initially founded in 1948 to finance the reconstruction of war-torn Germany after World War II. The initial capital of the KfW was financed by Marshall Plan resources, provided by the US government. Additional expansions of capital have been basically funded from profits of KfW itself which reflects the efficiency with which it operates, and the high commercial, as well as developmental, quality of its loans.

KfW has expanded significantly over the years, both in Germany and internationally. It has become the second largest commercial bank in Germany. Its large scale and its function as a German government instrument to implement a clear energy strategy has allowed it to play a key role in Germany to finance major energy transformation in the country and one of the most important energy transformations in Europe (known as Energie wende).

Domestically KfW promotional (German term used for developmental) activities comprise the financing of Small and Medium Enterprises (SMEs), startups (primarily investments including innovation, as well as climate and environmental protection within companies, such as renewables and energy efficiency), private customers (including energy-efficient construction and refurbishment of residential buildings,

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renewable energy, barrier-free housing and educational finance), as well as municipalities to finance communal infrastructure and environmental protection. Furthermore it acts as agent for different agencies of the German Federal Government (see Table 1).

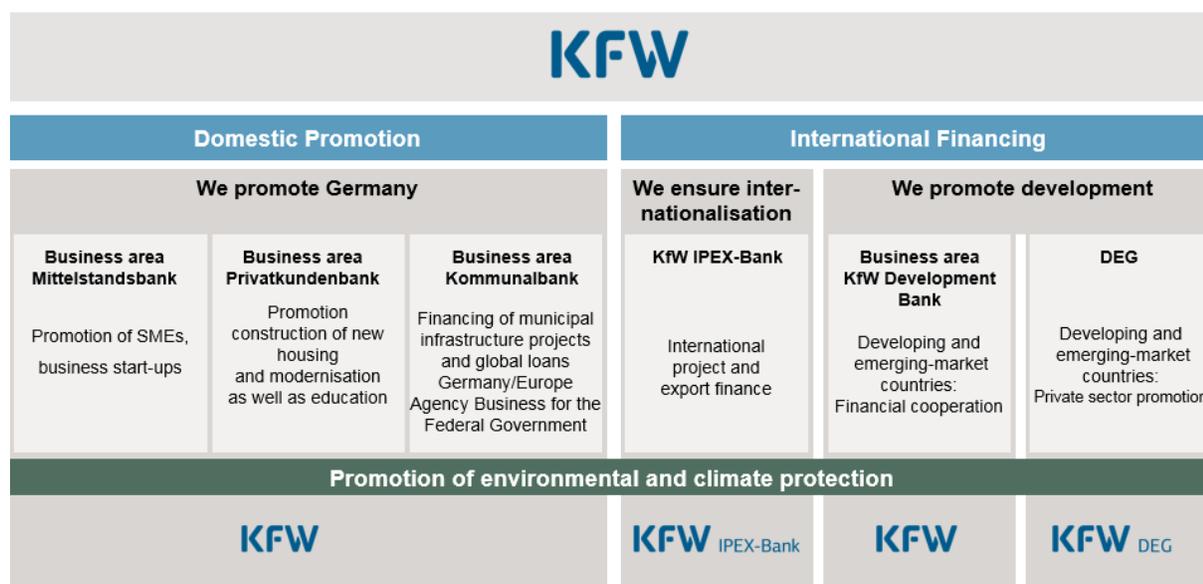
KfW is also playing a major international role, together with other development banks, in funding green investment in the rest of Europe, and in emerging and developing countries. Internationally, KfW Group comprises the bilateral “KfW Development Bank” and the subsidiary “Deutsche Investitions- und Entwicklungsgesellschaft“ (DEG). KfW Development Bank carries out Germany’s bilateral public Financial Cooperation and finances public investment in developing and emerging countries), DEG promotes private sector development in developing and emerging economies) and finances exports and projects on commercial terms, along with its subsidiary IPEX. KfW’s international structure is shown in Table 1. KfW has around 70 offices and representations worldwide, so it has a large presence on ground in many developing and emerging economies. It is interesting it does not have additional offices in Germany since it operates mainly through commercial banks within the country.

KfW refinances its lending activities mainly in the international money and capital markets. The main currencies in which it borrows are US dollars and euros, though it also uses other currencies. It benefits from a statutory guarantee of the German Government and associated top long-term ratings of AAA (from Fitch and Standard & Poor’s) and Aaa (from Moody’s). This allows KfW to issue bonds at the most favorable terms and thereby lend at favorable terms. The main investors who buy KfW bonds are institutional investors, followed by retail investors. In 2014 its refinancing volume reached \$ 65.44 bn.

Funds from the financial markets are supplemented by budget funds from the German Government for activities requiring an additional subsidy, i.e. a higher concessions, such as innovation and startup finance and development assistance. (Povel, 2015 and interview material).

KfW Group holds assets worth \$558 bn (in 2014) making it one of the largest development banks in the world.

Table 1: KfW structure



Source: KfW

In 2014 the Group committed a total of \$84.5 bn (see table 2). To put this figure into perspective, this is about 40% more than total commitments of the World Bank Group. Table 2 also allows us to see the scale of operations of its different entities, with \$54.3 bn of commitments for financing German domestic development, of which \$12.4 bn for SME finance and \$31.6 bn for private customers and municipalities; with \$29.1 bn for international activities, of which IPEX represents \$18.9 bn, KfW Development Bank represents \$7.4 bn, and DEG represents \$1.7 bn.

Table 2: Business activities of KfW Group in 2014 (commitments in billion USD)

Domestic business	promotional	SME finance	22.7
		Private customers and municipalities	31.6
		Subtotal	54.3
International business		IPEX	18.9
		KfW Development Bank	8.4
		DEG	1.7
		Subtotal	29.1
Business sector capital markets			1.4
TOTAL			84.5

Source: Povel (2015)

An important distinction is that KfW Development Bank lends and invests mainly through governments and national development banks in emerging and developing countries, whereas DEG channels funds to developing and emerging economies through the private sector comparable to the International Finance Corporation (IFC).

DEG, as well as the part of KfW in Germany, do much of their lending and investing through

private financial intermediaries called ‘global loans’. As we will discuss below, this is increasingly common and has become an important share of lending amongst many development banks, including for green lending. In the case of green lending, there has been a shift in lending by development banks from big fossil fuel companies to lending to smaller renewable consumers and households (see Bhattacharya, et al, 2015). The fact that development banks like KfW among others, do so much of their lending indirectly through intermediaries pose new challenges in terms of channeling their activities to green lending and monitoring environmental standards. It should be emphasized that KfW, in its different international parts, collaborates closely with other development banks. For example KfW Development Bank often collaborates and co-funds with the World Bank, European investment Bank and other regional development banks. Similarly DEG collaborates, and often co-funds projects and loans with other bilateral European DFIs, such as FMO, AFD, and IFC.

This means that though there are differences in these banks’ policies and mechanisms, there are also many common features, which is important in the context of this project. One example, which we will discuss in some detail below are environmental standards. Here often, common standards, such as those based on OECD-DAC guidelines, World Bank or IFC standards, are applied across the board; the aim of this is to avoid a “race to the bottom” in the implementation of environmental standards by different development banks competing with each other (interview material).

However, there are some challenges, for example in monitoring environment standards, where the World Bank has greater independent outside monitoring, whilst KfW Development Bank relies more on independent Divisions in the institution; as well as in broader issues, such as policy towards fossil fuels. Indeed, on the latter, according to interviews, KfW has a clearer negative policy towards lending or investing in fossil fuels than other development banks.

More broadly, one of the key features of the KfW, both domestically and internationally, has been that much of its lending has been driven by a strategic direction given by the German government. Thus KfW Germany played a major role in funding East Germany, post unification.

In particular, KfW plays a key role, domestically and internationally, in supporting energy revolution, through funding major investments in renewable energy and in energy efficiency. In the national German case, this was to a large extent implemented within a clear institutional and policy framework, namely the renewable energy law, through strong policy measures, such as feed in tariffs (FITs) and reverse competitive auctions, which made investment in renewables commercially attractive. A similar modus operandi existed for energy efficiency (Interview material). The combination of clear government policies and associated development bank targets has produced very positive results in green infrastructure in Germany, which can be replicated in emerging and developing countries.

KfW is estimated to have covered at least one third of total funding of the green transformation in Germany. However, in some years the proportion has been even higher; thus in 2012, KfW funded \$11.4 bn of renewable investment, which represented over 50% of renewable investment in Germany, and as much as 90% of investment in on-shore wind and over 50% of solar PV in Germany (see Table 3).

Table 3:

»» **The Volume of KfW-Funded RE Investments in 2012 according to KfW Programmes**

	EE Standard		EE Premium		Total	
	million €	%	million €	%	million €	%
Biogas ¹⁾	291.1	3.1	15.3	3.1	306.3	3.1
Biomass	62.5	0.7	64.3	12.9	126.7	1.3
Geothermal	40.2	0.4	12.2	2.4	52.3	0.5
Large heat pump	-	-	0.9	0.2	0.9	0.0
Solar PV	5,682.7	59.9	-	-	5,682.7	56.9
Solar thermal	0.2	0.0	8.1	1.6	8.2	0.1
Heat grid	-	-	389.4	78.0	389.4	3.9
Heat storage	0.2	0.0	9.0	1.8	9.2	0.1
Hydro	25.7	0.3	-	-	25.7	0.3
Wind onshore	3,386.4	35.7	-	-	3,386.4	33.9
Total	9,488.8 ²⁾	100.0	499.1	100.0	9,987.9 ²⁾	100.0

Source: KfW (2013)

In the international context, German cooperation gives clear directives in the area of green finance, with a strong stimulus for renewable energy, and limiting, or practically forbidding, lending for fossil fuels. Though KfW actions follows guidelines set by the government, both nationally and internationally on green lending, it also develops its own initiative financial mechanisms, as well as other measures such as providing technical assistance, that help fulfill this role. These mechanisms are further discussed below. Furthermore, KfW plays an important role in monitoring environment standards, either by itself or working with independent consultants. Therefore, the KfW, though working in a German government framework, has contributed in a major way to the design, implementation, and financing of the green strategy in the international sphere.

Section II will provide empirical analysis of lending by KfW for infrastructure and sustainable infrastructure within Germany and globally. We will use the data provided by KfW staff to account for sustainable infrastructure as defined by the International Development Finance Club—a consortium of national development banks that have begun to work on this issue.

Section III will look at instruments used and projects funded by KfW, with special emphasis on innovative ones, including loans, equity, and guarantees. One area explored in this report is the extent and the mechanisms through which KfW leverages private sources of finance and crowds-in private sector actors into sustainable infrastructure projects. The extent to which KfW uses financial intermediaries, especially in the case of KfW Germany and DEG, and its collaboration with other development banks will be analyzed in this section. The analysis in this and other sections will rely on extensive interviews carried out by the author with KfW staff, as well as on literature and material available on KfW website and special material provided by KfW staff.

Section IV looks in some detail at the issue of environmental standards in different parts of KfW.

Section V will examine policy lessons and implications for expanding these activities within KfW, for example in the rest of Europe, and in emerging and developing countries. Given the importance and urgency of a major transformation in infrastructure towards a greener one, the strong case for a significant expansion of development banks, such as KfW development bank and DEG, will be made especially for low-income countries. Furthermore, the case for creating or expanding development banks in both developing and developed countries, as well as their lending for sustainable infrastructure will also be made. Lessons from KfW, that are mainly positive but also include possible problems, for other development banks will be discussed in some detail.

II Green lending by KfW

A. Green lending by KfW Germany

Total green finance by KfW Germany in 2014 was \$21.9 bn. This represented 40.3% of total lending by KfW Germany that year. Of this green finance in 2014, \$9.5 bn was lending to business, of which \$3.8 bn was for renewable energy. \$12.4 bn was for communal and private clients, of which energy efficiency in housing was \$3.4 bn.

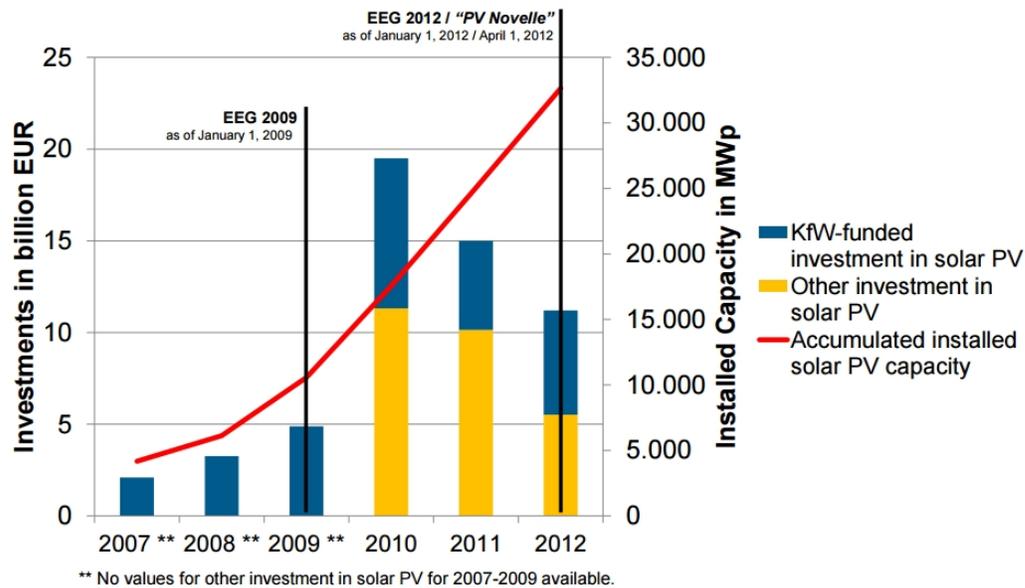
It is important to note the key role that KfW played in the initial phase of introduction of Solar PV to Germany. In fact, KfW funded all the investment in Solar PV during 2007-2009 in Germany, when solar PV began to be introduced in major scale to Germany, as shown in Graph 1. Therefore, KfW played a crucial role in introducing Solar PV investment in Germany, with its role then diminishing as other funding sources stepped in.

Such a catalytic role is precisely what a development bank should do to kick-start a major structural transformation by funding and show-casing new technologies and sectors. Thus KfW

Germany successfully crowded-in private financing, and 2010 onwards at least half of the new investment in Solar PV came from private or other non-KfW sources (see Graph 1).

Graph 1:

»» **Development of Investments in Solar PV and the Accumulated Installed Solar PV Capacity in Germany**



Source: KfW, 2013 in EUR

Domestically, KfW does not engage in project financing but reaches out to the mass-market through financial intermediaries (“Hausbankprinzip”). The financial intermediary has both a contract with KfW specifying the terms of the loan and with the client. The financial intermediary selling the KfW product fully bears the credit risk (Interview material). The exceptions to this practice of working through financial intermediaries are a few large programs, including the KfW Offshore Wind Energy Program. Details on this and specific other programs are given in Appendix 1.

KfW Germany can co-finance its programs with commercial banks’ own lending; however, it does not have to co-finance with private banks, and in some cases can lend up to 100% (Interview material). In this aspect, it is different from other development banks; for example the European Investment Bank typically should finance no more than 50% of a project, with the rest being provided by private commercial banks or private investors.

As can be seen in the figures above, KfW Germany has played an important role in financing increased energy efficiency especially in residential housing. This is for constructing new and refurbishing existing housing. This is done within the legal framework for energy efficiency with clearly defined standards verified by an energy efficiency consultant for each individual home. A

KfW lending facilities consist of loans up to 10 years maturity, with subsidized interest rates and limited debt relief, both for constructing new homes, with loans up to \$57000, and for refurbishment of existing houses, with loans up to \$85500 (KfW,2012). Such subsidized KfW loans are channeled through commercial banks, where they are often combined with mortgage loans provided by the commercial bank.

The programs KfW Germany offers have been developed a) on demand from the government which often includes a government subsidy or b) by KfW teams based on their assessment of the market. Government approval is needed for KfW programs through the Ministry for the Environment and the Ministry for Economic Affairs and Energy. A main financing instrument of KfW is the provision of loans at cheaper interest rates, facilitated by KfW's triple A credit rating which allows them to cheaply mobilize funds from capital markets and through targeted subsidies funded by the government. Details of the different features of lending in different programs is provided in Appendix 1.

Green bonds are an important instrument and attractive to investors because of their green earmarking. KfW wanted to be among the first in this important market in different currencies. Funds mobilized through green bonds are naturally transferred towards green programs. The first 'Green Bond – Made by KfW' was issued in 2014 with a volume of \$1.7 bn and became the largest Green Bond ever at the time of issuance. It has a maturity of 5 years and pays an annual coupon of 0.375%. Following the massive interest by investors, the order-book grew rapidly reaching \$3.02 bn within a short period of time. This implied that the KfW Germany green bond was greatly over-subscribed.

With the 'Green Bond – Made by KfW', KfW directly connected its financing of climate protection projects and the capital market. Investors benefit from the high credit and sustainability ratings as well as from the liquidity of KfW bonds and simultaneously support climate and environmental protection. The bond proceeds are linked to KfW's environment investment program, "Erneuerbare Energien" ("KfW Renewable Energies Programme – Standard" for details of this program see Table 4). Thus, it is transparent to the investors that their capital invested is used to finance projects for the of power generation especially from wind and photovoltaics.

Table 4:

»» KfW Renewable Energies Programme

“Standard“

Promotion of electricity from renewable energies

For whom?	<ul style="list-style-type: none">› German and non-German enterprises, self-employed professionals› Enterprises in which municipal authorities, churches or charities hold an interest› Private individuals and non-profit organisations which feed the generated electricity into the grid or which sell the generated heat
For what?	<ul style="list-style-type: none">› Electricity from solar energy (photovoltaic), biomass, hydropower, onshore wind power plants› Investments in low-voltage and medium-voltage power grids› Electricity and heat generated in combined heat and power stations
How?	<ul style="list-style-type: none">› Loan amount of up to EUR 25m› Financing of up to 100 %› Loan term of up to 20 years, up to 3 years repayment-free› Risk-based interest rate

Source: KfW (2013) In EUR

The positive and sustainable effects on the environment are certified by the independent, non-profit Center for Solar Energy and Hydrogen Research, Baden-Württemberg (ZSW). Furthermore, the qualified and independent research centre CICERO reviews and evaluates KfW’s Green-Bond-concept. These standards help convince many investors who wish to invest in green projects.

A note of caution should be raised here; it is somewhat unclear to what extent the funding that KfW Germany, or other similar institutions raise, are additional and cheaper to what they could have raised anyway on standard international capital markets. It is, however, of course true that green bonds raise funding from another category of investors-socially responsible investors, interested in channelling their savings to green projects; this is very positive as it adds to the investor base funding banks like KfW.

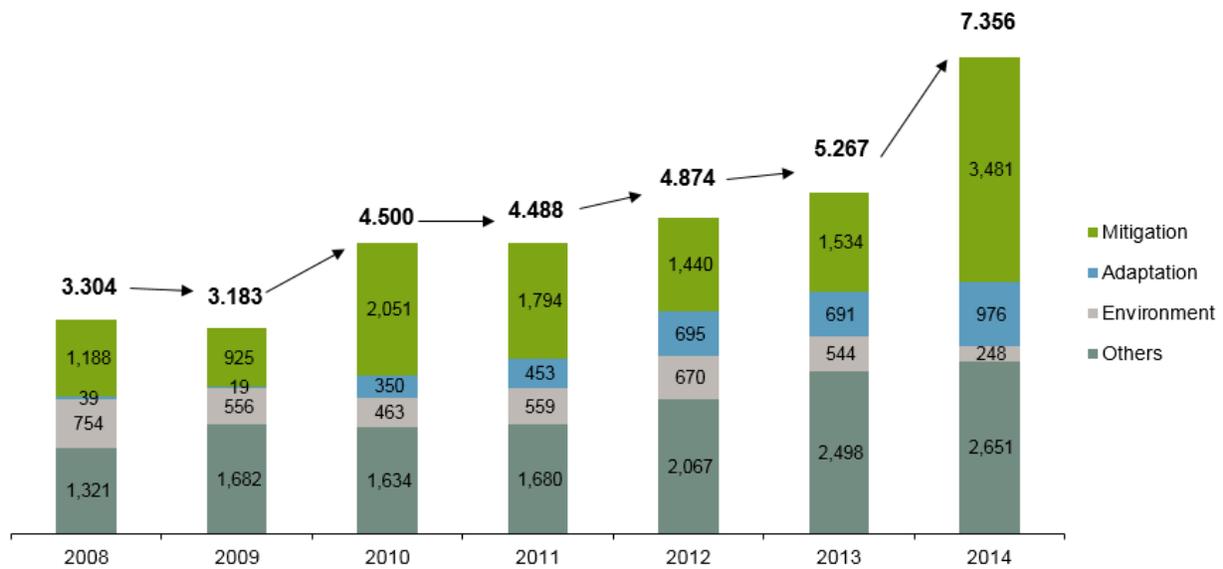
B. Lending by KfW development bank

As can be seen in Table 5, commitments for environment and climate are a large part of total lending by the KfW development bank to emerging and developing countries. By 2008 green lending had reached 60% of total KfW lending, and by 2014 it reached 64%. As the level of total KfW development bank commitments increased significantly, more than doubling in Euro terms between 2008 and 2014, the absolute value of commitments for environment and climate have increased rapidly. These amounts include commitments for mitigation, adaptation (which has been included since 2009) to climate change impacts, and the environment.

As Tables 5 and 6 show, the largest proportion of 2014 commitments for environment and climate went to mitigation, but there is also an important proportion going to adaptation. In regional terms, largest flows went to Asia/Oceania (27%), Latin America (23%) and North Africa and Middle East (21%). In terms of sectors, 60% went to energy and 11% went to water. It is interesting that only 10% of the loans went to financials for on-lending, meaning that most of KfW development bank green commitments is mainly done directly, unlike DEG and other development banks, which channel a large part of their resources through financial intermediaries.

Table 5:

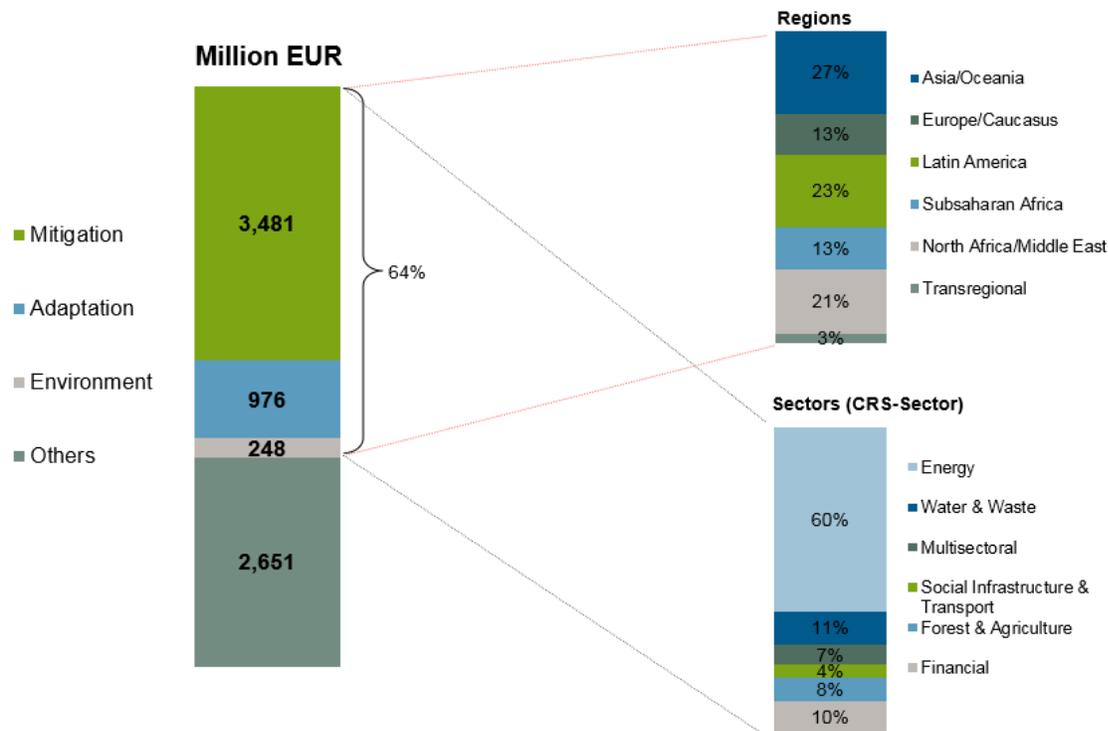
New total commitments made by KfW development bank for environment and climate: 2008 - 2014



In million EUR

Source: KfW (2015) In EUR

Table 6: Composition of commitments for environment and climate by KfW development bank - 2014, by sectors and regions



Source: KfW(2015) In EUR

KfW’s fossil fuel investments are close to zero and in this area the KfW Development Bank investments was almost insignificant for the last 5 years. There is however a large demand for the rehabilitation of power plants, combined heat and power (CHP) and district heating projects. KfW development bank finance an occasional gas power plants every two or three years (Interview material). KfW estimate that per year they fund no more than \$57-114 mn per year in fossil fuel investment, which is a very low number compared to total lending in 2014 for green finance of \$8.3 bn (see Table 3, above).

Restricting or eliminating funding for fossil fuels is a similar policy for all of KfW. However, it seems key to have an energy mix that provides continuous supply, because relying solely on renewables would be a risk for energy supply as renewable energy is intermittent, unless it becomes economically feasible to store or subsidies are made available for private investment in solar storage, which is the case for KfW lending in Germany. Thus German and non-German companies, as well as individuals, can get a repayment bonus from the German Ministry of the Environment of up to 30% of financeable costs for investment in storage of renewable energy.

More generally, there are limits to how much renewable energy is able to provide continuous supply, as back-up is needed when sun does not shine or the wind does not blow and until storage of energy becomes commercially attractive. This point is relevant for all lending by developing banks.

A further broad point, relevant for all of KfW but also for other development banks, especially in poor and emerging countries, is that it is important to significantly expand electricity access to poor, in addition to increasing the share of renewables and improving energy efficiency. Therefore, it is important that the cost of this energy is not excessive, so as not to burden poor households (Interview material).

C. DEG Lending and investing

Green finance from DEG in 2012 amounted to \$643 mn, which was 40% of total financial activity; in 2013, green finance was \$796 mn, representing 49% of total financial activity; in 2014 it reached \$787 mn, which represented 46% of total financial activity. It is interesting that over this period the levels of green finance provided exceeded the target level, so DEG is doing more in green finance than the government mandated target.

In terms of instruments, almost 55% of green finance activity by DEG in 2014 was in the form of loans, whilst the remainder 45.2% was in form of equity. This is different from KfW development bank, where loans are much more dominant. It is interesting that DEG is part of a network of European Development Finance Institutions (EDFI), which has 15 members from different countries. All these institutions focus on funding the private sector in emerging and developing countries. These institutions are quite closely coordinated and collaborate on joint projects and initiatives, including green finance, which is one of their priorities. This allows them to leverage their impact and reduce transactions costs. More specifically, working in such a closely associated network of European Development Finance Institutions, allows each of the institutions to have joint larger financing volumes, shared risks, harmonized standards, efficient joint due diligence, with one of the institutions often taking the lead per project, and joint work with other strong partners, such as the IFC and the European Investment Fund (EIF).

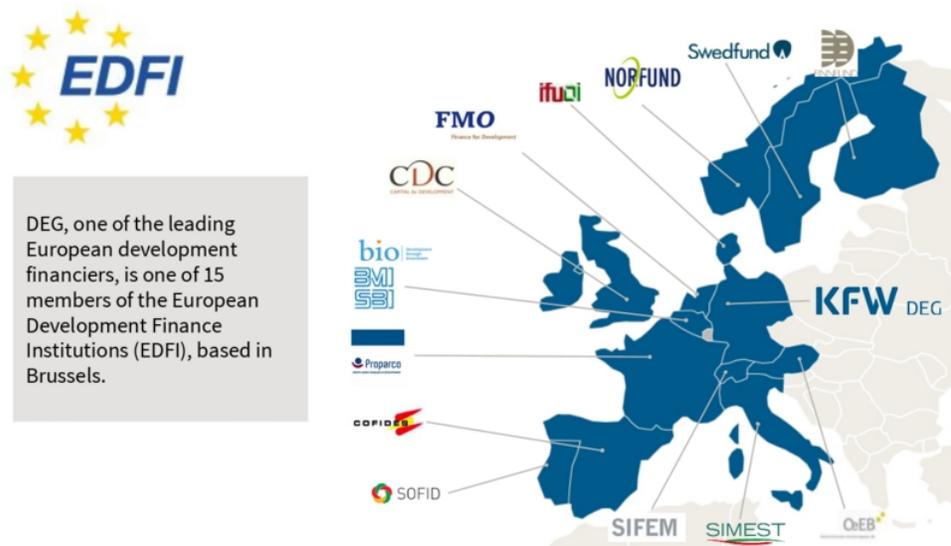
The 15 EDFI institutions had a total portfolio of \$37.5 bn in 2014 consisting of over 4000 projects. The 15 institutions are Bio from Belgium, CDC from the UK, DEG KfW from Germany, FINNFUND from Finland, FMO from Netherlands (with the largest individual portfolio), IFU from Denmark, Norfund from Norway, Oe EB from Austria, Proparco from France, SBI-BMI from Belgium, SIFEM from Switzerland, SIMEST from Italy, Sofid from Portugal, and Swedfund from Sweden (see Figure 2 for all the institutions and their country locations).

It may be of interest for other regions (e.g. Latin America, Africa and Asia) to think about creating closer networks of existing national development banks, which could include joint evaluation, funding and monitoring of projects, to achieve greater diversification, of portfolios and therefore risk, as well as larger scale of funding and lower transaction costs.

Figure 2:

»» Operating in a network

European Development Finance Institutions (EDFI)



Source: DEG

DEG does not have much exposure to fossil fuel investments; they financed the last coal power plant in the 1990s as DEG has clear guidelines not to invest in coal. DEG also does not directly finance investments in oil, but DEG has some indirect investments in diesel through private equity. All natural gas investments are in highly efficient plants with combined cycles.

III Instruments used for lending /investing; monitoring of standards

A list of different mechanisms used by different parts of KfW (but mainly by KfW Germany) can be found in Appendix 1. We now discuss approaches and mechanisms used by different branches of KfW.

A. KfW Germany

A key financing instrument of KfW is the provision of loans at cheaper interest rates facilitated by KfW's triple A credit rating which allows them to cheaply mobilize funds from capital markets and through targeted subsidies funded by the government (for a summary of the different elements that KfW can use to encourage investment in renewables and energy efficiency in Germany see Table 7; for details of the different features of lending in different programs see Appendix 1).

Table 7:

»» How to incentivize policy loan programmes?

Investor	Interest Rate Subsidy	Long term Maturity (e.g. 5, 10 or 20-year loans)	Amortization Grant (e.g. government contribution to loan repayment)	Technical Assistance Grant (e.g. for feasibility study)
On-lending Bank	Long term refinancing	Risk Sharing	Standardization	
Policy Bank	Capital market Position (AAA-Status)	Government Budget Funds	Regulatory Relief (e.g. debt to equity ratio)	Preferential Tax Regime (e.g. no profit tax)

Source: KfW(2013)

B. KfW development bank

Basic financial instruments used by KfW Development Bank are simple, some several centuries old. There seems to be no enthusiasm for complex financial engineering, but focus on good real engineering (Interview material). This emphasis on traditional and simple financial instruments is on the whole a very positive feature, which should, in broad terms, be adopted by other development banks. Financial complexity of instruments often implies high transaction costs; more importantly, it may hide future risks and potential contingent liabilities. The main instruments used are loans, representing approximately 70%, and grants, representing around 25%. The rest, which is small, is equity, guarantees, and mezzanine finance.

There are however important innovations, linked to needs for green finance in emerging and developing economies. One such innovation is GetFiT in Uganda (FiT means Feed in tariff, which is a standard instrument to promote investment in renewable energy), which has worked rather successfully in countries like Germany. Consequently, KfW and the German government are preparing to roll it out to other African countries beyond Uganda, e.g. Eastern and Southern Africa (Interview material).

GET FiT is designed to directly support FiTs in countries that already have them in place or are considering enacting them. Renewable energy policies are adapted for different countries,

including those with low electrification rates and minimal electricity grid infrastructure. In recognition of this, GET FiT proposed to craft programs to support different types of policy models beyond FITs, including: ‘Lighthouse’ or stand-alone projects in countries that face grid integration constraints or for technologies that have a limited in-country track record and mini-grids for off-grid applications in which performance-based incentives support decentralized multi-user energy systems, particularly in rural areas with limited grid infrastructure.

The first example developed as a pilot project is a 20 year top-up of FiTs in Uganda, accompanied by guarantees granted by the World Bank, which reduce costs of borrowing for the developer (for more details see Spratt, Griffith-Jones et al, 2013). The context is a tender with a premium payment for a long fixed period for production of electricity by renewables, which can provide cheaper energy to poorer people, whilst giving sufficient profitability to private investors in renewable energy. The premium linked to it is a feed-in tariff subsidy of 2c per unit, funded by the German government. It has been reportedly successful in encouraging private investment. A positive aspect is that it can be done for most renewable technologies.

There are also some interesting guarantee schemes, though they have limited use. Guarantees are used, for example for geo-thermal projects in East Africa and Latin America, to cover drilling risk, which represents approximately 50% of total risk. KfW covers up to 80% of that risk; other contributions are made from EU and even AU, African Union funds (Interview material). Good collaboration on this scheme has taken place with other development banks, e.g. World Bank and IADB.

A new product, being prepared at the time of writing is a regional liquidity facility in cooperation with IRENA, an institution that promotes investment in renewable energy. This would help ameliorate off-taker risk of purchase by off-taker not being paid, or not being paid on time, for smaller producers of energy (Interview material). Another new instrument just beginning to be developed is securitization, designed by KfW Development with the local government for South Africa.

KfW development bank and KfW Germany do not employ shadow carbon prices, unlike the European Investment Bank. But this is not considered problematic by KfW staff because a) the application of shadow carbon prices does not always lead to clear technology choices and b) KfW’s investments are overwhelmingly green due to the German government’s preference for a green portfolio, for example it does not fund coal projects anymore and funds very little gas. Priority is given by KfW development bank for renewables and energy efficiency. There is a clear directive on this and a project-by-project approval system is in place based on this directive.

Borrowers perceive a risk with borrowing in foreign currency when emerging or developing

countries' currencies may fluctuate, creating currency risk for borrowers. The hedging cost for the country is very expensive, or may not even be available for some low-income countries. This is an area where German or better developed governments' support for hedging would be important, for example by creating a global hedging fund. Other solution would be if KfW or other development banks could increase their borrowing and lending in local currencies. They could then create a diversified portfolio of loans in different local currencies, securitize it, as well as possibly sell on capital markets.

C. DEG

Today, as shown above, a larger share of DEG activities are the provision of loans, rather than equity investments. This was different in DEG's early years. The reason for the shift of emphasis towards loans is the greater demand for this product from clients. Guarantee mechanisms are very rarely used. On the other hand, structured finance is used sometimes, though also fairly rarely. For instance, cooperating with small companies is challenging, as transaction costs are relatively high. To address this problem, DEG pools similar projects within countries and regions. The challenge is however to identify similar projects as projects are seldom replicated across countries and regions.

DEG does business on its own balance sheet. DEG's main income is from equity participation. This income from equity makes up for losses in loans. In fact, cross-subsidisation allows DEG to provide loans that have negative returns associated to them (sometimes known ex-ante) but are worthwhile from a developmental perspective. Cross-subsidization is important for investments in many areas, including but not only in the area of climate finance. Around 3-4% of transactions are so-called promotional (developmental) business (Interview material). The scale is relatively limited, as DEG had only \$34.2 mn available in 2014 for different promotional activities.

In the development area there is also a close cooperation with BMZ, the Development Ministry, and the Ministry of the Environment. Activities of DEG are based on the assumption of private sector, entrepreneur driven development, but assume that knowledge in addition to funds is needed. This is for example applied in areas such as energy efficiency and especially to renewable energy. As part of these promotional activities, DEG carries out feasibility studies, where DEG can fund up to 50% of cost of feasibility study. Feasibility studies take also into account environmental costs and benefits. A second example for promotional activities is the project development programme of the GIZ Vocational training.

The Upscaling Programme is another interesting DEG initiative in the field of promotional activity. There exists a gap between the small companies funded by DEG via commercial banks and the large equity contributions (of \$2.3-3.4 mn) it can make to bigger projects. The rationale for this Upscaling programme is to offer medium-sized companies financial support via the promotional

programmes to help bridge this gap, thus trying to serve what Justin Lin has called the financing of the missing middle. Upscaling programme involves repayable grants (“rückzahlbarer Zuschuss”). Before providing the funds DEG defines success criteria. If these are met, that grant will be repaid, otherwise it will not be repaid. However, it should be mentioned that the incentive structure may be problematic, since if successful the finance has to be paid back, whereas if unsuccessful it becomes a grant. It is however, seen by staff to work very well (Interview material). An example is with solar kiosks in Africa through a program called Mobisol (see box 1).

Upscaling is a relatively new program, less than two years old, but seems to have yielded good outcomes.

Box 1

The story of Mobisol began in Tanzania and Rwanda, two countries in which around 80 per cent of the population have no access to the central electricity network, which does not extend to their region. In Germany, where subsidies for solar technology were also available, innumerable homeowners took advantage of the situation, outfitting their roofs with solar panels to generate their own electricity. The question was posed: If solar energy works for cloudy and rainy Germany, how many more people could benefit from it in the sun-drenched countries of Tanzania and Rwanda? Most people there use kerosene or diesel generators to produce electricity, which not only pollutes the atmosphere, but also severely endangers their health. These considerations gave rise to Mobisol: a start-up that should bring green solar energy to East Africa, an independent source of electricity with apparently no negative health implications.

Source: DEG

See more at: <http://www.tea-after-twelve.com/all-issues/issue-03/issue-03-overview/chapter1/mobisol/#sthash.Q2KT7390.dpuf>

As transactions costs are large, two methods could be used by DEG: 1) Pool projects, which is difficult so not used widely and 2) Finance through local banks, which is more common. Therefore, 30% of DEG financing is provided through financial intermediaries as DEG cannot finance local SMEs directly and has therefore to rely on local banks. Local banks also receive technical assistance, e.g. for energy lending. It is interesting that DEG does not do much concessional finance, as it does not want to destroy its own market. The currencies used by DEG are mainly US Dollars, Euros, and local currency.

DEG lends and invests on a project basis, with around 100-120 projects per year. As a

consequence, there is not much work on policy and strategy. Private German investors represent 5-8% of total amount. The rest of investors are international, from developed countries and especially emerging countries or less developed countries. In some cases, DEG invests in private equity funds, such as one in Latin America and Caribbean. DEG hopes to develop business model that can be multiplied, mixing renewable and energy efficiency. DEG is involved in helping develop the structure of projects.

IV Environmental standards

A. KfW Development Bank lending

KfW Development Bank uses climate markers and environment markers (based on OECD-DAC indicators and developed by the World Bank) to classify projects as having a “green” objective. Utilizing standardized data analysis project managers set markers at the initial stage of the project and there is also quality control by the German Development Ministry, BMZ. Irrespective of a potential “green” objective all new projects in KfW Development Bank are subject to an assessment of potential environmental and social risks applying World Bank standards.

To examine the achievement of development objectives and application of environment and social standards there is a final audit (absolute Kontrolle) and an ex post evaluation that is carried out externally by another KfW department, though consultants can also be hired to conduct the evaluation. The project team carries out all other controls. As pointed out, this is different from the World Bank, where independent teams conduct the monitoring.

The degree of rigorousness in applying these standards is consistent with international professional good practice, though not perfect as KfW staff stated in interviews.

KfW has an internal target of green lending to meet and therefore the categorisation of projects according to their environment and climate objectives is reasonably robust.

KfW does not use separate standards for public and private clients; with private clients KfW uses IFC standards, and if clients are public KfW uses World Bank standards. A key issue is how such standards are applied when finance is channelled through private financial intermediaries. KfW Development closes contracts with the financial intermediaries, which define the detailed obligations of the financial institution in “special conditions” annexed to any loan agreement. Where appropriate, training is provided by KfW to the financial institutions. However, the monitoring is clearly not as rigorous, and above all direct, as projects funded by KfW.

B. DEG application of standards

It is challenging to ensure that the financial intermediaries lend for the intended purposes. There are trade-offs here; DEG wants to avoid banks sitting on funds instead of lending out causing a “financing traffic jam”, but at the same time, it wants to apply rigorous standards. DEG wants to ensure on-lending and to have a good partnership with the bank (Interview material). As a result DEG is a “soft partner”, that means it is flexible. For instance if the banks do not lend funds for renewable energy as intended, DEG “may flexibly tolerate”(Interview material).

DEG uses the IFC performance standards when working as co-financier. All European DFIs, grouped together in EDFI, use same standards. As mentioned above, they often co-finance with each other. DEG has a sustainability department which monitors standards and puts forth an action plan, which is carried out on a monthly, quarterly or yearly basis depending on risk monitoring. They also employ action plans, which often involve green finance experts being assigned to projects. DEG does not adjust its standards to specific country types because it sees them as minimum standards, but provides technical assistance to countries needing them. The rationale is that the earlier poor countries embark on a green path, the better for them (Interview material). This may not be so consistent with preferences of borrowers in poor countries, who may prefer to use their own national environmental standards.

According to DEG staff, initially countries/clients do complain about standards, citing for instance higher transaction costs, but after some time they begin to see the economic benefits. It is believed by DEG staff that they may lose some investors with their strategy and standards, but these investors are not the most important ones. In the long-term DEG sees investors becoming more professional and climate aware. DEG trains financial intermediaries to apply environmental and social standards in monitoring. DEG recommends private equity funds and financial intermediaries to hire environmental experts in their teams as a pre-condition for DEG support. In order to guarantee good environment system management DEG prefers more rigorous standard setters. For example they prefer FSC standard for forestry as it is more rigorous. If the company is already using another standard setter, DEG accepts it but ensures due diligence (Interview material). This may partly deal with the problem that some standard setters on environment are less rigorous than others, and that investors will prefer them, risking a race to the bottom.

V. Lessons from KfW Germany, KfW development bank and DEG , for other development banks

Many valuable lessons can be learned from KfW, for similar banks in emerging and developing countries, as well as for new Banks like the AIIB or the New BRICS Development Bank. Naturally, lessons need to be adapted to different countries' contexts and needs.

One important lesson is the importance of clear strategic government policies combined with a supporting legal framework such as for energy transformation in Germany, and the role that the national development bank can play in helping fund such a strategy. This can be applied for sustainable infrastructure in emerging and developing countries, but also for other key sectors essential for their development. The development bank is thus a valuable instrument of the Government strategy.

Secondly, it is valuable that KfW mainly uses fairly simple, even “old-fashioned” financial instruments. This reduces transactions costs, and reduces hidden risks, that can lead to future losses. Finally, and perhaps most importantly, it allows greater focus on the real engineering and design of the projects themselves, their technical monitoring, and so on. Naturally, where there is need, there is space for some more innovative financial instruments, such as liquidity facility discussed above. Finally, KfW insists on equivalent environment standards for different categories of countries, including the poorest ones. This seems more controversial, as it is more difficult and costly for very poor countries to comply with the same standards as a developed economy. Here a somewhat more flexible approach may be more appropriate for other national development banks in low-income countries, while not compromising on standards, by relying more on national standards in borrowing country, as is apparently the case with the AIIB.

We now look at more specific lessons from the different parts of KfW, partly based on the views of their own staff.

A. KfW Germany

In Germany, KfW played a very key role in supporting the energy revolution and growth of renewable energy, as well as promoting energy efficiency. This was due to the German institutional framework, namely the renewable energy law, and the financial support given by KfW especially in the initial phases but continued as needed till today. Especially noteworthy was the massive and exclusive financial support given in the initial phase to solar PV during its introduction to the German energy market, which was then followed by a greater contribution by the private sector, whose investment was catalyzed by the initial funding by KfW Germany. Similarly, KfW played and continues to play a very major funding role in the financing of on-shore wind and energy efficiency.

Other countries and national development banks can learn valuable lessons from the KfW experience regarding its role in catalyzing structural transformation, both in renewable energy and energy efficiency. In some other countries, e.g. China, the development bank (in this case the CDB) has also played a key role in promoting and funding investment in renewable energy.

It is interesting that other European countries can access KfW Germany funding programs and experts often visit to learn from KfW experience. It seems important that when experts from developing and emerging economies visit the KfW Development Bank to learn valuable lessons from them that they also visit KfW Germany.

In development banking, according to KfW Germany staff interviewed, subsidized loans are better than grants because they are more reliable in the long-term as they are offered with long maturities. Grants would have to be complemented by additional loans on less favorable terms. Furthermore they are revolving funds, which means money flows back to the development bank and can be used for new loans, for further development activities in same or other sectors.

Technical assistance is important for developing and emerging economies. It is interesting it has also been important in Germany as the example of the energy advisor (Energieberater) shows. The role of energy advisor and consultant became important profession due to KfW programs in the area of energy efficiency for buildings, both commercial and for households. Technical assistance in and to developing and emerging economies (e.g. by German cooperation, but also by other donors and multilaterals) can draw valuable lessons from the KfW German experience, though it may need to be adjusted, especially for poorer countries.

B. KfW development bank

It is more difficult to transfer KfW's development bank way of working to other development banks as KfW's link to the German government is very direct and reflected in each project in terms of clear government guidelines, e.g. not funding coal. This may not be easily transferable to MDBs or RDBs, but is potentially relevant to national development banks if governments have a clear green strategy. Funds dedicated to support project preparation are provided by BMZ, the German Development Cooperation Ministry. Such a mechanism seems very valuable for all development banks. With small countries, it may be good to focus on sectors within green economy and on specific type of projects.

C. DEG

One broad lesson is from the network EDFI, which draws together 15 development finance institutions from different European countries, often resulting in joint evaluations, co-funding and monitoring (see details above). Lessons could be extracted for national development banks in

Latin America, Asia and Africa that could operate similar networks.

One lesson, emphasized by DEG staff was to ensure there is transparency in what is being done and why. Adhering to international standards is also important. Indeed, international environment standards and developing a common framework and agenda are important to avoid a race to the bottom. Partnership approach is important. Mutual commitments between lenders and investors are seen as very valuable. Willingness to help is valued by investors. Collaboration by DEG is mainly with investors, but sometimes also with local authorities.

D. The future for DEG and KfW development; development banks in developing and emerging economies

It is important to place greater focus on poorer countries, which have less access to private/public finance for sustainable infrastructure.

For 52 years, DEG relied on profits of own activities to expand. This seems to make a good case for increasing capital, with some contribution from the German government. This is also valid for other parts of KfW development bank, as well as for other EFDI members in other European countries. In both cases, this may be especially true for sustainable infrastructure lending and investing, and even more the case for funding this investment in low-income countries.

Furthermore, the case for creating or expanding national development banks in both developing and developed countries (but especially in the former), as well as increasing lending for sustainable infrastructure is very clear. Given the importance of having well-run development banks that maximize impact on sustainable development, many valuable lessons can be learned for the KfW experience. We hope this paper contributes something to this discussion.

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Appendix 1

List of mechanisms used by different parts of KfW (mainly in Germany) to promote green investment

Product		For what?	What kind of promotional funds are available?	What makes this KfW loan special?
KfW Environmental Protection Programme	<ul style="list-style-type: none"> - German and non-German enterprises, joint ventures - Self-employed professionals - Enterprises under an energy contracting - Cooperation and operator models (PPP) 	For investments in and outside Germany that contribute to substantially improving the environmental situation. Outside the EU, the share provided by the German partner will be financed.	Loans to finance investments in general environmental protection measures, usually Eur 10 million per project	<ul style="list-style-type: none"> - Up to 3 repayment-free start-up years - Disbursement 100% - Particularly favorable interest rates for small enterprises

<p>KfW Energy Efficiency Programme - Production Facilities and Processes</p>	<ul style="list-style-type: none"> - German and non-German enterprises, joint ventures - Self-employed professionals - Enterprises under an energy contracting 	<ul style="list-style-type: none"> - For investments in and outside Germany that achieve substantial energy-saving effects. Outside the EU, the share provided by the German partner will be financed. - Replacement investments must lead to energy end-use savings of at least 10% on the basis of the average consumption of the previous 3 years. - New investments must achieve energy savings of at least 10% compared with the industry average. 	<p>Loans to finance investments in energy efficiency measures, usually Eur 25 million per project</p>	<ul style="list-style-type: none"> - Promotional funding starts from energy-saving of 10% - Disbursement 100% - Favorable interest rates
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<p>KfW Energy Efficiency Programme - Energy-Efficient Construction and Refurbishment</p>	<ul style="list-style-type: none"> - German and non-German enterprises, joint ventures - Self-employed professionals - Enterprises under an energy contracting 	<p>1. Energy-efficient refurbishment of commercial-used non-residential buildings</p> <p>We promote the refurbishment of buildings if after refurbishment they do not exceed a specific energy requirement for a comparable new building.</p> <p>KfW has defined different levels of support for a “KfW Efficiency House” (KfW Efficiency House 70, 100 and efficiency House Monument)</p> <p>2. Individual measures to improve the energy efficiency (New constructions, KfW Efficiency</p>	<p>Loans to finance investments in energy efficiency measures, usually 25 million Euro per project</p>	<ul style="list-style-type: none"> - Favorable interest rates - Disbursement 100% - Up to 17,5% repayment bonus calculated on the loan amount
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<p>KfW Energy Turnaround Financing Initiative</p>	<p>For large commercial enterprises in and outside Germany with an annual group turnover Eur 500 million to Eur 3 billion.</p>	<p>For large-scale investment projects in Germany in the areas of energy efficiency, innovative projects in the areas of energy conservation, electricity generation, storage and transmission as well as the use of renewable energies.</p>	<ul style="list-style-type: none"> - Direct loans under a banking consortium, with KfW contributing 50% to the financing of the project - Financing package composed of a loan on-lent through a bank and a syndicated loan with participation by KfW 	<ul style="list-style-type: none"> - High financing volume - Disbursement 100% - Up to 3 repayment-free start-up years
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<p>BMUB Environmental Innovation Programme</p>	<p>German and non-German enterprises and other natural persons and legal entities under private law, enterprises in which municipalities are the majority shareholders</p> <p>Local and municipal authorities, companies owned and operated by municipal authorities, municipal special-purpose associations</p> <p>Other special-purpose associations or institutions incorporated under public law</p>	<p>For the financing of major industrial projects that demonstrate for the first time in what ways advanced technological procedures and combinations of procedures can be put to use to reduce environmental pollution and ecologically sound products can be manufactured and employed.</p>	<p>Up to 70% of the financeable costs, no maximum amount</p>	<ul style="list-style-type: none"> - Long-term financing at an attractive interest rate - Interest grant from the BMUB to the KfW loan -In exceptional cases, investment grant of up to 30% of the financeable costs -Disbursement 100%
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<p>KfW Renewable Energies Programme - Standard</p>	<p>Private individuals and not-for-profit organizations which feed the generated electricity/heat into the grid</p> <p>Self-employed professionals farmers</p> <p>German and non-German enterprises majority-owned by private individuals</p> <p>Enterprises in which local authorities, churches or charities hold an interest</p> <p>Investment funds</p>	<p>Electricity from solar energy (photovoltaics), biomass, wind energy, hydropower, geothermal energy</p> <p>Electricity and heat from renewable energies, generated in combined heat and power stations</p>	<p>Up to 100% of the investment costs eligible for financing, not more than Eur 25 million</p>	<p>Long-term, low-interest loans</p> <p>Interest rate fixed for ten years, or even longer for the entire term</p> <p>Repayment-free start-up period</p>
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<p>KfW Renewable Energies Programme - Premium</p>	<p>Private individuals and not-for-profit organisations which use the generated heat exclusively for their own needs</p> <p>Self-employed professionals</p> <p>Small and medium-sized enterprises (SMEs)</p> <p>Enterprises that are majority-owned by municipalities and that do not meet the SME threshold values for turnover and number of employees</p> <p>Large enterprises only if their solar thermal, deep geothermal, heat storage and heating network measures are</p>	<p>For large plants in which heat is generated from renewable energies</p>	<p>Up to 100% of the financeable costs of investment, not more than Eur 10 million</p>	<ul style="list-style-type: none"> - Long-term, low-interest loans - Repayment-free start-up period - Particularly favourable interest rates for small enterprises Attractive repayment bonuses
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<p>KfW Renewable Energies Programme – Storage</p>	<p>Private individuals Not-for-profit organisations Self-employed professionals, farmers Enterprises</p>	<p>New installations of stationary battery storage systems combined with photovoltaic systems</p>	<p>Up to 100% of your investment costs for the battery storage system and the photovoltaic system</p>	<p>Long-term, low-interest loans Repayment bonus of 30% of the financeable costs of the battery storage system Repayment-free start-up period Interest rate fixed for up to 20 years</p>
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<p>KfW Offshore Wind Energy Programme</p>	<p>Project companies</p>	<p>Establishment of wind farms off the German coast of the North and Baltic Sea</p>	<p>Up to 70% of the total debt capital requirements, not more than EUR 700 million per project</p> <p>Project financing in the form of a:</p> <p>A – a direct loan under banking consortia; private commercial banks contribute on the same terms and conditions and, in total, at least in the same amount as KfW</p> <p>B – a financing package composed of a loan from KfW on-lent through a bank and a direct loan from KfW or</p> <p>C – a direct loan under banking consortia to finance unforeseen cost overruns (cost</p>	<p>Financing of high loan volumes</p> <p>10-year term</p> <p>Interest is fixed for 10 years</p>
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