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# Public Financial Institutions and the Low-carbon Transition

**FIVE CASE STUDIES ON LOW-CARBON  
INFRASTRUCTURE AND PROJECT INVESTMENT**

Ian Cochran, Romain Hubert,  
Virginie Marchal, Robert Youngman

JEL Classification: G11, G18, G23, G28, O44, Q01,  
Q54

ENVIRONMENT DIRECTORATE

**ENVIRONMENT WORKING PAPER No. 72: PUBLIC FINANCIAL INSTITUTIONS AND THE LOW-CARBON TRANSITION: FIVE CASE STUDIES ON LOW-CARBON INFRASTRUCTURE AND PROJECT INVESTMENT**

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## ABSTRACT

Public financial institutions (PFIs) are well-positioned to act as a key leverage point for governments' efforts to mobilise private investment in low-carbon projects and infrastructure. The study identifies the tools, instruments and approaches used by five PFIs to directly support and scale-up domestic private sector investment in sustainable transport, energy-efficiency and renewable energy in OECD countries. Between 2010-2012, these five institutions – Group Caisse des Dépôts in France, KfW Bankengruppe in Germany, the UK Green Investment Bank, the European Investment Bank, and the European Bank for Reconstruction and Development – have provided over 100 billion euros of equity investment and financing for energy efficiency, renewable energy and sustainable transport projects. They use both traditional and innovative approaches to link low-carbon projects with finance through enhancing access to capital; facilitating risk reduction and sharing; improving the capacity of market actors; and shaping broader market practices and conditions.

**JEL Classification:** G11, G18, G23, G28, O44, Q01, Q54

**Keywords:** Public financial institutions, infrastructure, low-carbon, climate change, renewable energy, energy efficiency, investment, climate finance

## RÉSUMÉ

Les institutions financières publiques (IFP) sont particulièrement bien placées pour compléter les efforts des pouvoirs publics visant à mobiliser les investissements privés dans des projets et des infrastructures sobres en carbone. Cette étude identifie les outils, instruments et méthodes dont se servent cinq IFP pour financer et / ou accroître les investissements du secteur privé au niveau national dans les transports durables, l'efficacité énergétique et l'énergie renouvelable dans des pays membres de l'OCDE. De 2010 à 2012, ces cinq institutions – le Groupe Caisse des Dépôts en France, la KfW Bankengruppe en Allemagne, l'UK Green Investment Bank, la Banque européenne d'investissement, et la Banque européenne pour la reconstruction et le développement – ont apporté un total de plus de 100 milliards EUR d'investissements en fonds propres et de financement en faveur de projets d'efficacité énergétique, d'énergies renouvelables et de transports durables. Elles font appel à des méthodes à la fois traditionnelles et nouvelles pour lier des projets aux moyens de financement, en améliorant l'accès aux capitaux ; en facilitant la réduction et le partage des risques ; en renforçant les capacités des acteurs de marché et, dans un cadre plus large, en mettant en place des pratiques et des conditions de marché.

**Classification JEL :** G11, G18, G23, G28, O44, Q01, Q54

**Mots clés :** Institutions financières publiques, infrastructure, bas carbone, changement climatique, énergie renouvelable, efficacité énergétique, investissement, finance climat

## FOREWORD

This study, jointly undertaken by the OECD and CDC Climat Research<sup>1</sup>, analyses the role of Public Financial Institutions (PFIs) in fostering the low-carbon energy transition through domestic climate finance activities. The institutions reviewed in this report include PFIs established at the national level in three OECD countries (the Group Caisse des Dépôts (France), KfW Bankengruppe (Germany) and the UK Green Investment Bank (United Kingdom)) and two PFIs established at the regional level, covering the European Union and former Soviet countries (the European Investment Bank (EIB) and the European Bank for Reconstruction and Development (EBRD)). This work builds on existing OECD work on low-carbon, climate resilient (LCR) investment, including the 2012 paper *Towards a Green Investment Policy Framework* by Corfee-Morlot et al. This report has been developed by the Secretariat for the *Working Party on Climate Investment and Development* of EPOC.

The study maps the key tools and instruments currently used by these institutions to mobilise private sector investment, principally in OECD countries, in three areas of activity: 1. facilitating access to long-term financing, 2. reducing project and financial risks, and 3. filling the capacity gap (i.e. providing needed expertise to support low-carbon investments and market development). The analysis focuses mainly on the role of PFIs in investing in low-carbon infrastructure projects. In this role, PFIs support investment in climate-friendly projects on the demand side by helping to overcome barriers to the development of a project pipeline. They also support the supply side by promoting and mobilising private sector financing and investment. As such, PFIs support the financing of existing projects and also assist in scaling-up the low-carbon infrastructure pipeline and available financing flows for future projects.

This report analyses five PFIs to understand the impact of these institutions within their domestic or target environments. While a number of the PFIs studied are also active in international climate finance activities, this report focuses exclusively on domestic climate finance activities. Information for the case studies was gathered through a combination of desk reviews of existing academic, grey and institutional literature and interviews with a limited number of relevant representatives from the public financial institutions studied. The case studies of each institution are published separately by CDC Climat Research and available on their website at: <http://www.cdcclimat.com/Public-financial-institutions-OECD.html?lang=en>

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<sup>1</sup> CDC Climat Research is a public research office dedicated to help public and private decision-makers to improve the way in which they understand, anticipate, and encourage the use of economic and financial resources aimed at promoting the transition to a low-carbon economy.

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The paper builds on the 2012 OECD Environment Working Paper "Towards a Green Investment Policy Framework: The Case of Low-Carbon, Climate-Resilient Infrastructure," and applies elements of the framework to the case of public financial institutions.

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This work benefitted from review and comments from the OECD Working Party on Climate, Investment and Development (WPCID) and Environment Policy Committee (EPOC). The preliminary findings of the study were presented and benefited from comments at the 19<sup>th</sup> session of the Conference of the Parties to the United Nations Framework Convention on Climate Change in Warsaw, Poland in 2013 under the auspices of the European Pavilion.

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## EXECUTIVE SUMMARY

Achieving ambitious climate change and other environmental goals at sufficient pace and scale will require significant investment and a large shift in private capital away from investments in polluting technologies and toward investments in clean technologies and low-carbon, climate-resilient infrastructure. The long lifetime of these investments makes “greening” infrastructure an urgent task. As extensively analysed in work by the OECD, choices made today about new and renovated infrastructure lock-in future greenhouse gas emission pathways as well as vulnerability or climate-resilience for decades to come. A combination of factors, however, has limited private actors’ ability and appetite to invest in low-carbon infrastructure. In addition to regional and country-specific policy and regulatory barriers, other barriers include policy obstacles that hamper the supply of long-term finance, unattractive risk-return profiles of projects and a lack of capacity in the development of, and investment in low-carbon projects.

Public financial institutions (PFIs) are created to address such factors as market failures or externalities which limit private-sector investment and to deliver financial services that help meet a public policy objective and are not currently provided by the market. In some cases, these institutions hold a mandate to provide long-term financing independent of market cycles and in line with policy priorities. They are able to leverage capital at advantageous, below-market rates for targeted investments. In many instances these institutions serve as a catalyst for private-sector investment and innovation. These characteristics and objectives of PFIs are well-aligned with the challenge of overcoming barriers to private investment in low-carbon projects. Indeed, PFIs are currently playing an important role in facilitating the shift to and scaling-up of private investment in such projects.

This study explores the mandates of five public financial institutions to address climate change issues; their different roles in low-carbon infrastructure investment and finance activities; the instruments and approaches they use to support renewable energy, energy-efficiency and sustainable transport investments; and their ability to scale up private sector investments. These cases include: the Group Caisse des Dépôts (CDC) (France); KfW Bankengruppe (KfW) (Germany); the UK Green Investment Bank (UKGIB) (UK); the European Investment Bank (EIB) (European Union); and the European Bank for Reconstruction and Development (EBRD) (transition economies). In particular, the study focuses on PFIs’ activities to increase *domestic* low-carbon investments in OECD countries. A number of these institutions are also involved in activities to scale-up cross-border (including North-South) flows of low-carbon investments by private investors. In this context, the report considers only the EBRD’s international climate finance activities in transitioning economies.

The study focuses on the instruments and approaches used to support sustainable transport, energy-efficiency and renewable energy investments.<sup>2</sup> The mapping exercise has identified how the five institutions are already playing a role in supporting low-carbon infrastructure and energy efficiency projects. First, they use both traditional and innovative means of linking projects with finance. This includes enhancing access to capital; facilitating risk reduction and sharing; and improving the capacity of market actors. Second, these institutions are also experimenting with approaches to direct capital flows to low-carbon activities. This includes initiatives to improve the capacity of individual market actors, as well

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<sup>2</sup> A forthcoming OECD report, “Institutional Investors and Sustainable Energy: Mapping Channels and Approaches to Mobilise Capital”, provides definitions of the various investment channels (instruments and vehicles) through which sustainable energy infrastructure can be financed and the interventions (tools and techniques) that exist which can enable or facilitate these investments. Future OECD reports on climate finance and investment will seek to incorporate these definitions, which differ in some instances from those used in this report on public financial institutions.

as shape broader market practices and conditions. Public Financial Institutions are also experimenting with integrating indicators and targets related to a low-carbon transition across all of their business divisions and activities.

### **The relevance of PFIs in financing the transition to a low-carbon economy and society**

Public financial institutions are well-positioned to act as a key leverage point for governments' efforts to mobilise private investment in low-carbon projects and infrastructure. First, the PFIs reviewed in this analysis were established to serve the public interest as defined by existing national, regional or international policy objectives. Given the direct or implicit policy mandates under which these institutions operate, PFIs are, under certain circumstances, both able and willing to provide financing at below-market returns, setting them apart from commercial institutions.

Second, the PFIs studied here all have access to high volumes of stable, long-term finance. They use their capitalisation, State guarantees and high credit ratings to leverage low-cost funding from international capital markets or through the use of household savings. In many instances, this ability to leverage low-cost funding allows these institutions to provide concessional financing for projects without the use of public subsidies.

Third, all of the institutions studied are actively exploring a broad range of approaches and instruments to use the public resources at their disposal to mobilise private finance. These range from the European Investment Bank's experimentation with new investment and finance instruments (such as layered-debt funds), to the development of holistic approaches that consider both the financing of individual projects and broader capacity-related and market-development issues. Such holistic approaches include, for example, the EBRD's policy dialogue with governments encouraging the development of a supportive regulatory environment for low-carbon projects through the institution's *Sustainable Energy Initiative (SEI)*.<sup>3</sup>

### **Mandates and channels to promote low-carbon investment activities**

The five public financial institutions reviewed in this report can be differentiated according to the level of clarity of the "low-carbon" mandate they receive from governments. Some PFIs have an explicit mandate and authority to invest in green infrastructure – often with established guidelines on which technologies or markets to address. Others undertake ad-hoc green investment activities as one element of varied activities to meet a much broader mandate driven by public interest. The EIB, KfW and the UK Green Investment Bank are institutions with clear mandates to support policy on climate and low-carbon energy related subjects. The CDC and the EBRD do not have specific low-carbon mandates from their mandating institutions, but have integrated climate change into their priorities, and support national and international climate and energy objectives through involvement in specific programmes or through agreements signed with other governmental agencies.

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<sup>3</sup> Created in 2006, the Sustainable Energy Initiative (SEI) is the EBRD's principal programme dedicated to energy efficiency and renewable energy. It is designed to transversally integrate these two issues into investment decisions across the institution.

There are three channels through which the five PFIs contribute to the low carbon economy:

- development and financing for low-carbon projects,
- support to SMEs, and
- investment in research and development.

The main area of these institutions' activities – and the focus of this study – is project development and finance.<sup>4</sup> All five PFIs are involved through a variety of tools and mechanisms in the development, construction and operational stage of projects. Low-carbon project types include energy efficiency projects for households, industry as well as commercial and public actors; centralised and decentralised renewable energy production; and sustainable transport. As seen in Table 1, over the 2010-2012 period, the five institutions studied have provided a total of over 100 billion euros of equity and financing for energy efficiency, renewable energy and sustainable transport projects.

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<sup>4</sup> The PFIs studied also support SMEs and investment in research and development; however these areas have not been analysed in detail in this study.

**Table 1. Public financial institutions' self-reported low-carbon infrastructure investment levels vs. total commitments for investment activities – 2010-2012**

	Sector	2010		2011		2012		Period Total	
		M€	%	M€	%	M€	%	M€	%
EIB	Sustainable Transport	7 700		8 100		5 700		21 500	
	Renewable Energy	6 000		5 700		3 300		15 000	
	Energy Efficiency	2 200		1 300		1 100		4 600	
	<b>Total “low-carbon” projects</b>	<b>15 900</b>	22%	<b>15 100</b>	24%	<b>10 100</b>	20%	<b>41 100</b>	23%
	<b>Total Commitments</b>	<b>72 000</b>		<b>61 000</b>		<b>52 000</b>		<b>184 000</b>	
CDC <sup>i</sup>	Sustainable Transport (Loans)	548		3660		1 500		5 709	
	Renewable Energy (Loans)	233		380		453		1 066	
	Energy Efficiency (Equity)	40		38		53		131	
	<b>Total “low-carbon” projects</b>	<b>821</b>	6%	<b>4078</b>	24%	<b>2006</b>	13%	<b>6906</b>	15%
	<b>Total Commitments</b>	<b>14 793</b>		<b>17 340</b>		<b>15 413</b>		<b>47 551</b>	
KfW	Sustainable Transport	-		-		-		-	
	Renewable Energy <sup>ii</sup>	9 591		7 017		7 937		24 545	
	Energy Efficiency	10 315		9 701		13 697		33 713	
	<b>Total “low-carbon” projects</b>	<b>19 906</b>	31%	<b>16 718</b>	33%	<b>21 634</b>	43%	<b>58 258</b>	35%
	<b>Total Domestic Commitments</b>	<b>64 442</b>		<b>50 927</b>		<b>50 629</b>		<b>165 998</b>	
UKGIB <sup>iii</sup>	Sustainable Transport	-	-	-	-	-	-	-	-
	Renewable Energy	-	-	-	-	200 M€	-	200 M€	-
	Energy Efficiency	-	-	-	-	145 M€	-	145 M€	-
	<b>Total estimated investment to 2016</b>	<b>3 800 M€</b>							
EBRD	Sustainable Transport	2006 – 2013 : 100 M€							
	Renewable Energy	2006 – 2013 : 320 M€							
	Energy Efficiency	2006 – 2013 : 850 M€							
	SEI Total 2006-2013	2006 – 2013 : 127 M€							
	<b>Total “low-carbon” projects</b>	<b>2 200</b>	24%	<b>2 600</b>	29%	<b>2 300</b>	26%	<b>7 100</b>	26%
	<b>Total business volume</b>	<b>9 009</b>		<b>9 051</b>		<b>8 920</b>		<b>26 980</b>	

Source: Author after institutional reports and data provided by the EBRD on 2006-2013 investment totals. Please see appendices for detailed information on data sources.

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<sup>i</sup> The estimations for the CDC exclude CDC Infrastructure's equity investments between 2010-13 (EUR 225 million in sustainable transport projects and EUR 55 million in renewable energy). Due to a lack of data, this total also excludes the activities of *ExterImmo* as well as the CDC Climat's 2013 energy efficiency investments in the industrial sector.

<sup>ii</sup> These values exclude projects financed outside of Germany as well as the project financing by the KfW IPEX-Bank in Germany. Additionally, the "KfW Offshore wind energy programme" introduced in 2011 is not included due to comparability reasons (EUR 542 million in 2011). The transversal Energy Turnaround Financing Initiative also is not included since funds are used for renewable energy as well as energy efficiency projects (EUR 65 million in 2012).

<sup>iii</sup> The UKGIB began investing in 2012. The GBP 200 million of renewable energy investment includes GBP 100 million for offshore wind and GBP 100 million for biomass. The GBP 145 million of investment in energy efficiency is made up of non-residential projects.

### Mixing traditional and innovative instruments to finance low-carbon projects

While the five PFIs studied generally have focused their low-carbon financing activities on the same set of sectors, the investment philosophies and associated approaches of the institutions vary greatly. These approaches include the use of below-market financing partially co-financed by national government budgets to reduce the cost of finance for low-carbon projects (KfW and CDC). They also comprise the use of market-rate financing to demonstrate to private investors the potential profits to be made on projects even in the absence of subsidised financing (UK Green Investment Bank).

To support low-carbon projects, the five institutions deploy a broad range of instruments and programmes. In some cases, these take the form of dedicated programmes and facilities focusing on a specific sector or sub-sector (such as off-shore wind or energy efficiency in the residential sector). In other cases, PFIs combine both traditional investment tools (equity investments, concessional loans, junior debt) with “innovative” tools (layered debt funds, bond enhancement, etc.). In most instances, PFIs’ use of instruments which increase access to capital and share risk, and their dedicated programmes to build capacity, are intended to leverage private finance in projects.

**Table 2. Roles and tools of public financial institutions in supporting the low-carbon energy transition**

Role	Functions	Tools and instruments
<b>Facilitate access to capital</b>	<ul style="list-style-type: none"> <li>• Providing long-term capital</li> <li>• Facilitating access to private capital</li> </ul>	<ul style="list-style-type: none"> <li>- Concessional and non-concessional lending</li> <li>- Equity investment</li> <li>- International climate funds</li> <li>- Public private partnerships</li> </ul>
<b>Reduce risk</b>	<ul style="list-style-type: none"> <li>• Risk sharing</li> <li>• Credit enhancement mechanisms</li> </ul>	<ul style="list-style-type: none"> <li>- Guarantees</li> <li>- Structured finance</li> <li>- Public private partnerships</li> <li>- Junior debt/Mezzanine financing</li> </ul>
<b>Fill the capacity gap</b>	<ul style="list-style-type: none"> <li>• Aiding project development</li> <li>• Reducing project risks</li> </ul>	<ul style="list-style-type: none"> <li>- Technical assistance</li> <li>- Capacity building</li> <li>- Information tools (GHG quantification, energy certificate tracking)</li> </ul>

Source: Authors based on UNCTAD 2012, CPI 2013.

Public financial institutions **facilitate access to capital** by acting as providers as well as facilitators of long term financing. As investment and financing providers, they typically act by purchasing equity positions and providing long-term loans. Such activities signal state support for sectors and projects, thereby catalysing further investment from private actors. PFIs’ activities as facilitators of financing include providing initial investments to demonstrate viability, and developing structures to pool small-scale loans and investments into tranches with risk-return profiles that appeal to different types of investors. Such activities can support the development of new markets and mechanisms – such as the EIB’s continued participation in the nascent climate bonds markets.

Public financial institutions play a role in **reducing risk** to leverage private finance and investment in low-carbon infrastructure and activities. They reduce risk both in terms of addressing financial risk between project phases (financing and refinancing) as well as facilitating risk sharing among project participants. Risk reduction across different project stages may come in the form of loan refinancing guarantees (e.g.

PFI's commitments to refinance, at the end of the construction period, projects initially financed by the commercial banking sector) as well as bond credit enhancement. Risk sharing among project participants takes a number of forms, such as loan underwriting, specialised fund structures, first loss provisions junior debt and mezzanine financing. Through reducing the risks perceived by private investors, sharing them across project phases and between actors, and constructing financial vehicles that reduce risks and deliver attractive risk-adjusted returns, these institutions remove barriers to private sector participation and help scale-up investment.

Low-carbon investments such as wind and solar photovoltaic (PV) energy infrastructure are relatively new for a large number of financial actors. PFIs help **fill the capacity gap** through the use of dedicated research teams that develop new market tools and expertise to provide technical assistance and project appraisal support to project developers and other actors. This can increase the viability of the project and the chance of success in attracting financing. Public financial institutions can also increase the capacity of local banks to provide financing for low-carbon projects (e.g. by extending long-term credit lines to local banks which then provide loans for energy efficiency and small-scale renewable energy projects, in the case of the EBRD's Sustainable Energy Financing Facilities (SEFF) model).

### **Redirecting financing flows: The mainstreaming of climate change across all activities**

Achieving the transition to a low-carbon economy and society will require scaling up financing for low-carbon projects, both in absolute terms and relative to fossil-fuel intensive, business-as-usual development. A number of the institutions studied here are pioneering means of integrating climate and energy targets, indicators and criteria into their broader business-lines and investment activities.

All of the public financial institutions studied in this report have undertaken activities focusing on the low-carbon energy transition in one form or another. However, in addition to financing low-carbon activities as described above, these institutions (with the exception of the UK GIB) also finance traditional, potentially fossil-fuel intensive, projects and companies. Furthermore, a number of PFIs are large asset managers investing billions of euros annually in "paper" assets (stocks, bonds, etc.) as well as physical assets. Whether these asset management activities are used to generate revenue to finance public-interest development projects, as in the case of the CDC, or to assure a needed level of liquidity, as in the case of the EIB and KfW, these activities can support economic activity that is incompatible with a low-carbon energy transition.

This "brown vs. green" issue is important as PFI's business-as-usual investment in "brown" infrastructure can exceed their investment in and financing of low-carbon-oriented activities. As such, the mainstreaming or integration of climate change criteria into PFI's investment decision-making across their portfolios will be important. The PFIs studied in this report have taken initial steps to support this mainstreaming. Climate change had previously been grouped within a broader set of corporate social responsibility and Environment, Social and Governance (ESG) criteria. However, low-carbon considerations are increasingly being taken into account through different quantified metrics: institution-wide tracking, quantified climate-related investment quotas, analysis of the greenhouse gas (GHG) emissions impacts of projects, as well as portfolio-wide "carbon footprinting" tools. While much progress has been made on analysing physical projects and assets with respect to low-carbon criteria (such as project GHG emissions, shadow carbon prices), analysis of financial assets (stocks, bonds, etc.) is less developed.



**Table 3. Studied PFIs and low-carbon project investment targets**

<b>CDC</b>	No quantified internal target for low-carbon investment
<b>EBRD</b>	Internally-established quantified target: reduction target of 26 to 32 million tonnes CO <sub>2</sub> per year for its <i>Sustainable Energy Initiative</i> over the period 2012 to 2014
<b>EIB</b>	Internally-established objective: 25% of all investment activities to be climate-related
<b>KfW</b>	Internally-established objective: 30% of investment activities to be climate-related
<b>UK GIB</b>	No precise target; annual quantification of avoided GHG emissions of all projects

### Estimates of private financing leveraged by PFIs

Benchmarking the leveraging effect of different instruments and programmes deployed by PFIs can shed light on what tools / combination of tools may be the most appropriate, and perhaps most effective, in given contexts. However, there is relatively limited information provided by PFIs concerning their impact on private finance, and the lack of a standardised methodology for calculating leverage ratios makes comparisons of such ratios problematic. Nevertheless, the PFIs' estimates provide at least some partial snapshots of their leveraging potential.

For example, the EIB has estimated that their 10% participation in an externally-managed fund structure can lead to 90% additional funds raised (1:10), and those additional (private) funds on average provide 25% of the capital needed for a given project. Furthermore, through its lending for energy efficiency in the housing sector, KfW made EUR 6.5 billion in commitments leading to EUR 18.4 billion of total investments across 282, 000 housing units. This was done at a cost to the federal budget of EUR 934 million – representing a leverage effect of almost twenty-fold (20 private euros invested for one euro of public funds). During its first period of activity, the UK Green Investment Bank has estimated that its direct commitments of GBP 635m in 11 projects valued at a total of GBP 2.3 billion has resulted in a funding ratio that sees GBP 1 billion from GIB mobilising almost GBP 3 billion of private sector money (UKGIB 2013a).

Finally, the EBRD has calculated the volume of sustainable energy investments mobilised per euro it has spent on technical assistance and other grant programmes. The EBRD calculated its grant impact leverage ratio for sustainable energy investments at 1:5.5 in 2012 and at 1:232 for technical co-operation (taking follow-on investment into account) (EBRD 2012d).

As suggested by these examples, leveraging ratios can vary significantly. However, the overall effectiveness of public interventions may not always be captured by these ratios. For example, a PFI that demonstrates the feasibility of an investment by taking on a significant share of debt or equity in a project may not be able to claim a high leveraging ratio for that project, but may help unlock similar investments by the private sector in the future.

### Placing PFI actions within the OECD green investment policy framework

To help governments create and improve domestic enabling conditions to shift and scale-up private sector investments in green infrastructure, and to finance a transition to a low-carbon, climate resilient (LCR) economy and greener growth, the OECD developed elements of a “green investment policy framework” (Corfee-Morlot et al., 2012). To varying extents, actions taken by public financial institutions are relevant to each of the five elements of the framework:

- *Goal-setting and aligning policies across and within levels of government:* Policy mandates set by governments for PFIs can be seen in the broader context of national policy frameworks for meeting energy, infrastructure and climate change objectives. The PFIs reviewed in this report reinforce the priority given to national policy objectives through their investments and investment facilitation activities. This in turn can demonstrate to market actors the types of financing and investment activities that can support a low-carbon energy transition. Importantly, the mandates of PFIs also provide an opportunity to policymakers to align policies and to send clear signals regarding government support for low-carbon investments and the feasibility of such investments.
- *Reforming policies to enable investment and strengthen market incentives for LCR infrastructure:* This includes market-based and regulatory policies to correct market failures and overcome investment barriers for low-carbon investment. PFIs have a role in putting into practice and experimenting with incentives for low-carbon investment (e.g. risk-sharing tools such as loan guarantees) and for drawing in private capital (e.g. risk-sharing tools such as loan guarantees).
- *Establishing specific financial policies, regulations, tools and instruments that provide transitional support for new green technologies:* While the PFIs in this analysis are not responsible for establishing specific policies, their experience can inform government policy. For example, the EBRD works with the governments of countries within which it invests to establish a market environment to support energy efficiency and renewable energy projects. In addition, these institutions are active in developing, and experimenting with instruments, tools and programmes to foster both the supply and demand-sides of low-carbon project development. This includes the issuance of climate and green bonds, and thus the development of financial markets that support LCR investments, as well as the use of innovative tools, de-risking instruments and investment vehicles that provide attractive risk-adjusted returns and crowd-in private investment.
- *Harnessing resources and building capacity:* The PFIs studied have in many instances developed capacity-support programmes, tools, expert knowledge and knowledge-sharing networks needed to support low-carbon investment by the private sector as well as other financial actors, including commercial banks and institutional investors.
- *Reporting and consumer awareness programmes and public outreach:* A number of PFIs have begun to report how their investments influence greenhouse gas emissions, whether at the scale of individual projects or the broader portfolio.

### **Challenges: learning across institutions and scaling up action**

This study has not attempted to analyse the efficiency or effectiveness of these low-carbon investment activities and programmes undertaken by PFIs. Nevertheless, the description of practices and tools presented here can serve to inform policymakers, other PFIs, and institutions active in low-carbon finance and investment. This review demonstrates that these institutions play an important role in incentivising private action. PFIs support investment in climate-friendly projects on the demand side by helping to overcome barriers to the development of a project pipeline. They also support the finance supply side by promoting and mobilising private sector financing and investment. Through these activities, PFIs are accumulating insight and experience in leveraging private finance for the transition to a low-carbon economy and society, as well as pioneering new means of mainstreaming these issues to redirect financial flows towards these objectives.

In view of the urgent need to shift private investment from brown to green, and to scale up green infrastructure investment, a number of areas for further action by PFIs and governments can be considered.

First, improving the tracking of low-carbon investment across a number of the PFIs is an important step to understand their contribution to the low-carbon transition. Better tracking also can assist institutions to understand what portion of their activities may be at odds with their low-carbon objectives. Ideally, this process should also calculate the leveraging of private finance of the different instruments and programmes to better understand their potential in different contexts.

Second, balancing green mandates with other, potentially carbon-intensive, mandates will be an important challenge for PFIs and governments seeking to send consistent policy signals to facilitate a shift to and scaling-up of low-carbon investments and infrastructure. As seen in a number of institutions, the development of a portfolio-wide indicator for low-carbon activities and the integration of greenhouse gas- and energy-efficiency criteria into the analysis of all projects and activities is an important step to expand PFIs' overall contribution to low-carbon investment. PFIs are in a position not only to improve their own carbon footprint, but also to pilot GHG reporting of financial portfolios and the development of other tools and indicators. This can help the broader financial sector improve its performance in this area as well as prepare for potential future disclosure and regulation.

Third, beyond measuring and information, in a number of instances PFIs are pioneering new instruments and tools for investment. The mapping exercise in this report indicates that much progress has been made in developing means of providing capital for low-carbon projects. While PFIs' support for projects through traditional investment instruments – such as loans and equity – is important to foster private sector investment in many areas, PFIs are playing an important role in experimenting with innovative tools such as structured finance, different forms of bonds and other assets to facilitate the scaling-up of private finance from multiple investor classes.

As a distinct class of investors, PFIs are in a unique position to help leverage private finance and investment in LCR infrastructure projects at the scale needed for the low-carbon transition. In particular, they are able to support different forms of credit enhancement and securitisation, and have the necessary level of expertise to ensure that projects and financing structures meet stringent environmental and financial criteria to ensure their success. When undertaken in accordance with broader institutional mandates and investment philosophies, developing further de-risking and risk-sharing tools for targeted sectors could be a priority area for these institutions and merits further investigation. The further development of de-risking and risk-sharing tools, paired with expanded capacity support for project development and larger market development, could allow PFIs to scale-up the mobilisation of private resources.

The five public financial institutions reviewed in the report have demonstrated their ability to contribute to the transition to a low-carbon economy and society. However, their ability to take action is often dependent on external factors, such as mandates, the availability of financial resources from national governments, or broader economic and market trends. Governments will have an important role in providing the broader regulatory environment within which these institutions can successfully catalyse the scaling-up of private finance for the low-carbon energy transition, and in communicating clear and coherent objectives to be pursued by these institutions. As such, the expansion of the involvement of PFIs in the low-carbon transition will depend greatly on the broader policies of national governments and the mandates governments set for PFIs. In addition, PFIs' ability to leverage larger amounts of private investment in LCR infrastructure may depend to a large extent on their increased use of de-risking and risk-sharing tools.

## INTRODUCTION

1. Tackling climate change in both developed and developing countries requires actions to reduce greenhouse gas emissions across a broad range of sectors. Nations worldwide are working to hold the global average temperature increase below 2 degrees Celsius above pre-industrial levels and attain a global peaking of global greenhouse gas emissions as soon as possible. Achieving this objective will require an economic, social and technological transformation and a shift away from fossil fuel use. Most GHG emissions are “locked-in” through existing infrastructure (transport, energy and buildings). Achieving ambitious climate change objectives will require significant investment and a large shift in private capital from polluting to clean technologies and green, low-carbon infrastructure. The long lifetimes of these investments makes greening infrastructure an urgent task, as it is necessary to avoid lock-in to climate-vulnerable, emission-intensive development patterns.<sup>5</sup>

2. Ensuring sufficient financing and investment to support a shift towards green growth will be a challenge. Governments from OECD countries today have a limited scope for financing such infrastructure needs in light of high levels of national debt and ongoing economic recovery. Fostering increased investment in green infrastructure and a transition to a low-carbon economy and society will involve a broad range of actors. This will include public actors – such as the central government, which will need to create a supportive investment environment through changes to existing policies – as well as private actors including households and private investors, including institutional investors. However, many barriers prevent private actors today from investing in low-carbon infrastructure. In order to attract the necessary capital, low-carbon infrastructure must be perceived as financially attractive over the long-term. This in turn requires adequate risk-adjusted returns and financial vehicles that are compatible with investors’ investment objectives and needs. Ensuring the participation of private investors will require addressing market failures, putting a price on carbon, aligning policy signals across the regulatory landscape, and addressing the lack of familiarity with information on, and expertise in green infrastructure projects.

3. Policy-makers have a role to play to help mobilise private sector finance towards green investment, by improving and strengthening the enabling framework for green investment in host countries. The OECD has developed elements of a Green Investment Policy Framework that can help governments drive private sector investment in low-carbon, climate resilient infrastructure (see Box 1). A key priority is to establish clear and predictable policy frameworks for investment in green infrastructure, including in renewable energy, energy efficiency and sustainable transport (Corfee-Morlot et al. 2012).

4. Different institutional and financial actors play different roles in achieving low-carbon development pathways, and understanding these different roles is important to effectively mobilise private finance and investment. Given the existence of market failures, public financial institutions (PFIs) – or those publicly created and/or mandated financial institutions that have often been created to correct for the lack of market-based finance through the provision of missing financial services (Ratnovski and Aditya Narain 2007) – are well-placed to play an important role in scaling up private sector investments. These institutions are often active in sectors where market failures have substantially limited private-sector investment.

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<sup>5</sup> See (Corfee-Morlot et al. 2012) for estimates of the lifespans of different categories of infrastructure.

5. The role that public financial institutions, and bilateral or multilateral development banks, can play in financing the transition to a low-carbon society has been widely explored in the context of developing economies (UNCTAD 2012; Smallridge et al. 2012). However, to date there has been little research on the role that PFIs play in leveraging private sector investment in the OECD country context. This study, jointly undertaken between CDC Climat Research and the OECD, analyses the role of PFIs in three OECD countries and at the regional level (the European Union and in transition economies) in fostering the domestic transitions to a low-carbon economy and society. This report takes a case-study based approach analysing three institutions from OECD countries and two regional banks to understand the impact of these institutions in the domestic environments within which they operate. These cases include: the Group Caisse des Dépôts (CDC) (France); KfW Bankengruppe (KfW) (Germany); the UK Green Investment Bank (UKGIV) (UK); the European Investment Bank (EIB) (European Union); and the European Bank for Reconstruction and Development (EBRD) (transition economies). While a number of these institutions are active in international as well as domestic climate finance activities, these PFIs' international climate finance activities are outside of the scope of this study and are thus not considered here. While this exercise focuses on domestic, principally OECD country contexts, the lessons learned are to an extent also relevant to developing country context.

#### **Box 1. The OECD green investment policy framework**

The OECD has developed a green investment policy framework consisting of five elements (Corfee-Morlot *et al.* 2012):

1. Setting goals and aligning policies across and within levels of government. This includes clear, long-term vision and targets for infrastructure and climate change; policy alignment and multilevel governance, including stakeholder engagement.
2. Reforming policies to enable investment and strengthen market incentives for low-carbon, climate resilient (LCR) infrastructure. This includes sound investment policies to create open and competitive markets; market based and regulatory policies to “put a price on carbon;” removing harmful subsidies and correcting market failures.
3. Establishing specific financial policies, regulations, tools and instruments that provide transitional support for new green technologies, including financial reforms to support long-term investment and insurance markets; innovative financial mechanisms to reduce risk or increase market liquidity; and transitional direct support for LCR investment.
4. Harnessing resources and building capacity. This includes R&D for green technology; human and institutional capacity building to support LCR innovation; monitoring and enforcement; and climate risk and vulnerability assessment.
5. Reporting and consumer awareness programmes and public outreach.

Source: (Corfee-Morlot et al. 2012)

The objective of the study is to map the tools and instruments<sup>6</sup> used by these institutions to scale-up private sector investment in OECD country context, through:

1. facilitating access to long-term capital;
2. reducing project and financial risks; and
3. filling the capacity gap.

6. This analysis focuses on the PFIs' role in investing in low-carbon infrastructure projects, although some information is also provided on how these PFIs are supporting low-carbon enterprises and R&D. The principal objective is to understand how the instruments and programmes currently in use foster both public and private investment in low-carbon infrastructure projects. Initial analysis suggests that these interventions support investment in climate-friendly projects on the demand side by helping to overcome barriers to the development of a project pipeline. They also support the supply side by promoting and mobilising private sector financing and investment. As such, PFIs support the financing of existing projects and also assist in scaling-up the low-carbon infrastructure pipeline and available financing flows for future projects.

7. This report explores the role that selected PFIs are currently playing in financing the energy transition, and considers several questions:

1. Why are public financial institutions relevant to the transition to a low-carbon economy and society? How can they address existing barriers to private sector investment?
2. What are the specific mandates of these institutions? In what climate-specific activities are they involved? How does involvement vary between sectors (renewable energy, energy efficiency, sustainable transport), beneficiaries, brownfield vs. greenfield projects, etc.?
3. What are the financial instruments used by each institution to facilitate access to capital, manage risk and build capacity? What specific tools and instruments have been developed and how do they leverage private sector investments (investment structures, vehicles, financing types, de-risking instruments)?
4. How do these institutions mainstream climate concerns across their portfolio?

8. For each case study, data was collected through a desk review of academic and grey literature as well as official institutional communications. To complement this information, interviews were conducted with representatives from each of the financial institutions. The authors have strived to ensure the accuracy of the detailed, institutional-specific information presented in the report. However, given the rapidly evolving policy and investment environment within which these PFIs function, changes can occur quickly and render some estimates obsolete. Consequently, all program-specific information in the report should be taken as indicative rather than definitive. The case studies, published separately by CDC Climat Research, are available as working papers on their website at: <http://www.cdcclimat.com/Public-financial-institutions-OECD.html?lang=en>

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<sup>6</sup> For a broader discussions of the definitions of the various investment channels (instruments and vehicles) through which sustainable energy infrastructure can be financed and the interventions (tools and techniques) that exist, see the forthcoming OECD study "Institutional Investors and Sustainable Energy: Mapping Channels and Approaches to Mobilise Capital" (C. Kaminker et al. 2014). The definitions used in this study in this report on public financial institutions differ in some instances from those used.

**1. Public financial institutions: a key role to play in financing the transition to a low-carbon society**

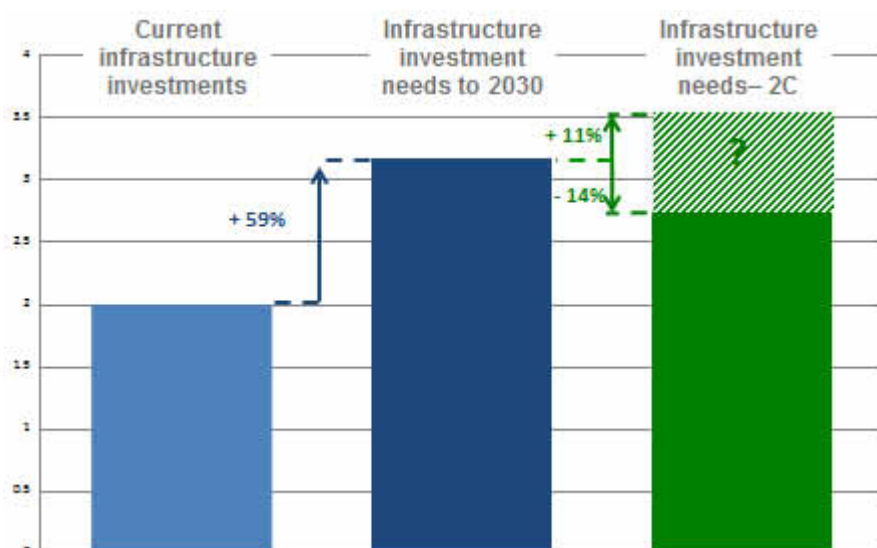
**1.1 The challenge of financing low-carbon infrastructure**

9. Development of low-carbon infrastructure is a key component of the transition to a low-carbon economy and society. Infrastructure plays a systemic role in structuring carbon- and energy-intensity on both the supply and demand sides. Given current global infrastructure activities and needs – such as construction of networks and systems in developing countries, and expansion or renewal of existing infrastructures in developed countries – this area of investment represents both an opportunity and a challenge. As explored in previous OECD work, the challenge lies in getting investment right to support climate action: choices made today about types, features and location of new and renovated infrastructure will lock-in “commitments” to future levels of climate change and to vulnerability or climate-resilience for decades to come (Corfee-Morlot et al. 2012; Kennedy and Corfee-Morlot 2012). Thus, prioritising investment in low-carbon climate-resilient infrastructure will be important in the coming years.

10. To achieve long-term climate objectives agreed by the global community – i.e. the 2-degree (2°C) goal – economies will need to shift from fossil-fuel intensive to low-carbon and climate-resilient<sup>7</sup> infrastructure investments. Examples include shifting from fossil-fuel-fired power plants to wind and solar power, and investing in low-carbon passenger rail, metros, bus rapid transit systems and electric vehicle charging infrastructure.

11. This shift may require additional spending beyond levels needed to meet global infrastructure needs, but could also result in net savings instead. (Figure 1, for example, suggests the shift could require 11% more investments or 14% less than regular infrastructure needs). For example, coal accounted for 44% of rail tonnage in the US in 2007. Transport of oil and coal accounted for 44% of the tonnage of maritime trade in 2010. If demand for fossil fuels decreased, this could reduce overall investment needs for rail and port infrastructure.

**Figure 1. Infrastructure investment gap**



Source: (Kennedy and Corfee-Morlot 2013)

<sup>7</sup> While this report focuses principally on greenhouse gas mitigation, the OECD and CDC Climat Research recognize the importance of ensuring that infrastructure under construction today will be resilient to future climatic conditions.

**Box 2. Scope of the project: Mapping of PFIs' project-related activities**

This report looks at PFI activities in three different roles: as a direct investor in low carbon infrastructure projects, as a project facilitator through capacity building for private actors, and as an investor mainstreaming climate change criteria in its investment portfolio.

In this context, low-carbon infrastructure projects encompass those which **mitigate** greenhouse gas emissions in the area of transport, energy sources and power production, as well as production and end-use energy efficiency. They include PFIs' investment activities in renewable energy (excluding nuclear power), sustainable transport infrastructure (public transport systems such as trains, Bus Rapid Transit (BRT) systems, metros and electric vehicle infrastructure), and energy efficiency measures in buildings (retrofitting of existing buildings or new buildings).

Efforts to "green" infrastructure investments may be directed at renovation of physical infrastructure (also referred to as "**brownfield**" investments), such as retrofitting power plants or energy efficiency projects, or building new infrastructure ("**greenfield**" investments), such as renewable energy projects or new public transport infrastructure systems. Investment to support green infrastructure may also be in the form of service sector activity (e.g. information provision, engineering or management advice).

*Source:* authors, (Kennedy and Corfee-Morlot 2012)

## 1.2 *Barriers*

12. Achieving the levels of investment necessary to meet climate objectives will be challenging. In addition to a general lack of widespread expertise in the financial community concerning these types of infrastructure, obstacles stemming from both the 2008 financial crisis as well as the resulting measures put into place to reform the financial sector have added additional complexity. The financial crisis has constrained government budgets in many OECD countries, putting downward pressure on public sources of investment financing for green infrastructure. Utility companies have little capacity to expand their investment in green infrastructure, as their balance sheets are constrained and any new debt could have potentially negative impacts on their credit rating and cost of capital. The financial resources required to meet the challenges relating to a shift to a low-carbon economy are substantial and the private sector will need to play a major role in green infrastructure projects, including by providing long-term debt finance and up-front capital investments. Alternative sources will be needed not only to compensate for these constraints, but also to ramp up green infrastructure investments. One potential source is institutional investors, including insurance companies, investment funds, pension funds, public pension reserve funds, foundations, endowments and other forms of institutional investors. (DellaCroce, Kaminker, and Stewart 2011; Kaminker and Stewart 2012; UNEP-FI 2009; UN-AGF 2010; Kaminker et al. 2013)

13. As identified in the latest OECD report, a range of barriers can have an impact on the risk-return profile of green infrastructure and can determine whether the financial asset class is attractive or accessible to long-term investors at all. They include: (1) Environmental, energy and climate policies and regulation that favour investments in "brown" infrastructure over green infrastructure, (2) Regulatory policies with unintended consequences, (3) A lack of suitable financial vehicles with attributes sought by institutional investors, and (4) A shortage of objective information, data and skills to assess transactions and underlying risks (Christopher Kaminker et al. 2013).

### 1.2.1 *Constraints in the banking sector: lack of long-term finance*

14. In the wake of the economic and financial crisis, some of the traditional sources of long-term finance and investment – governments, commercial banks and utilities – have significant constraints. For example, commercial banks have undertaken significant "deleveraging" in the wake of the financial crisis,



partly as a response to new regulations such as Basel III aimed at improving banks' solvency. Financial regulations agreed at international level to increase banks' level of capital and reduce their exposure to long-term debts (Basel III for banks around the globe, and Solvency II for insurance companies in Europe) can discourage long-term investments, including green infrastructure investments. In addition, certain accounting rules such as fair value or mark-to-market accounting (while having brought greater transparency and consistency to financial statements) can be difficult to apply to illiquid investments with long holding periods. Traditional equity investors in infrastructure development are also under pressure – both in terms of utility and corporate balance sheets – with an increasing need for third-parties for assistance. In the medium term, much hope has been placed in the financial markets – including the USD 83 trillion<sup>8</sup> in assets managed by institutional investors in OECD countries in 2012. For example, with often long-term investment horizons and an interest in projects that proved steady, inflation adjusted income stream, institutional investors such as pension funds and insurance companies are increasingly interested in projects such as the deployment of renewable energy projects. However, institutional investors' asset allocation to direct infrastructure investment in general remains small, less than 1% for OECD pension funds, and the “green” investment components remains even more limited. These issues are linked to the perception that green investments do not offer a sufficiently attractive risk-adjusted financial return, and to the fact that they still lack the knowledge and expertise, as well as investment channels (Kaminker et al. 2013).

### 1.2.2 *Currently unattractive risk-return profile requiring financial structuring*

15. Beyond the general financial constraints, private investment in low-carbon infrastructure projects is confronted with a number of specific constraints that further limit involvement today. The return profile of LCR infrastructure is different than usual infrastructures, typically with a high capital intensity concentrated in the construction phase (e.g. off-shore wind farms' high upfront costs). Investment timelines may also be long, and returns sometimes low compared to the risk profile of such investments.

16. Work by the Climate Policy Initiative (CPI 2013a) divides the LCR infrastructure-specific risks into several categories:

- *Political and regulatory risks* are a common set of risks in infrastructure investment, but are exacerbated in the context of green investments. The financial viability of low-carbon investment often relies on a supportive regulatory environment – either through taxing negative environmental externalities or removing subsidies for fossil fuels. As a result, changes in the political and regulatory landscape can significantly impact the financial feasibility of a project and increase investors' perception of risk. In particular in OECD countries, budget constraints and government's retroactive changes in support policies, such as the drastic reduction in feed-in tariff levels in Spain in 2010, increased the perception of policy risk by investors, both in the development phase and in the financing phase.
- *Technology and technical risks* are perceived as higher for immature low-carbon technologies, as no track record exists for investors on the performance of technologies and technologies are not yet proven.
- *Market and commercial risks* include uncertainties around: foreign denominations of currencies (currency risks); the demand for the project output (demand risks); access to capital for financing and re-financing (financing risks); ability of counterparties to honour contracted obligations

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<sup>8</sup> 2012 figure based on OECD estimates.

(counterparty risks); and the realised value when monetising the investment before the end of the asset's life cycle (for equity sponsors), or maturity of loans (for lenders) (liquidity/exit risks). These risks can be also significant barriers to investment in developed economies as well, given the long investment horizon and payback periods and the high upfront costs. According to the Climate Policy Initiative, market risk is not often the key barrier to private sector as instruments such as power purchase agreement and revenue support policies provide the sufficient support for risk management. However, in some instances the financial risk is perceived as high because of the lack of liquidity in a market where policies are developed on a project by project basis. (CPI 2013a)

### 1.2.3 *Lack of capacity*

17. Investments in LCRI are also undermined by lack of familiarity, limited information and knowledge, and limited expertise on green infrastructure among investors. For example, OECD research indicates that most institutional investors have limited experience with direct investment in green infrastructure projects, and it is expensive to build an internal team with the right skill set (investors need a minimum of USD 50 billion in assets to build such a team) (Christopher Kaminker et al. 2013). Unlike such investments as stocks, bonds, green infrastructure and infrastructure investment performance data is generally not collected systematically. No standardised financial vehicles have been developed that overcome these knowledge barriers, and investors tend instead towards traditional stock and bond investments or general infrastructure projects (Christopher Kaminker et al. 2013). In the absence of transparent information, data and financial research that can act as a signal to investors or means for performance comparison in any given sector, there are significant barriers to entry. Much of this data may reside in commercial banks which have specialised in infrastructure finance. The availability of such data would be a key element in stimulating investment conditions and building confidence in and track-records for new technologies, markets and financial products (Christopher Kaminker et al. 2013).

18. These factors influence the perception of investors on the riskiness of LCRI investments. To attract necessary capital, low-carbon infrastructure must be perceived as financially sustainable over the long-term, which in turn requires adequate risk-adjusted returns for different classes of investors (and adequate financing vehicles). A large portion of the barriers to engage private investors is linked to an unsupportive policy backdrop; lack of familiarity, information, knowledge and expertise with green infrastructure projects. As a result, reducing perceived risks and mitigating real risks for investors must be addressed for the risk-return equation to be sufficiently attractive to draw in the needed private capital.

### 1.3 *Public financial institutions: A role to play to overcome these barriers*

19. Public financial institutions (PFIs) – *or those publicly created and/or mandated financial institutions that have often been created to correct for the lack of market-based finance through the provision of missing financial services* have a potentially important role to play to scale up private sector investments. Historically, these institutions often have been active in sectors where market failures have substantially limited private-sector investment. As described in the literature, these institutions typically have mandates to provide long-term financing independent of market cycles in line with policy-oriented objectives. They are able in most cases to leverage capital at below-market rates for target investment through their high credit ratings. Finally, these institutions often serve as a catalyst for private-sector investment and innovation (Ratnovski and Aditya Narain 2007; UN-AGF 2010; UNCTAD 2012).<sup>9</sup>

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<sup>9</sup> Ratnovski and Narain's working paper for the IMF looked at 18 public financial institutions in five G10 countries (Canada, Germany, Japan, United Kingdom and the United States). The institutions studied ranged from different

1.3.1 *A policy driven mandate*

20. The institutions studied here have very different histories, with the oldest, the Caisse des Dépôts founded in 1816 and the newest, the UK Green Investment Bank created in 2012. Given their different initial purposes, funding sources and total assets under management, the range of support services they provide to their respective domestic economies varies. In general, these institutions are involved in providing financing to local governments, small, medium, and in some cases large companies, as well as financing domestic and territorial development projects – principally infrastructure. These institutions are typically independent, fully-public structures with their own corporate governance and management independent from their respective national governments in terms of day to day operations. However, their activities are restricted according to their mandates and their designated economic sectors by their respective government oversight bodies – whether individual national governments, the 28 EU Member States in the case of the EIB or the 64 shareholding companies of the EBRD. Mandates for all of the institutions focus on providing low-term financing, implementing targeted investment and financing programmes, and supporting national, regional and EU-scale policy.

21. Given the policy-oriented mandates within which these institutions operate, they are at times able to accept low- or below-market returns for capital provision. While the financial structure and viability of investments are important for these institutions – they operate at a loss only in extremely rare cases typically accompanied by a direct governmental mandate and remuneration – they are at times both able and willing to provide financing at below-market returns, setting them apart from commercial institutions.

22. These institutions have a history of acting in the public good, with historical examples including their support for post-war redevelopment, social housing, ex-Soviet transition economies and European integration. As such, addressing climate change, greenhouse gas mitigation and the necessary transition to a low-carbon economic model is in line with the tradition of PFI actions to achieve broad international and national public policy objectives.

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divisions of KfW Bankengruppe in Germany (as also included in this report) to the Japan Housing Loan Corporation to the Small Business Administration Credit Guarantees Program in the United States. The authors of this study expand on Ratnovski and Narain's classification to include public financial institutions working internationally (bilateral and multilateral development banks) and domestically (national development banks) with mandates to provide missing financial services and foster market development. While this paper principally addresses domestically-focused institutions in OECD countries, examples in non-OECD countries would include Banco Nacional de Desenvolvimento Economico e Social (BNDES) in Brazil, Corporación Financiera de Desarrollo in Peru, and China Development Bank, etc.

### Box 3. Formal mandates of public financial institutions

#### Caisse des Dépôts: Loi de la modernisation de l'économie, 2008

"Caisse des Dépôts et consignations is a special institution in charge of administering deposits (including compulsory ones), providing services related to the funds it has been entrusted to manage and carrying out the other missions legally attributed to it. It is in charge of protecting popular savings, financing social housing and managing retirement bodies. It also contributes to local and national economic development, particularly in the areas of employment, town policy, the fight against banking and financial exclusion, creation of businesses and sustainable development."

#### European Investment Bank: Article 130 Treaty of Rome<sup>10</sup>

"The task of the European Investment Bank shall be to contribute, by having recourse to the capital market and utilising its own resources, to the balanced and steady development of the common market in the interest of the Community. For this purpose the Bank shall, operating on a non-profit-making basis, grant loans and give guarantees which facilitate the financing of the following projects in till sectors of the economy:

- (a) projects for developing less developed regions;
- (b) projects for modernising or converting undertakings or for developing fresh activities called for by the progressive establishment of the common market, where these projects axe of such a size or nature that they cannot be entirely financed by the various means available in the individual Member States;
- (c) projects of common interest to several Member States which are of such a size or nature that they cannot be entirely financed by the various means available in the individual Member States."

#### European Bank for Reconstruction and Development: Articles of Association – Article 1: Purpose<sup>11</sup>

"In contributing to economic progress and reconstruction, the purpose of the Bank shall be to foster the transition towards open market-oriented economies and to promote private and entrepreneurial initiative in the Central and Eastern European countries committed to and applying the principles of multiparty democracy, pluralism and market economics."

#### KfW: Law Concerning Kreditanstalt für Wiederaufbau: Article 2 – Functions and business

1. KfW has the function of 1. Performing promotional tasks, in particular financings, pursuant to a state mandate in the following areas: a) small and medium-sized enterprises, liberal professions, and business start-ups, b) risk capital, c) housing, d) environmental protection, e) infrastructure, f) technical progress and innovations, g) internationally agreed promotional programmes, h) development cooperation, i) other promotional areas specifically stated in laws, regulations, or published guidelines on public economic policy that are assigned to KfW by the Federal Republic or by a Federal State. Each promotional task must be specified in a body of rules;
2. Granting loans and other forms of financing to territorial authorities (Gebietskörperschaften) and special-purpose associations under public law (öffentlichrechtliche Zweckverbände);
3. Financing measures with purely social goals and for the promotion of education;
4. Granting other financings in the interest of the German and European economy. The tasks of KfW in this area include: a) projects in the interest of the European Community that are co-financed by the European Investment Bank or similar European financing institutions, b) export financings outside the member states of the European Union, the other contracting states of the Agreement on the European Economic Area, and states with official status as candidates for accession to the European Union: a) on a syndicated basis or b) in countries lacking sufficient financing offers."

#### UK Green Investment Bank: Articles of Association – Green Objective 15 May 2012

*"(A) The objects of the company are to carry on the business of the company, making, facilitating, engaging in and encouraging investment, lending and related activities (including (without limitation) by or with respect to (i) the lending of money, (ii) the grant or provision of credit and other financial accommodation, (iii) the investment of money*

<sup>10</sup> [http://ec.europa.eu/economy\\_finance/emu\\_history/documents/treaties/rometreaty2.pdf](http://ec.europa.eu/economy_finance/emu_history/documents/treaties/rometreaty2.pdf)

<sup>11</sup> <http://www.ebrd.com/downloads/research/guides/basics.pdf>

*in investments and other financial assets (including (without limitation) securities (whether debt or equity in character)) and to hold sell or otherwise deal with such investments or other financial assets, (iv) the grant or provision of guaranteed security or support or (v) the grant or provision of other financial products (in all of the foregoing cases with or without interest, security or consideration)) which the board considers, will or are reasonably likely to, accelerate, advance or result in the completion, deployment, development, emergence, establishment or expansion of any business, enterprise, industry, infrastructure, project or technology which, in respect of each of the foregoing, the board considers will or is reasonably likely to contribute to one of the following:*

- (i) The reduction of greenhouse gas emissions,*
- (ii) The advance of efficiency in the use of natural resources,*
- (iii) The protection or enhancement of the natural environment*
- (iv) The protection or enhancement of biodiversity, or*
- (v) The promotion of environmental sustainability..."*

### 1.3.2 Access to long-term capital

23. The funding for these institutions comes from a variety of sources. A number of institutions, such as the Caisse des Dépôts, have accumulated over the course of their existence a substantial portfolio of assets. This capital is invested to generate funding for public-interest projects and SMEs. Other institutions such as the EBRD, EIB and the UK Green Investment Bank (UKGIB) have been capitalised by their “shareholders” – typically national governments – to leverage further financing or directly fund their overarching missions. Furthermore, these institutions are often assigned by their “shareholders” to manage targeted investment programmes using dedicated additional funding. For example, the French government has charged CDC with managing a portion of the *Investissements d’Avenir* programme in France. Further, KfW receives supplementary funding related to the deployment of certain government-mandated promotional programmes (energy efficiency for households, industry, etc.) which serve to cover KfW’s costs for providing concessional lending.

24. In general, one of the PFIs’ greatest strengths is their capacity to leverage high volumes of typically stable capital from sources independent of the public budget. The CDC is able to leverage a portion of France’s national private savings through its management of household passbook savings accounts. It uses these savings to support long-term, high-volume lending to local governments. Second, a number of these institutions (EIB, EBRD, and KfW) use their high credit ratings, and in some cases guarantees<sup>12</sup> from their respective governments, to leverage high volumes of financial resources from the international capital markets at rates unavailable in national markets. They are able, in turn, to pass these rates on to individual project developers through different lending instruments – both direct and intermediated. Finally, the EBRD works with a number of international donors – national governments as well as multilateral donors (Global Environment Facility, Eastern Europe Energy Efficiency and Environment Partnership, Western Balkans Investment Framework, etc.) – to co-finance technical support and capacity building at the project level.

<sup>12</sup> KfW benefits from a Federal German government-backed guarantee for its borrowing on international capital markets.

**Table 4. Principal financial resources of the studied public financial institutions**

	Own Assets / Shareholder Capitalisation	Dedicated Programme Funding / Management	National Household Savings	International Capital Markets	International Donors
CDC	X	X	X	X (limited)	
EBRD	X			X	X
EIB	X	X		X	
KfW	X	X		X	
UK GIB	X				

**Table 5. Capitalisation and resources of PFIs studied**

CDC (2012)	<ul style="list-style-type: none"> <li>- Own Assets: EUR 23 billion</li> <li>- Banking Services: EUR 47.9 billion, including €32.6 billion in funds entrusted by the legal profession and EUR 3.7 billion in escrow accounts</li> <li>- Regional and Local Development and Network Division (DDTR): EUR 388.9 million invested in public interest projects in 2011</li> <li>- Savings Funds (DFE): Centralised deposits from passbook savings accounts (LA, LDD, LEP): EUR 222.5 billion</li> </ul>
EBRD (2012)	Total assets: EUR 51.2 billion <ul style="list-style-type: none"> <li>- Financial assets: EUR 25 billion</li> <li>- Loans: EUR 18.8 billion</li> <li>- Shares: EUR 6.7 billion</li> </ul>
EIB (2012)	<ul style="list-style-type: none"> <li>- Own funds: EUR 55 billion</li> <li>- Uncalled subscribed capital: EUR 220 billion</li> <li>- Balance Sheet: EUR 508 billion</li> </ul>
KfW (2012)	<ul style="list-style-type: none"> <li>- Balance sheet: EUR 511 billion</li> </ul>
UK GIB	GBP 3.8 billion: <ul style="list-style-type: none"> <li>- Initial Capitalisation: GBP 3 billion to 2015,</li> <li>- Additional GBP 800 million for 2015-2016</li> </ul>

Source: (CDC 2013; EBRD 2012a; EIB 2013a; KfW 2012; UKGIB 2013a)

25. As seen in Table 5 the public financial institutions studied here have altogether a combined balance sheet of over two trillion euros deployed in the support of their public interest mandates.

### 1.3.3 Additional strengths: Size, reputation and relationships

26. In addition to their specific mandates and their ability to access high volumes of long-term capital, the PFIs studied have a number of characteristics that make them key actors in developing and pioneering new market offers, particularly low-carbon investment practices.

27. For example, the EIB has a long history of developing and experimenting with new investment and finance instruments (such as layered-debt funds as well as the Special Operations - ex-Structured Finance Facility described in Section 3) that are able to draw in additional sources of capital. Furthermore, while conservative in its approach, the EIB is nevertheless able to take risks for individual investments of a size that other market actors may not be able to absorb given the large size of its balance sheet.

28. These institutions also have developed strong reputations and close working relationships with other economic and financial actors. For example, the EIB, the EBRD and KfW all work extensively with national and local commercial banks through their intermediated or “on-lending” activities. KfW does not lend directly to enterprises or individuals, but rather lends through local commercial banks by providing refinancing loans to intermediaries at low rates and long maturities. Through the provision of access to funding for commercial banks, KfW incentivises these banks to participate in projects with profiles that they are not used to dealing with (energy efficiency, renewable energy, etc.). Similarly, the CDC works through its network of regional offices with local governments and private companies.

29. Finally, PFIs often appear to take a holistic approach to their engagement in particular sectors – focusing on the financing of individual projects, but also on broader capacity and market-development issues. As described in more detail in Section 3, the EIB is involved in a number of dedicated programmes (ELENA, JESSICA) to support capacity development among both public and private project developers, including low-carbon projects. KfW and its governmental counterparts have developed holistic financing programmes to target key market segments and leverage private actors. In addition to providing concessional loans, KfW has developed a number of market offers targeting specific sectors and technologies to help overcome barriers to investment (Offshore Wind Energy programme). Finally, providing technical assistance is a key part of the EBRD’s strategy. The EBRD provides grant co-financing (financed by donor partners) to facilitate project development. Through its donor-funded Technical Cooperation funds, the EBRD provides clients with technical support across the whole investment life-cycle. This includes undertaking energy audits in order to unlock opportunities to achieve sustainable reforms, and developing capacity building programmes with some clients.

30. These institutions may also have a role in addressing more systemic issues in markets. The EBRD combines project-level financing and investment and a broader policy dialogue with national governments and project developers through the *Sustainable Energy Initiative (SEI)*, which is the EBRD’s principal programme to address climate and energy through their market-centred mandate. This initiative addresses the twin challenges of climate change and energy efficiency in the EBRD’s region of operation through scaling up the EBRD’s sustainable energy investments in all sectors, improving the business environment for sustainable investments, and working closely with donors and shareholders to develop effective measures to address key barriers.

#### **1.4 Framework for analysing PFIs’ roles in the transition to a low-carbon society**

31. Drawing on UNCTAD’s work on the role of national development banks (UNCTAD 2012), Table 6 presents the framework used in this report to analyse the role of *public financial institutions* in terms of supporting projects and private sector investments, including in the low-carbon energy transition. The activities of PFIs can be grouped into three categories, mapping the barriers identified in section 1.2: (1) providing and facilitating access to long-term capital; (2) reducing project and financial risks; (3) filling the capacity gap. The instruments to fulfil these roles are explored in detail in Section 3.

**Table 6. Roles and tools of public financial institutions in supporting the low-carbon energy transition**

Role	Functions	Tools and instruments
<b>Facilitate access to capital</b>	<ul style="list-style-type: none"> <li>• Providing long-term capital</li> <li>• Facilitating access to private capital</li> </ul>	<ul style="list-style-type: none"> <li>- Concessional and non-concessional lending</li> <li>- Equity investment</li> <li>- International climate funds</li> <li>- Public private partnerships</li> </ul>
<b>Reduce risk</b>	<ul style="list-style-type: none"> <li>• Risk sharing</li> <li>• Credit enhancement mechanisms</li> </ul>	<ul style="list-style-type: none"> <li>- Guarantees</li> <li>- Structured finance</li> <li>- Public private partnerships</li> <li>- Junior debt/Mezzanine financing</li> </ul>
<b>Fill the capacity gap</b>	<ul style="list-style-type: none"> <li>• Aiding project development</li> <li>• Reducing project risks</li> </ul>	<ul style="list-style-type: none"> <li>- Technical assistance</li> <li>- Capacity Building</li> <li>- Information tools (GHG quantification, energy certificate tracking)</li> </ul>

Source: Authors based on UNCTAD 2012; CPI 2013.

#### *Facilitate access to capital*

32. Public financial institutions are able to both provide and facilitate access to long term capital. As investors and financiers, they purchase equity positions and provide long-term loans. In both cases, this signals State support for a sector or given project, thus catalysing further investment from private actors. As a facilitator, PFIs can play a role in developing new markets and mechanisms – either through their own expertise or through being an initial investor to demonstrate viability. They also develop aggregating structures to pool small-scale loans and investments into tranches with risk-return profiles appealing to different types of investors.

#### *Reduce risk*

33. PFIs play a role in reducing risk – whether between project phases (financing and refinancing), by sharing among project participants or by providing credit enhancement mechanisms to reduce overall risk perception of projects. Risk reduction across the different stages of the project can take the form of credit refinancing guarantees. Risk sharing between project participants takes a number of forms, such as loan underwriting, specialised fund structures, and first-loss arrangements such as junior debt and mezzanine financing. Finally, PFIs can provide direct credit enhancement for projects through their participation in bond issuances. Through reducing the risks perceived by private investors and sharing them across project phases and between actors, these institutions can take important steps to removing many of principal barriers to private sector participation.

#### *Fill the capacity gap*

34. Public financial institutions can contribute to filling the capacity gap associated with low-carbon projects due to the relatively new nature of these investments for a large number of financial actors. The PFIs studied in this report act through dedicated research teams focusing on developing new market tools and expertise needed for the provision of technical assistance and project appraisal support to project developers and other actors. Providing these tools and expertise can reduce overall project risks described above. Furthermore, PFIs' consideration of broader societal, environmental and economy-wide impacts of



investments as well as financial aspects allows them to analyse the pertinence of individual investments as well as broader sector participation in light of broader public policy objectives.

35. While the PFIs studied here all fulfil all [?] these roles, investment approaches and philosophies may vary across institutions. For example a number of them provide financing principally through lending (EIB, KfW, EBRD) or a mix of debt and equity (CDC, UKGIB). Furthermore, much variance is seen in terms of the risk-oriented mechanisms currently used as well as their role in filling capacity gaps. Section 2 looks at the low-carbon sectors in which the five institutions studied are involved, focusing principally on renewable energy, energy efficiency and sustainable transport. Section 3 maps the types of instruments used by these institutions to support these activities. Finally, Section 4 looks transversally at how climate change and the transition to a low-carbon economy and society are integrated across all of the institutions' activities and into decision-making processes.

**Table 7. History and activities of public financial institutions**

	Creation	Principal Sources of Funding
CDC	1816	Own equity: no contributions from the State budget or taxes. Mandated financial sources: Regulated savings accounts (Livret A); Investments for the future programme; Pensions and solidarity schemes; Funds entrusted to the legal profession
EBRD	1991	63 shareholder donor countries, including the EU and the EIB. International capital markets: bond issuance
EIB	1958	Own funds including called capital from the Bank's shareholders (the 28 EU Member States) International capital markets: bond issuance
KfW	1948	International markets: raises funds at least cost through government guaranteed bond issuance Budget allocation from Federal Ministries to support mandated programmes and promotional offers
UKGIB	2012	Direct funding from the UK government Currently does not borrow, capital increases will come from investment returns

## 2. PFIs and the low- carbon transition: Mapping involvement in infrastructure projects

36. A principal objective of this study is to map the current involvement of public financial institutions in project development and financing low-carbon sectors. The five public financial institutions studied in this report have different histories, ranges of activities, sources of funding and mandates and priorities. Nevertheless, they often share similar traits in terms of how they are involved in and support the low-carbon energy transition. These PFIs are involved – either explicitly or indirectly – in a number of different activities supporting low-carbon development. This includes investments and support for research, development and innovation in low-carbon technologies and processes, and support for companies specialised in low-carbon service provision. In general, however, the PFIs studied are most involved in supporting infrastructure projects. This is in line with their broader mandates to fill market gaps in long-term financing.

37. In addition to providing direct financing of projects, PFIs play a role in catalysing and mobilising additional public and private sources. All five PFIs studied are involved through a variety of tools and mechanisms in the development, construction and operational stage of projects. Project types include

energy efficiency projects for households, industry and commercial and public actors; investments in centralised and decentralised renewable energy production; and the financing of sustainable transport.

38. This section presents the different mandates of these institutions for low-carbon development, their current levels of investment in this area as well as their specific project-development activities in the areas of renewable energy, energy efficiency and sustainable transport.<sup>13</sup> While these institutions are also active in terms of supporting R&D investments and climate-related service companies (energy service companies, etc.), this information is not included below as it falls outside of the main focus of this paper.<sup>14</sup>

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<sup>13</sup> For the purposes of this paper, sustainable transport encompasses investment in public transport, fluvial and rail modes.

<sup>14</sup> A brief description is included in each of the case study appendices available on the CDC Climat Research website at <http://www.cdcclimat.com/Public-financial-institutions-OECD.html?lang=en>

**Table 8. Strategic sectorial priorities of public financial institutions studied (as of 2013)**

Overarching Priorities & Mandates	
<b>CDC</b>	<p>2007-2012 Strategic Plan's objectives :</p> <ul style="list-style-type: none"> <li>• housing and urban development;</li> <li>• businesses;</li> <li>• universities and the knowledge economy;</li> <li>• sustainable development.</li> </ul> <p>The definition of sustainable development used by the CDC includes not only renewable energy and the fight against climate change, but also biodiversity and more broadly socially-responsible investment. At the end of 2013, the CDC issued a new strategic plan including the Environmental and Energy transition as a strategic priority area of action for the institution.</p>
<b>EBRD</b>	<p>Businesses: Access to loan and equity finance provides firms of all sizes not only with opportunities to undertake investment, but also with additional incentives to improve management performance and business planning.</p> <p>Financial institutions: The EBRD has helped strengthen and stabilise the financial infrastructure of countries by investing directly in banks, and by providing credit lines for on-lending to businesses and individuals.</p> <p>Utilities, city governments and national authorities: finance the increased capacity that economies need to function, covering transport networks, energy generation and supply, water and sanitation, and other urban infrastructure projects.</p>
<b>EIB</b>	<p>Six priorities, as defined in its the 2012-2014 Corporate Operational Plan<sup>15</sup>:</p> <ul style="list-style-type: none"> <li>• Small and medium-sized enterprises &amp; mid-caps: the creators of 80% of new jobs;</li> <li>• Regional development: to address economic and social imbalances;</li> <li>• Environmental sustainability: including both climate action and investment in the urban and natural environment;</li> <li>• Innovation: promoting skills and innovation at every level;</li> <li>• Trans-European Networks: linking Europe's infrastructure, principally in transport;</li> <li>• Energy: building competitive and secure supply.<sup>16</sup></li> </ul>

<sup>15</sup> The EIB has since issued its 2014-2016 Operational Plan, which similarly focuses on SME access to finance, marketability of SME risk, unemployment, strategic infrastructure and resource efficiency initiatives, blending EIB resources with EU funds, advisory services, EU cohesion, innovation, climate action, young and innovative firms and other forms of social and economic infrastructure.

Overarching Priorities & Mandates	
<b>KfW</b>	<p>The three main objectives of the lending and promotional activities are:</p> <ul style="list-style-type: none"> <li>• Combatting climate change and protecting the natural environment;</li> <li>• Ensuring competitiveness in a globalised world and promoting technical progress;</li> <li>• Managing demographic change.</li> </ul> <p>KfW addresses additional transversal challenges in its activities: poverty reduction, general corporate finance (especially for SMEs) and start-up financing.</p>
<b>UKGIB</b>	<p>Purpose is to help Government to achieve its sustainability targets in a cost effective way, and will therefore never undertake activities which are in conflict with Government policy objectives.</p>

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<sup>16</sup> More broadly, in the energy sector, the Bank's activities contribute to broad EU policy objectives such as environmental sustainability; competitiveness in energy supply; and security of supply, reducing and diversifying Europe's dependence on external energy. While many synergies are present, not all actions in the area of energy are coherent with climate objectives.

## *2.1 Mandates in the low-carbon economy*

39. The PFIs studied here can be differentiated according to the level of clarity of the mandate they receive from governments: from exclusive mandate and authority in green infrastructure to ad-hoc green investment activities as part of a much broader mandate driven by public interest. **Error! Reference source not found.** presents the overarching mandates of the five PFIs.

40. The EIB, KfW and the UK Green Investment Bank are institutions with clear mandates to support policy on climate and low-carbon energy related subjects:

- As a policy driven institution in charge of supporting the implementation of European Union policy, the EIB has integrated EU targets in the Climate-Energy Package of 20-20-20 into its activities. Since 2007, it has stepped up its energy lending including for renewable energy and energy efficiency, and set itself specific targets in order to achieve concrete results.
- KfW supports the Federal Government with the “KfW Energy Turnaround Action Plan” (or “Energiewende” in German), which aims at meeting the financing requirement for the EUR 27 billion of capital investment needed each year to implement the energy turnaround by 2020.
- The raison d’être and principal mandate of the UK GIB is to support the UK government in achieving its sustainability targets in a cost effective way. As such, they are mandated by the UK Government to deploy at least 80% of capital in the following priority sectors: (1) offshore wind, (2) waste recycling and energy from waste, (3) non-domestic energy efficiency, and (4) support for the Government’s Green Deal.<sup>17</sup>

41. Other public financial institutions appear to be involved in a less targeted manner, supporting national climate and energy objectives through involvement in specific programmes or through agreements signed with other governmental agencies:

- CDC has signed an agreement to help the French government finance 10% of its planned investments in renewable energy to achieve the national commitment to have 20% of gross internal energy consumption from renewable sources in 2020. Most recently, in 2013 the CDC has made supporting the low-carbon energy transition a principal objective in its current five year strategic plan. This has led to the creation of a transversal chair to coordinate activities across business areas. Furthermore, it was entrusted in the fall of 2013 with the creation and management of a national guarantee fund to support energy efficiency investment in the residential sector. The operational details of this fund are being developed in 2014.

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<sup>17</sup> The Green Deal is a government programme launched by the Department of Energy and Climate Change focused on providing loans for energy saving measures for homeowners. The Green Deal has four main objectives: to provide accredited advice and recommendations to improve the energy efficiency of UK homes; to improve energy efficiency at no upfront cost to the homeowner; to ensure that energy efficiency improvements will be executed to the highest standards; and to allow repayments to be made through energy bills, with the opportunity of switching suppliers at any time.

- As part of its sustainability objectives, the EBRD has integrated climate and energy issues across its activities. However, it also recognises that the economic growth capacity of the regions in which it invests will continue to rely on energy-intensive industries. As such, rather than exclude activities, the EBRD focuses on making these industries less energy-demanding. Thus priority is given to best available techniques without excluding a specific activity as long as they contribute to developing a market-based and sustainable economy in the operating area. Furthermore, the EBRD has set a Sustainable Energy Investment financing target of EUR 4.5 to EUR 6.5 billion for the 2012-2014 period as part of Phase 3 of its Sustainable Energy Initiative (SEI).<sup>18</sup>

#### **Box 4. The proliferation of dedicated energy and climate investment institutions: US examples**

The beginning of the 2010s has seen the creation of a number of public financial institutions with specific environmental, climate- and energy-related mandates similar to that of the UK Green Investment Bank. Three such institutions have either been created or are in the process of being created by individual States in the United States: the Connecticut Clean Energy Finance and Investment Authority, the New York Green Bank, and the California Green Bank.

The Connecticut Clean Energy Finance and Investment Authority (CEFIA) was created in 2011 by the State of Connecticut with the mandate of supporting the Connecticut government's strategy to facilitate the production of cleaner, cheaper and more reliable sources of energy through clean energy finance. While it does not provide loans itself, CEFIA administers a number of programmes focusing on the deployment of renewable energy production as well as energy efficiency. It tends to target households, SMEs as well as public institutions (municipalities). To date, CEFIA has intervened principally through grants and other direct incentives as well as third-party leasing programmes. The institution has been funded with USD 30 million per year from an existing surcharge on electricity bills and USD 18 million from a dedicated Connecticut Green Loan Guaranty Fund. It is currently in the process of launching to expand its use of financial instruments (buy down of interest rates, support for loan losses, third-party insurance).

Source: (CEFIA 2013)

Created in December 2013 by the New York State, the NY Green Bank (NYGB) focuses on the use of different financial instruments to work with private sector lenders in supporting the installation of hard infrastructure and energy efficiency projects. The NY Green Bank has an initial capitalisation of USD 218.5 million. Rather than lending itself, the NYGB has expressed its intent to use credit enhancement, loan loss reserves and loan bundling to support securitisation and build secondary markets.

Source: (State of New York 2013)

The State of California also has been exploring the development of its own green bank to focus on investments in green infrastructure since March of 2013. While to date relatively little information is available concerning the structure of the institution, its objective would be to leverage private capital to increase infrastructure financing. Initial discussions have suggested that revenues from the auction of carbon credits from the State's emission trading system would be used to fund the green bank.

Source: (CGC 2013)

<sup>18</sup> The Sustainable Energy Initiative (SEI) was created in 2006 to address specifically the twin challenges of climate change and energy efficiency, to mainstream both aspects into all EBRD operations across all sectors, and to scale up sustainable energy finance in the operating region. SEI investments are in five areas: industrial and corporate energy efficiency; sustainable energy financing facilities (SEFFs); power sector energy efficiency; renewable energy; and municipal infrastructure energy efficiency. SEI activities also include carbon market development, climate change adaptation, financial products development (e.g. financing tools for ESCOs), and sustainable energy policy dialogue to support regulatory change.

## 2.2 *Quantifying the current activities of the PFIs: Project finance*

42. The PFIs studied in this report have begun to track total levels of investment in low carbon sectors such as energy efficiency, renewable energy, and sustainable transport. As seen in Table 9 over the period 2010-2012 PFIs have made millions of euros in equity investment as well as billions of euros in loans for renewable energy, energy efficiency and sustainable transport projects. The relative weight of low-carbon activities in the energy and transport sectors compared to all commitments, nevertheless, varies significantly between institutions as well as between sectors (Table 10). It ranges from 15% of lending and 13% of equity investments (CDC), to 23% of all commitments (EIB), to 35% of all commitments (KfW). (Comparable estimates for the EBRD are not available. The UK Green Investment Bank's portfolio consists exclusively of low-carbon investments.) This data should be taken, however, as indicative as it provides an incomplete picture due to data availability. Given that the PFIs studied do not include low-carbon investment categories as separate accounting lines, the consolidation of low-carbon investment data poses a number of challenges. Furthermore, the data presented may not be comparable as it may aggregate information from a variety of beneficiaries (local government, SMEs, project developers), financial instruments (debt, equity, de-risking, structured finance, investment in funds), and initiatives to provide expertise and support capacity building.

**Table 9. Public financial institutions' self-reported low-carbon infrastructure investment levels vs. total commitments for investment activities – 2010-2012**

	Sector	2010		2011		2012		Period Total	
		M€	% <sup>iv</sup>	M€	%	M€	%	M€	%
EIB	Sustainable Transport	7 700	11%	8 100	13%	5 700	11%	21 500	12%
	Renewable Energy	6 000	8%	5 700	9%	3 300	7%	15 000	8%
	Energy Efficiency	2 200	3%	1 300	2%	1 100	2%	4 600	3%
	<b>Total “low-carbon” projects</b>	<b>15 900</b>	<b>22%</b>	<b>15 100</b>	<b>24%</b>	<b>10 100</b>	<b>20%</b>	<b>41 100</b>	<b>23%</b>
	<b>Total Commitments</b>	<b>72 000</b>		<b>61 000</b>		<b>52 000</b>		<b>184 000</b>	
CDC <sup>v</sup>	Sustainable Transport (Loans)	548	72%	3660	84%	1 500	55%	5 709	73%
	<i>Total Loans Sustainable Infrastructure</i>	757		4365		2 727		7 849	
	Energy Efficiency (Loans)	233	2%	380	3%	453	4%	1 066	3%
	<i>Total Loans Social Housing and Urban Programme</i>	13 699		12 657		12 362		38 723	
	<b>Total “low-carbon” projects (loans)</b>	<b>782</b>	<b>5%</b>	<b>4 040</b>	<b>24%</b>	<b>1 953</b>	<b>13%</b>	<b>6 775</b>	<b>15%</b>
	<b>Total Lending Commitments</b>	<b>14 456</b>		<b>17 022</b>		<b>15 089</b>		<b>46 572</b>	
	Renewable Energy (Equity)	<b>40</b>	<b>12%</b>	<b>38</b>	<b>12%</b>	<b>53</b>	<b>16%</b>	<b>131</b>	<b>13%</b>
<b>Total Annual Equity Investment</b>	<b>337</b>	<b>318</b>		<b>324</b>		<b>979</b>			
KfW	Sustainable Transport	-	-	-	-	-	-	-	-
	Renewable Energy <sup>vi</sup>	9 591	15%	7 017	14%	7 937	16%	24 545	15%
	Energy Efficiency <sup>vii</sup>	10 315	16%	9 701	19%	13 697	27%	33 713	20%
	<b>Total “low-carbon” projects</b>	<b>19 906</b>	<b>31%</b>	<b>16 718</b>	<b>33%</b>	<b>21 634</b>	<b>43%</b>	<b>58 258</b>	<b>35%</b>
	<b>Total Domestic Commitments</b>	<b>64 442</b>		<b>50 927</b>		<b>50 629</b>		<b>165 998</b>	
UKGI B <sup>viii</sup>	Sustainable Transport	-	-	-	-	-	-	-	-
	Renewable Energy	-	-	-	-	200 M€	-	200 M€	-
	Energy Efficiency	-	-	-	-	145 M€	-	145 M€	-
	<b>Total estimated investment to 2016</b>					<b>3 800 M€</b>			
EBRD	Sustainable Transport	2006 – 2013 : 1 billion €							
	Renewable Energy	2006 – 2013 : 3,2 billion €							
	Energy Efficiency <sup>ix</sup>	2006 – 2013 : 8,5 billion €							
	SEI <sup>x</sup> Total 2006-2013	2006 – 2013 : 12,7 billion €							
	<b>Total “low-carbon” projects</b>	<b>2 200</b>	<b>24%</b>	<b>2 600</b>	<b>29%</b>	<b>2 300</b>	<b>26%</b>	<b>7 100</b>	<b>26%</b>
<b>Total business volume</b>	<b>9 009</b>		<b>9 051</b>		<b>8 920</b>		<b>26980</b>		

Source: Author after institutional reports and data provided by the PFIs studied. Please see appendices for detailed information on data sources.



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<sup>iv</sup> Percentage of total annual commitments or, in the case of the CDC, sector-specific lending.

<sup>v</sup> The estimations for the CDC exclude the equity investments of CDC Infrastructure has invested EUR 225 million in sustainable transport projects and EUR 55 million in renewable energy between 2010-2013. Due to a lack of data, this total excludes the activities of *ExterImmo* as well as the CDC Climat's 2013 energy efficiency investments in the industrial sector.

<sup>vi</sup> These values exclude projects financed outside of Germany as well as the financing of project by the KfW IPEX-Bank in Germany. Additionally, the "KfW Offshore wind energy programme" introduced in 2011 is not included due to comparability reasons (EUR 542 million in 2011). The transversal energy Turnaround Financing Initiative is not either included since funds are used for renewable energy as well as energy efficiency projects (EUR 65 million in 2012).

<sup>vii</sup> This includes energy efficiency construction and renovation programmes for private households, and other initiatives for energy efficiency targeting companies and local authorities.

<sup>viii</sup> The UKGIB began investing in 2012. The GBP 200 million of renewable energy investment includes GBP 100 million for offshore wind and GBO 100 million for biomass. The GBP 145 million of investment in energy efficiency is made up of non-residential projects.

<sup>ix</sup> Includes industrial, municipal and power-sector energy efficiency.

<sup>x</sup> Created in 2006, the Sustainable Energy Initiative (SEI) is the EBRD's principal programme dedicated to energy efficiency and renewable energy. It is designed to transversally integrate these two issues into investment decisions across the institution.

### Box 5. Leveraging effects of PFIs

Little information is available concerning the leveraging of private finance by public financial institutions through their low-carbon investment activities. Furthermore, it is difficult to compare information provided by PFIs on their leveraging effects, as they do not systematically provide data on their low-carbon investments.

The EIB has estimated that their 10% participation in a fund structure can lead to 90% additional funds raised (1:10) which then on average provides 25% of the capital needed for a given project (Knowles 2013). Across all their activities, the EIB has estimated that they have been able to maintain a capital leverage ratio of 1:2.5 (EIB 2013a).

In 2011, through EUR 6.3 billion KfW committed to renewable energies programmes in Germany, an estimated EUR 8.3 billion private investment mobilised. Furthermore, through its lending for energy efficiency in the housing sector, KfW made EUR 6.5 billion in commitments leading to EUR 18.4 billion of total investments across 282 thousand housing units. This was done at a cost (funding for subsidised lending, repayment bonuses, etc.) to the federal budget of EUR 934 million – representing a leverage effect of almost twenty-fold (20 private euros invested for 1 euro of public funds). Further, in 2010, for each euro dedicated to energy efficiency in buildings (insulation), the State received 2 to 4 euros back through taxes and avoided cost of unemployment only thanks to a rise in activity. (Gumb 2012)

Furthermore, researchers have estimated potential benefits for public accounts also exist: for each euro dedicated to energy efficient renovation (thermal), the State received 2 to 4 euros back through taxes and avoided cost of unemployment thanks to a rise in economic activity and job creation. Further positive externalities could also be included, such as avoided fossil fuel consumption. (Rüdinger 2013)

During its first period of activity in 2012, the UK Green Investment Bank committed funds to 11 transactions for a total value of GBP 2.3bn. Of this amount, the UKGIB directly committed GBP 635m, resulting in a leveraging ratio that sees an almost 1:3 leveraging ratio of private sector money (UKGIB 2013a).

The EBRD has taken a slightly different approach in analysing its leverage effect. The institution has calculated the volume of sustainable energy investments mobilised per euro spent on technical assistance and other grant programmes. The EBRD calculated its grant impact leverage ratio for sustainable energy investments at 1:5.5 euros in 2012 and at 1:232 for technical cooperation (EBRD 2012d).

## 2.3 *Financing projects: Sectors, types, phases and beneficiaries*

43. The sectors in which PFIs provide interventions, types of intervention, phases of involvement, and beneficiaries are as diverse as the mandate of institutions. This divergence can be linked to a number of different factors, including: differing mandates from PFIs' governance bodies and national governments; each institution's historical range of activities; their freedom to develop new financial products; as well as the resources they dedicate to climate and energy. These factors, combined with the overall investment philosophy of each institution appear to have a significant impact on the choice of instruments used by each institution.

### 2.3.1 *Investment philosophy*

44. Each PFI's sectors of activity can be linked to its broader investment philosophy concerning what is the best means of leveraging additional private financing for projects. Institutions such as the EIB support the "crowding in" of private finance through de-risking instruments and a provision of large-scale long-term finance at advantageous interest rates. The EIB is often seen as playing a role that no other market actor is able to play given the large amounts of capital involved in the different projects and the investment time horizons (Knowles 2013). With similar objectives, KfW and the EBRD work mainly through intermediated lending, partnering with local commercial banks to lend typically to small- and medium-sized projects.

45. The UK Green Investment Bank is pioneering a different investment philosophy, focusing on drawing in private capital through setting an example to the private sector in terms of the potential profits to be made on projects (see Box 6). There is a strong emphasis on prioritising sectors in which public actions can quickly leverage private investment. As such, the selected sectors are those where it appears that UK GIB's added "capital, knowledge and reputation can make the difference that enables a project to be financed successfully". UK GIB prefers technologies that are on the "cusp" of profitability from an investor perspective. As such, the UKGIB does not offer de-risking tools or concessional financing, but rather focuses on sectors where the provision of capital at market rates can lead to financially viable products and projects. (UKGIB 2013b; UKGIB 2013c).

### 2.3.2 *Principal sectors of intervention*

46. The five public financial institutions vary in terms of the sectors and sub-sectors within which they actively invest in low-carbon projects. This variation appears to be strongly linked to their broader investment mandates and historical scope of activity. As seen below in Table 10 the institutions show a degree of variety in their sectors of activity, and that seems to be linked to their mandates.<sup>19</sup>

#### **Box 6. The UK Green Investment Bank's investment philosophy**

The UK Green Investment Bank's investment approach challenges a number of traditional methods of financing "green" and "low-carbon" projects that are typically seen as posing a large number of investment risks. Rather than deploying financial instruments to reduce the price of capital (subsidies, guarantees, concessional loans) or investing in high-risk projects, the UK GIB has expressed their unwillingness to accept high levels of risk for low levels of return.

The GIB does not think that capital is too expensive for projects, but rather that the risk-return profile of the project is not attractive. As such, they hypothesise that market actors do have a reasonable understanding of the market and the current risk profile of these new technologies, and conclude that there is too much risk for too little return. To correct this problem in the market, the GIB plans to invest in projects that can deliver a strong return in order to demonstrate that these projects can be profitable. Thus, UKGIB will show that these projects are on the cusp of being profitable for all market players and that the biggest barrier is more expert knowledge – not necessarily risk-mitigation or cost reduction. While this approach may not solve all market "gaps", the GIB believes that their approach will help keep private capital within the market after public financing or other support is removed.

For more information, see: <http://www.greeninvestmentbank.com/what-we-do/our-investment-approach.html>

<sup>19</sup> Public financial institutions' activities in both energy efficiency and renewable energy investment can often be divided into two general categories: large scale and small scale. While this definition can vary per institution, large scale projects typically have minimum investment thresholds of multiple millions of euros and involve direct interaction with a project promoter. Small-scale projects often are much smaller in size – representing thousands of euros per project. PFIs are often involved in small-scale projects through intermediated lending or through fund structures.

Table 10. Principal sectors of intervention for public financial institutions

	Renewable Energy		Energy Efficiency					Transport
	Small Scale <sup>20</sup>	Large-Scale <sup>21</sup>	Small Scale		Large Scale			
			Residential	SMEs	Commercial/ Industrial	Public Buildings	Social Housing	
<b>CDC</b>		X		X	X	X	X	X
<b>EBRD</b>	X	X	X	X	X	X		X
<b>EIB</b>	X	X	X	X	X	X	X	X
<b>KfW</b>	X	X	X	X	X	X	X	X
<b>UK GIB</b>	X	X	X	X	X			

<sup>20</sup> Decentralized, small-scale installation principally for retail customers (residential, small commercial interventions, etc.).

<sup>21</sup> Renewable energy-based power plants and industrial installations.

47. PFIs have integrated or developed climate- and energy-related programmes in areas within which they have been historically active. For example, the Caisse des Dépôts has long worked with local governments and local housing authorities on social housing and public transport. They have worked much less with individual households and have not focused on the provision of direct lending or finance for large private companies. Furthermore, as noted above, the EBRD attempts to integrate energy efficiency aspects into all of the projects it is involved with in transitioning economies with continued heavy dependence on fossil-fuel –based energy.

48. Additionally, the mandates of the five PFIs in this study can have a strong impact on the areas in which they are active. KfW works with the Ministries of the German Federal government. In its regular field of activity (promotional business, Article 2 paragraph 1 KfW-Law) KfW also develops programmes and new initiatives in close cooperation with the government Ministries and complying with larger government strategies. Typically, before KfW's programmes are put into practice, KfW establishes a written mandate or contract with the respective Federal Government Ministry. Furthermore, in the case of the UK Green Investment Bank, the areas within which it is active must be approved by the UK government as priority sectors. It has a mandate to deploy at least 80%<sup>22</sup> of its capital in four sectors: offshore wind; waste recycling and energy from waste; non-domestic energy efficiency; and support for the Government's Green Deal. The selection of sectors for investment is either directly tied to Government programmes and objectives (i.e. the Green Deal) or an analysis of need for intervention within a given sector.

### 2.3.3 *Investment phases: High participation in construction*

49. The public financial institutions studied here are principally involved in the financing of the construction and operational phases of infrastructure and energy efficiency projects. This appears to stem partially from their history and mandates to provide assistance and capital for construction when large amounts of initial long-term funds may not be available for capital-intensive projects. In some cases this may also be linked to the risk/return profile of projects as the level of risk tends to increase further upstream in the process. This appears to be particularly true for the UK Green Investment Bank which typically does not accept project risk/return profiles out of line with broader market practice.

50. When involved at the pre-construction phases, the PFIs tend to provide subsidies (grants) or direct technical support for a given project. This support assists project developers who are typically time-rich but capital-poor. As described below in Section 3, a number of institutions – particularly the EIB and the EBRD – have developed dedicated capacity support and technical cooperation programmes to aid project developers with the initial phases of their projects. As discussed above the EBRD has estimated that this can have a significant leveraging effect on the total volume of financing for projects in later phases. EBRD estimates its grant impact leverage ratio for sustainable energy investments at EUR 1:5.5 in 2012 and at 1:232 for technical cooperation (EBRD 2012d).

51. During construction phase, the institutions studied here provide different forms of capital through the broad range of instruments described in Section 3. Whether in the form of equity stakes to assist project promoters to attract further equity or be eligible for loans, direct and intermediated lending (the most widespread method), or de-risking instruments, PFIs' most widespread role is in linking actors with capital.

52. At the "Operational" phase of a project – or when construction is complete or close to completion and the project is able to begin to reimburse debt and provide investors with revenue streams – a number of

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<sup>22</sup> The balance of capital can be deployed in the following "non-priority" sectors authorized by the UK GIB's State Aid approval from the European Commission: biofuels for transport; biomass power; carbon capture & storage; marine energy and renewable heat.

PFI's are becoming increasingly involved. The UKGIB is involved in fostering “capital recycling” or investments in equity in these projects to free-up initial capital investments by project developers for future projects. The CDC is also involved in a similar type of support through CDC Infrastructure which is actively investing in mature brownfield infrastructure projects through equity. At this stage PFI's also provide refinancing and or refinancing guarantees to ensure that debt continues to be available for new projects from providers with shorter tenors in their lending activities.

**Table 11. Principal phases of intervention in project life cycle for public financial institutions**

	Pre- construction	Construction	Operational
CDC	- Studies (grants)	- Debt - Equity	- Equity
EBRD	- Technical cooperation (grants) - Studies (grants and facilities)	- Debt - Equity - Guarantees - External fund structures	- Equity holding - Assistance with refinancing (debt, refinancing guarantees)
EIB	- Studies (grants and facilities)	- Debt - Equity - Guarantees - External fund structures	- Same as under constructions - Refinancing
KfW	- Studies (grants)	- Debt	
UK GIB		- Debt - Limited equity	- Equity

#### 2.3.4 Beneficiaries: A principal focus on supporting regional and local governments

53. The institutions studied here typically have a historical and direct mandate to assist local governments and other sub-national public actors with the development and execution of their projects. The CDC, the EBRD, the EIB and KfW all have a long history of providing debt for local projects in line with public policy priorities.

54. These institutions also often have a mission to support small- and medium-sized companies and in certain cases large companies of national interest. Given the large size of the projects on which they focus, the EIB and the UKGIB finance both utility companies and private project promoters developing renewable energy projects. In some instances, the scope of the PFI's perimeter for investment is limited by size of the companies involved. For example, the CDC has signed an agreement with the French state to invest equity only in SMEs involved in the deployment of renewable energies to foster the development of this market – thus excluding existing, large-scale market actors who potentially have fewer limitations in accessing capital. Furthermore, given the EBRD's mandate to support a transition in former Soviet countries towards a market economy, its investment strategy in general focuses on developing the private sector and freeing up public sector resources for investment in other areas. As such, the EBRD's activities often benefit private beneficiaries – focusing on small, medium and large companies. This also holds true for their financing of renewable energy and energy efficiency projects. Nevertheless, the EBRD is working

with both national and local government bodies to provide financing for projects – particularly in the areas of transport and municipal infrastructure.

55. Of the PFIs studied that interact with private households, there is a tendency to use intermediated lending through local commercial banks. In the case of KfW, financing for households for energy efficiency projects and small-scale renewables is provided through intermediated financing by local financial institutions. This programmatic approach through intermediated financing allows these institutions to both involve private financial actors (thus sensitising them to these subjects) as well as leverage local financial institutions' knowledge of their respective markets.

**Table 12. Principal investment partners and beneficiaries for public financial institutions**

	Public	Private		
	Local governments	Utilities /Large Corporations	SMEs	Households
<b>CDC</b>	<ul style="list-style-type: none"> <li>- Transport</li> <li>- Renewable energy</li> <li>- Energy efficiency</li> </ul>	<ul style="list-style-type: none"> <li>- Energy efficiency</li> </ul>	<ul style="list-style-type: none"> <li>- Renewable energy</li> </ul>	
<b>EBRD</b>	<ul style="list-style-type: none"> <li>- Sustainable transport</li> <li>- Renewable energy</li> </ul>	<ul style="list-style-type: none"> <li>- Renewable energy</li> <li>- Industrial energy efficiency</li> </ul>	<ul style="list-style-type: none"> <li>- Renewable energy</li> <li>- Industrial energy efficiency</li> </ul>	<ul style="list-style-type: none"> <li>- Renewable energy</li> <li>- Energy efficiency</li> </ul>
<b>EIB</b>	<ul style="list-style-type: none"> <li>- Transport</li> <li>- Renewable energy</li> <li>- Energy efficiency</li> </ul>	<ul style="list-style-type: none"> <li>- Renewable energy</li> <li>- Limited energy efficiency</li> </ul>	<ul style="list-style-type: none"> <li>- Renewable energy</li> <li>- Limited energy efficiency</li> </ul>	
<b>KfW</b>	<ul style="list-style-type: none"> <li>- Renewable energy</li> <li>- Energy efficiency</li> </ul>	<ul style="list-style-type: none"> <li>- Under specific conditions<sup>23</sup></li> </ul>	<ul style="list-style-type: none"> <li>- Renewable energy</li> <li>- Energy efficiency</li> </ul>	<ul style="list-style-type: none"> <li>- Renewable energy</li> <li>- Energy efficiency</li> </ul>
<b>UK GIB</b>	<ul style="list-style-type: none"> <li>- Renewable energy</li> <li>- Energy efficiency</li> </ul>	<ul style="list-style-type: none"> <li>- Renewable energy</li> <li>- Energy efficiency</li> </ul>	<ul style="list-style-type: none"> <li>- Renewable energy</li> <li>- Energy efficiency</li> </ul>	<ul style="list-style-type: none"> <li>- Energy efficiency (UK Green Deal)</li> </ul>

<sup>23</sup> Large companies are eligible for KfW's programmes under specific conditions. For example, large renewable energy companies are eligible for the *Premium Renewable Energies Program* provided that their solar thermal, deep geothermal, heat storage and heating network measures are "particularly deserving of support." For energy efficiency, large companies are eligible for the *KfW Energy Efficiency Program* as long as the annual group turnover does not exceed EUR 2 billion (up to EUR 4 billion is possible with approval of the Federal Ministry of Economics and Technology).

## 2.4 Sector-specific activities: Filling gaps and creating new markets

56. As seen above, the public financial institutions studied for this report are active in varying sectors, targeting a range of beneficiaries during different phases of the project lifecycle. While the activities of the individual institutions vary, in many instances they attempt to address many of the same barriers to investment.

### 2.4.1 Renewable energy

57. In the renewable energy sector, the institutions studied have frequently identified a need for the provision of high-volume, long-term capital to support the development of these projects. The lack of available financing stems both from issues of risk perception (insufficient returns on the risks taken for these technologies, many of which are relatively untested) as well as liquidity and refinancing concerns as capital is locked-up in projects over long durations.

58. Support for this sector by the PFIs studied varies in terms of technology, the size of projects and beneficiaries.

59. For example, the majority of the EIB's renewable energy loans go to wind and solar power generation. It encourages the expansion of early-stage or evolving technologies such as offshore wind, photovoltaic and concentrated solar power as well as second-generation biofuels as well as "mature" renewable energy technologies, such as onshore wind farms, hydropower, geothermal and solid biomass. The UK Green Investment Bank is active only in those renewable energy sectors where it deems greater market participation is limited by perceived rather than actual risks. These sectors include off-shore wind and bio-energy.

60. The Caisse des Dépôt's involvement in financing the development of renewable energies stems from its agreement to support the French government to achieve national objectives in this area. Investments in renewable energy occur principally through equity participation in small- and medium-sized project companies. To a lesser extent, CDC makes equity investments in large-scale projects, through external funds structures or the dedicated infrastructure subsidiary company, CDC Infrastructure. As such, it attempts to assist in market development through the promotion of decentralised energy production throughout the national territory; foster competition in a largely centralised industry (the large European energy companies); as well as strengthen French sectors in the context of strong international competition. Finally, CDC also takes equity positions in operational (completed) projects through the investments of CDC Infrastructure, although such activities account for a much smaller portion of the total investment portfolio.<sup>24</sup>

61. KfW's "*Renewable Energy Programme*" is one of the flagship initiatives of KfW concerning environmental protection. The programme stimulates investments in renewables such as solar, wind, hydropower and biomass through the provision of concessional loans through local finance institutions (on-lending) and limited direct lending to municipalities. KfW also provides support for offshore wind projects. As KfW's role in these large-scale offshore-wind projects is to provide financing packages of necessary size and tenor (i.e., large, long-term loans), it may provide direct lending at un-subsidised market rates.

62. The EBRD's activities in renewable energy have been accelerating over the last few years. In 2012, half of EBRD's investments in power and energy projects were dedicated to large and small-scale renewable power generation, totalling 14 projects that amount to EUR 300 million (EBRD 2013d). The

<sup>24</sup> CDC infrastructure has invested 9 million euros (24% of total capital) in the *ForVEI* joint venture currently purchasing equity stakes in operational solar power plants in Italy (CDC Infra 2012).



investments included large-scale wind farms and solar installations as well as small-scale hydropower and biomass projects. The EBRD supports large-scale projects through a number of instruments, including direct loans, intermediated loans as well as limited equity investments<sup>25</sup>. In many instances, this financing is paired with donor support for projects through Sustainable Energy Direct Financing Facilities (SEDFFs) discussed in Section 3. Furthermore, as in all sectors, the EBRD engages with national governments through its Policy Dialogue (see Section 3) to facilitate broader market reforms and regulations to foster renewable energy deployment.

#### 2.4.2 *Energy efficiency*

63. Energy efficiency activities at the PFIs studied are often transversal in nature, cutting across other sectoral activities such as energy production and distribution, industry and production, transport as well as residential and tertiary areas. As such, the approaches taken vary greatly depending on the targeted area. The interventions of PFIs are provided to respond to a number of barriers linked to supply of finance for energy efficiency investments (UKGIB 2013):

- A highly fragmented market, with a large number of often small-scale projects using multiple technologies;
- Lack of full and confident knowledge of the available savings;
- Agreed way of managing and sharing the project risks in order to create a financeable investment.

64. The institutions studied are involved on the demand-side for energy efficiency to foster the number of projects in the pipeline – particularly at the residential level. As described in further detail below, the CDC and KfW (see Box 7) have developed programmes that incentivise energy efficiency improvements. The CDC’s lending programme for energy efficiency in social housing as well as KfW’s range of programmes offer increasingly attractive terms (interest rates, eligibility of reimbursable costs, repayment bonuses) linked to the level of ambition of energy efficiency projects.

65. Energy efficiency is a cross-cutting issue that the EBRD addresses in various sectors including transport, industries, municipal and environmental infrastructure, energy production and the residential sector. EBRD provides intermediated and direct lending for energy efficiency projects. In 2012 through the EBRD’s Sustainable Energy Financing Facilities (SEFFs – see Section 3) which provide dedicated credit lines to local financial institutions, new loans worth EUR 4,221 million were provided to 33 financial institutions across 12 countries. In addition to the corporate, industrial and residential sectors, the EBRD widened its outreach by extending financing through banks to local municipalities and by increasing its activities in the agricultural sector (EBRD 2013a). In addition to lending and its actions through the SEFFs, the EBRD has developed an integrated support programme for energy efficiency as reflected in its Central European Initiative (CEI) Fund.<sup>26</sup> In the countries of operations of the CEI Fund and

<sup>25</sup> More recently, equity was used for the first time to scale up investment in wind farms in Hungary and Poland (EUR 125 million equity investment in the Polish and Hungarian subsidiaries of Iberdrola Renovables in 2010). Equity investments can be combined with loans such as in 2012 when the EBRD financed the first wind farm in Mongolia with a USD 42 million loan and a USD 4 million equity investment.

<sup>26</sup> The Central European Initiative, established in 1989, is a regional forum for cooperation and consultation at political, economic and cultural levels in Central and Eastern Europe. In 1992 Italy signed an agreement with the EBRD on the establishment of a CEI Fund “to assist the Bank’s countries of operations in central and eastern Europe in their economic and social transformation process”. The CEI Fund, to which the Italian Government has been the sole donor with a total contribution to date of EUR 36.5 million, mainly provides grant-type assistance for specific components of technical cooperation (TC) projects. Since its inception, it has provided more than EUR 22.2 million for TC funding. It has also contributed more than EUR 1.4 million to the Know-How Exchange Programme, which

of the EBRD, energy has typically been cheap in past years. Companies have traditionally been slow to consider environmental issues and improve their energy efficiency. The fundamental components of integrated support are: energy audits, support in project implementation and know-how transfer. This support helps companies through the whole energy efficiency implementation process, starting from the initial appraisal of existing energy use, through the identification of the best technologies/practices to be adopted, and finally to their incorporation in companies' core activities (EBRD 2012b). Finally, as described in its "Energy Strategy" the EBRD also addresses energy efficiency through its larger policy dialogue. Its policy dialogue activities aim to enable energy-efficient behaviour, and support the introduction/upgrading of energy efficiency standards and establishment of appropriate energy efficiency policy frameworks. For the EBRD, the most effective driver of energy efficiency is the promotion of cost-reflective pricing of energy supplies (EBRD 2013b).

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supports transfer of best practice from the EU to the non-EU countries within the CEI and is the Fund's second most important instrument (EBRD 2012b).

### Box 7. Targeted subsidies to increase energy efficiency ambition: Repayment bonuses

Within KfW's programmes focusing on the energy efficiency of buildings, the level of aid is progressive. While the base rate of the loans does not vary, the repayment bonus granted by KfW after the certified completion of projects is indexed to project's overall level of ambition. For example, as seen in the Energy-efficient Construction and Refurbishment Programmes for households:

- KfW designs its EECR offer to improve upon Federal energy efficiency requirements for new buildings. The programme requires a higher energy efficiency standard than the German Federal government's standard energy efficiency requirements for new constructions in the Energy Saving Ordinance (EnEV).<sup>27</sup>
- Aid is progressive: the higher the efficiency standard met, the greater the repayment bonus. The progressive nature of the programme gives incentives to increase the ambition of projects and surpass regulatory standards and use the most efficient technologies. This helps ensure that energy efficient renovation will reduce expenditures from residents on their heating bills and postpone the need for additional thermal renovation. In the case of new construction, KfW provides funds only if the building will be better than the EnEV requirements for new buildings in terms of primary energy demand and transmission heat loss. For rehabilitation projects, the conditions for eligibility start at 115% of the allowed energy demand level for new construction. KfW has defined five levels of support for a "KfW Efficiency House": 55, 70, 85, 100, 115 – corresponding to the resulting energy demand after construction/renovation as a percentage of the energy demand allowed for new construction. In case the landlords cannot engage in projects that lead to one of these KfW standards, KfW also funds partial rehabilitation work through the so-called "individual measures".
- An obligation of performance: aid is granted only when the achievement of a higher energy efficiency level resulting from construction or refurbishment work has been verified. To do so, one of the 4,500 accredited experts must evaluate the building before and after work is performed. The combination of ex-ante and ex-post evaluation is a key factor for the success of the programme.
- Technology-neutrality: there is no requirement regarding the technological means used to reach the target energy efficiency level. This flexibility increases demand for new energy efficient technologies, and thus indirectly stimulates research and development for them.

#### 2.4.3 Sustainable transport

66. The PFIs that currently actively invest in the area of sustainable transport (CDC, EIB, EBRD) have established investment policies that are often linked with broader transport-related investment issues.<sup>28</sup> These institutions are particularly involved in providing high-volumes of long-term capital necessary for inter-urban and urban transport projects. These institutions have been involved over the last decade in developing a Public-Private Partnership model to share risk among actors and leverage private sector investments.

<sup>27</sup> The EnEV assesses energy efficiency based on both primary energy demand and transmission heat loss. Primary energy demand is the leading criterion and refers to the energy input in the complete supply chain to heat the building and supply warm water.

<sup>28</sup> KfW does not have a special domestic programme dedicated to public transport infrastructure. Nevertheless, it can finance low-carbon transport through a number of programmes. For example, KfW's Environmental Program fosters the commercialisation of different kinds of low-emission vehicles. KfW committed EUR 184 million to low-emission vehicles through the KfW-Environmental Program between 2010 and 2012.

67. For example, the Caisse des Dépôts and its subsidiaries have long been active in transport infrastructure investment in France. Today, this investment occurs principally through the debt finance activities of the Savings Fund division (DFE) and CDC Infrastructure – a subsidiary of the CDC specialised in equity investments in infrastructure projects. While historically the CDC has been a substantial actor in the development of the national highway system, it currently plays much less of a role in this sector. Instead, it recently has become a major investor in both public and national rail transport systems, including through financing the high-speed rail lines.

68. The EIB's actions promote a shift from private to public transport and investment in lower-carbon transport of goods and people. This in turn supports the development of low-carbon transport modes, improvements in energy efficiency and limits greenhouse gas emissions, while often improving air quality and reducing noise pollution. The Bank's support of low-carbon transport ranges from: the construction, extension or rehabilitation of sustainable transport infrastructure (for example railway, light rail, metro and tramway systems, short-sea shipping, inland waterways and bus rapid transit systems); the acquisition of its associated vehicles/rolling stock; the promotion of cycling and pedestrian networks; deployment of electro-mobility. Between 2010-2012, the EIB lent EUR 21.5 billion 2010-2012 or 12% of EIB lending over the same period. In 2011, the EIB supported a total of 37 transport infrastructure projects in 13 countries in the EU. Rail projects accounted for more EIB finance than investment in roads, with EUR 4.3 billion and EUR 3.4 billion respectively. In 2011, support for sustainable transport amounted to EUR 8 billion (EIB 2012a). Projects included the Ile-de-France transport network upgrade involving four tramway lines in Paris, the first tramway in Tours (France) and the Nottingham (UK) tram network extension, as well as the extension of metro lines in Rome, Prague, Bucharest and Helsinki.

69. The EBRD has focused on energy efficiency investments in the transport sector under the SEI programme. These investments have targeted more fuel efficient rolling stock, ships and other vehicles, as well as better use of traffic management systems and the adoption of best practices in terms of energy efficiency standards in the built environment for transport infrastructure, such as airports and port terminals. In the field of non-urban transportation, the EBRD invests broadly in aviation (7%), ports and shipping (7%), railways (34%), roads (49%), and intermodal logistics (3%). Thus while EBRD's investments in this sector may support carbon-intensive modes of transport, the EBRD nevertheless fosters "sustainable" transport by applying energy efficient technologies, operational practices and standards, reducing energy consumption in the transport sector, and developing logistic services and new technologies to reduce the need to travel.<sup>29</sup> In urban transport, the EBRD's activities focus principally on maximising energy efficiency or low-carbon transport. It seeks to improve urban transport sustainability by focusing on various goals: increasing walking, cycling and public transport usage; reducing traffic congestion through traffic reduction measures; increasing the energy efficiency of urban transport systems; and introducing the use of sustainable renewable energy for urban public transport.

## 2.5 *Low-carbon activities beyond infrastructure investment*

70. In addition to financing low-carbon infrastructure and energy efficiency projects, the public financial institutions studied here are often involved in a number of areas consistent with the transition to a low-carbon economy and society. These include supporting the development of low-carbon technologies and supporting businesses that provide services needed to support the energy transition. Furthermore, a number of institutions have also developed dedicated programmes for adaptation and other climate-related areas such as forestry.

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<sup>29</sup> For instance in the rail sector, sovereign-guaranteed loans were used to purchase energy-efficient rolling stock in FYR Macedonia. The EBRD also engaged with rail companies in Serbia and FYR Macedonia to build capacity for energy management through technical cooperation funds for the implementation of energy management systems.

### 2.5.1 *Supporting low carbon technologies and service companies*

71. The five PFIs have developed programmes to support R&D for low-carbon technologies and the development of low-carbon service companies. Many of these programmes and activities are integrated into initiatives to foster innovation in technology development and more general business development and employment. Their activity in these areas can come in the form of climate- or energy-specific programmes and actions or indirectly when support for projects contributing to the low-carbon energy transition are a “co-benefit” of a synergetic activity.

72. The CDC, EIB and KfW have a number of programmes specifically targeting low-carbon sectors for technology development and the creation of companies specialised in low-carbon areas:

- The CDC is active through a number of programmes providing seed capital, debt and equity investment in companies involved in the development of green technologies, eco-industry and other sectors. For examples, CDC Climat has taken an equity holding in a number of low-carbon services companies such as: Climipact (Metnext), a company specialising in providing information and decision-support services on climate-related topics; HPC-SA, a software developer focusing on low-energy-use buildings; as well as G2Mobility, a company involved in the deployment of charging stations for electric vehicles.
- Acting as an agent for the European Commission, the EIB is raising financing through the sales of 300 million EU Allowances and providing project appraisal expertise for the NER300 initiative, which is one of the world’s largest funding programmes for carbon capture and storage demonstration projects and innovative renewable energy technologies. The monetisation is now completed and more than EUR 2 bn has been raised.
- KfW has developed a number of dedicated programmes to support low carbon technologies and service companies – such as energy service companies as well as software and information technology companies designing products for low-carbon management solutions. While not dedicated to low-carbon technologies, the ERP Innovation programme assists a number of companies to help them develop and get to market. KfW also supports industrial actors in this area through the BMU Environmental innovation programme which aids industrial projects using advanced technological procedures to reduce environmental pollution, to manufacture and employ ecologically sound products.

**Box 8. KfW ERP Innovation Programme: focus on R&D and commercialisation, favouring “Energy Turnaround” projects**

This programme enhances the ability of existing firms to develop innovative technologies and to market them. The programme targets self-employed professionals and enterprises, with preferential conditions for SMEs (i.e. a reduced interest rate). It does not focus on start-ups, since companies must have been on the market for at least 2 years to be eligible.

The ERP Innovation Programme is not specific to companies focusing on energy-climate efficiency per se, but it includes advantageous conditions for efficient energy technologies. Indeed, the R&D part of the programme provides up to 5 million loans per project; but if the technology is for saving, storing, transmitting or producing energy, the maximum amount rises up to 25 million per project (limited to 50 million per enterprise).

### 2.5.2 *Adaptation & forestry activities*

73. Public financial institutions are active in adaptation and forestry, although these activities are more limited in scope than their activities in terms of low-carbon infrastructure and to a lesser extent R&D and service companies.

74. The EIB has made adaptation to climate change a priority in its investment practices. In 2011, the EIB supported 16 projects, of which 14 were in the water sector, that contribute to increasing climate-resilience and adaptation to changing weather conditions. These projects were located both inside and outside the EU, and amounted to a total of 1.2 billion euros. Furthermore, the EIB has been active in the forestry sector through its activities in afforestation and reforestation in the EU for thirty years, including through providing direct financing for projects (EUR 200 million loan for afforestation and forest management measures in Hungary; EUR 75 million for forest fire prevention in Spain). The EIB activities in this area also include its participation in a number of global private equity funds. This includes EUR 30m invested in the Dasos Timberland Fund<sup>30</sup> and up to EUR 25 million in the Althelia Climate Fund.

75. The KfW Entwicklungsbank (*KfW Development Bank*), which focuses on international development finance, introduced a systematic climate change assessment in 2011 to look at climate protection and adaptation risks, opportunities and solutions.

76. The EBRD also supports projects focused on adaptation and resilience to climate change by providing finance and technical assistance, from identifying climate change impacts to developing strategies for adaptation and investing in measures and technologies to improve their resilience. Climate change adaptation was introduced in Phase 2 of the Sustainable Energy Initiative (2009-2001). As a cross-cutting issue, it also relates to projects under its Sustainable Resource Initiative. The EBRD supports both “hard” adaptation measures (e.g. physical modifications and additional infrastructure/ technology) and “soft” adaptation measures (e.g. adaptive management to provide improved flood or hydrological monitoring and emergency response plans) (EBRD 2012a). Since 2006, the EBRD has provided EUR 348 million to 43 adaptation projects in 13 countries through the SEI (EBRD 2012c). It identified sectors with critical climate adaptation needs, including water supplies in early transition countries, hydropower investments, water efficiency in water-intensive industries, and coastal and port infrastructures (EBRD 2011).

### 2.5.3 *Supporting carbon finance and market-based tools*

77. While marking up only a small portion of their climate-related activities, climate finance and other market-based tools have been supported by a number of the PFIs studied. The EIB has historically played an important role in supporting carbon finance. It has been involved in a number of programmes to help EU Member States implement their GHG emission reduction commitments and encourage developing economies’ engagement by developing market-based instruments. Several instruments aimed at reinforcing the carbon markets and supporting the development of green technologies were launched, the first of which beginning in 2006.<sup>31</sup>

78. The EBRD aims at connecting its regions of operations with current and future carbon markets to facilitate the transition towards a sustainable energy future. The EBRD became active in this area well

<sup>30</sup> This fund aims at investing in forestry projects in member states and candidate countries that have a positive impact on carbon emissions, soil and freshwater conservation and biodiversity. It has an investment period of four years and is expected to reach a total fund size of €300m.

<sup>31</sup> All funds below are closed or are in the process of closing, including: Multilateral Carbon Credit Fund, Carbon Fund for Europe, EIB-KfW Carbon Programme I & II, Post 2012 Carbon Credit Fund and the Fonds Capital Carbone Maroc.

before the Kyoto Protocol entered into force in 2005. The EBRD's role in developing carbon markets is threefold. First, the EBRD manages two carbon credit funds, the EUR 32 million Netherlands Emissions Reduction Cooperation Fund (NERCoF) established in 2003, and the Multilateral Carbon Credit Fund (MCCF) established jointly with the EIB in 2006. Second, the EBRD assists clients in developing and monitoring their carbon assets by providing technical assistance on carbon markets. Third, the EBRD builds capacity for carbon markets development. Such activities include the determination of electricity grid emission factors (in Kazakhstan, the Russian Federation and Ukraine) for purposes of calculating emission reductions in Joint Implementation projects in order to lower transaction costs in the development of such projects.

### **3. PFI financial tools and instruments to leverage private finance**

79. The public financial institutions studied in this report deploy a range of instruments and programmes to support low-carbon infrastructure investments. In some cases, this takes the form of dedicated programmes and facilities focusing on a specific sector or sub-sector (such as a focus on off-shore wind or energy efficiency in the residential sector). In other cases, PFIs are combining both traditional investment tools (equity investments, concessional loans, junior debt) with "innovative" tools (layered debt funds, bond enhancement). In most instances, when these resources are deployed – whether through instruments increasing access to capital, sharing risk or through dedicated programmes to build capacity – there is a focus on how to best use such instruments to mobilise private finance in projects.

#### **3.1 Access to long-term capital**

80. Given the scope of the investment challenge at hand, with estimates of hundreds of billions of euros needed in the energy sector alone to achieve long-term climate objectives, investment requirements significantly exceed what the public sector can provide. Public financial institutions play a role by facilitating access to capital for institutional, commercial and individual investors. As illustrated in Table 13, this occurs through PFIs' lending activities, equity participation and a number of other instruments (fund structures, market-rate junior debt, bond issuance and enhancement).

Table 13. Principal instruments deployed by PFIs to facilitate access to capital

	Renewable Energy		Energy Efficiency					Transport
	Small Scale	Large-Scale	Small Scale		Large Scale			
			Residential	SMEs	Commercial/ Industrial	Public Buildings	Social Housing	
<b>CDC</b>	-	- Equity - Externally managed funds	-	- Equity	- Equity - Externally managed funds	- Concessional Debt	- Concessional Debt	- Equity - Concessional Debt
<b>EBRD</b>	- Intermediated lending	- Intermediated lending - Multilateral carbon credit fund - Direct lending - Equity - Loan syndication	- Intermediated lending - Multilateral carbon credit fund	- Intermediated lending	- Intermediated lending - Multilateral carbon credit fund - Direct lending - Equity - Loan syndication	-	-	-
<b>EIB</b>	- Intermediated Lending - Externally-Managed Funds	- Direct lending - Externally-managed funds - Refinancing	- Externally-managed funds	- Intermediated Debt - Externally-managed funds	- Intermediated Lending - Dedicated programmes (Green Initiative - )	- Direct Lending - Externally-managed funds	- Direct lending - Intermediated lending	- Direct Lending



	Renewable Energy		Energy Efficiency					Transport
	Small Scale	Large-Scale	Small Scale		Large Scale			
			Residential	SMEs	Commercial/ Industrial	Public Buildings	Social Housing	
	- Guarantees	- Guarantees						
<b>KfW</b>	- On-lending concessional debt	- Direct market-rate debt (off-shore wind)	- On-lending concessional debt	- On-lending concessional debt	- On-lending concessional debt  - Direct market-rate debt ( <i>Energy Turnaround Initiative</i> )	- On-lending concessional debt	- On-lending concessional debt	-
<b>UK GIB</b>	- Externally-Managed Funds	- Debt  - Equity	- Provision of Capital for Green Deal	- Externally-Managed Funds	- Debt/  - Equity	-	-	-

### 3.1.1 *Lending: Provision of senior debt*

81. Since 2008, access to long-term debt for both brown and green project types has been reduced due to broader economic conditions as well as changes in regulation. When available from commercial institutions, debt tends to be offered in small amounts with short tenors to assure liquidity. Increasing access to lower-cost financing, and finding ways to reduce commercial financing rates across green infrastructure sectors are key elements for fostering project development.

82. Among the PFIs studied, lending to low-carbon projects is provided mainly through direct lending (for large-scale projects) or intermediated lending through local finance institutions. In the case of large-scale projects, PFIs tend to be involved due to the high volume of debt financing necessary for the project, and which is typically either unavailable from commercial capital markets or provided at interest rates that are unacceptable for the project's financial model. Intermediated financing allows PFIs to involve private local finance institutions through their administering of loans for small-scale, diffuse energy efficiency and renewable energy projects. For example (see Box 9), KfW uses extensive intermediated "on-lending" to provide local finance institutions with low-cost capital to subsequently lend to projects as well as the selective use of guarantees to incentivise their participation. As such, KfW works not only to develop a larger market offer for energy efficiency, but also to build capacity to support energy efficiency projects among local financial institutions and overcome a number of the transaction costs they would experience in attempting to provide direct financing to small-scale projects.

83. The EBRD also provides intermediated lending to smaller projects, such as through the Sustainable Energy Financing Facilities (SEFF) model. SEFFs are used to finance energy efficiency and small-scale renewable energy investment opportunities and typically benefit industrial and residential sector borrowers. SEFFs currently operate in 15 countries via 70 local financial institutions. Financing is based on the EBRD extending long-term credit lines to local banks that participate in the Facilities.<sup>32</sup> Each credit line is specifically dedicated for on-lending to final beneficiaries. In turn, the local banks use the credit line to provide loans to borrowers with eligible investment opportunities. Loan amounts vary depending on the Facility and the investment opportunity and typically range from EUR 2,500 to EUR 5 million.<sup>33</sup> The EBRD supports each credit line with a comprehensive technical assistance package that helps potential borrowers prepare loan applications, and familiarises local bank loan officers with sustainable energy investment opportunities (see Section 3.3). Since 2006, more than EUR 900 million was on-lent to approximately 1,000 businesses, 500 housing associations and 30,000 households (McCallion 2012).

#### 3.1.1.1 Below-market rates and terms

84. When mandates and investment priorities specifically allow, public financial institutions are able to lend to projects in targeted sectors at concessional rates or rates normally lower than those to which project developers have access. Additionally, a number of the PFIs studied can lend on further advantageous terms, such as fixed-interest rates and multiyear initial payback-free periods as seen in many of KfW's lending practices.

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<sup>32</sup> The EBRD contends that SEFFs do more than encourage investments in energy sustainability. By ensuring that local financial experts are able to identify such investment opportunities, and by appraising and financing these investments, SEFFs also generate long-term local capacity and contribute to the establishment of self-supporting markets for investment in energy sustainability.

<sup>33</sup> Loan amounts typically range from a few hundred thousand euros to a few million euros for industrial energy efficiency projects, from a few thousand euros for individual apartments to a few hundred thousand euros for multi-apartment buildings, and as high as a few million euros for renewable energy projects.

85. Funding for concessional loans is either raised on the international capital markets using the high credit rating of the PFIs in question (EIB, KfW) to borrow at rates not available to national capital market actors or individual project developers, or derives from loans using the passbook savings accounts managed by the institutions (CDC). As seen in Box 9, the use of passbook savings funds by PFIs tends to occur under close oversight by the State with limits on the type of projects for which these funds can be used. These two methods allow PFIs to lend at below-market rates without recourse to public subsidies.

86. Concessional lending is also – when government programs exist - partially financed through government funds – as is the case for a number of KfW’s programmes as well as for the CDC’s *Eco-prêt Réhabilitation Logement Social Bonifié*.<sup>34</sup> In the case of KfW, the bank often elaborates its programme in collaboration with the relevant Federal Ministry. After approval, the programmes may receive in some instances a budget allocation from the Ministry to fund the grant element of promotional loans. KfW finances the rest of the loan at low cost on the international capital market, by issuing German Federal government-guaranteed bonds.

87. Finally, the EBRD applies a syndication approach to its lending. Throughout its lending activity, the EBRD tailors each project to the needs of the client, and to the specific situation of the country, region and sector. It typically funds up to 35% of the total project cost for a greenfield project. There must be additional funding provided by the project sponsors or other co-financiers, or generated through the EBRD’s syndications programme. EBRD’s loans have a number of adaptable features on a case-by-case basis (guarantees, syndication, senior/ subordinated/ mezzanine/ convertible debt, maturities from 1 to 15 years, project-specific grace periods for repayment where necessary, etc.) (EBRD 2013f). Loan syndication occurs using an “A/B loan structure” in which the EBRD remains the lender of record for the entire loan and the commercial banks derive benefit from the EBRD’s preferred creditor status. In this arrangement, the EBRD is normally prepared to provide, in the form of debt or equity, up to 35% of the long-term capital requirements of a single private sector project or company.

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<sup>34</sup> This concessional loan gives local governments and housing authorities an incentive to integrate energy efficiency investments into the wider rehabilitation of existing social housing stock. Its concessional aspect is not the interest rate on the loan, which remains at 130 points above the current statutory passbook savings rate, but rather the scope of the total project costs eligible for loan coverage.

**Box 9. Examples of lending models: Leveraging household savings and local commercial banks**

The public financial institutions studied use different models to lend within the areas they are active. In the case of the CDC, national household savings are leveraged for investment while KfW, in turn, partners with local commercial banks to finance small- and medium-sized projects.

The CDC is mandated with the investment management of a portion of the funds committed by households to national passbook savings accounts (Livret A, LDD, LEP). The CDC uses these funds – representing a significant portion of national household savings – to finance long-term loans for projects serving the public interest (social housing, infrastructure, etc.). Financing social housing remains the overriding priority of the Savings Funds, but other project types are receiving loan coverage as well, notably in the area of sustainable development. Since the mid-2000s, the investment mandate of the Savings Fund Division has been widened to meet national development priorities, including major sustainable infrastructure projects such as high-speed railway lines, tramways, the modernisation of hospitals and the renovation of university buildings or the upgrading of waste water treatment plants. Financing for these projects occurs principally through the provision of debt provided for the most part at an interest rate 130 points above the interest rate of the Livret A35, the principal passbook savings account.

KfW distributes its promotional loans to private customers through the branch network of German commercial banks. This on-lending system works in two steps. First, the commercial bank assesses the loan application of the final beneficiary and concludes a loan agreement. Second, KfW makes its own eligibility assessment, and contracts a refinancing loan to the commercial bank. KfW offers a low interest rate to the bank that is passed on to the final beneficiary after the commercial bank has added a risk premium to it. This risk premium is adjusted and capped by KfW, in order to ensure that the promotional conditions benefit the final beneficiary rather than the intermediary bank.

This on-lending system involves the private banking sector in low-carbon investments. In addition, each bank keeps focusing on their own core competencies: the commercial bank is responsible for the primary credit worthiness assessment of its clients, and KfW channels its programmes efficiently through a broad range of banks that it need not manage. Through this approach, KfW avoids entering into competition with commercial banks, and facilitates market development in areas within its mandate. KfW provides commercial banks which act as intermediaries for its programmes with loans at low rates and long maturities. The fact that commercial banks do not rely on their own capacity to raise funds on the markets enables KfW to crowd-in financing from these banks for projects with risk profiles that they are not used to dealing with.

### 3.1.1.2 Limited financing at commercial market rates

88. Depending on their investment philosophy as well as on the sector in question, some public financial institutions are active in lending to low-carbon projects at local or national financial market rates. For example, the UK Green Investment Bank invests in projects near or at commercial terms and rates in all of its projects. The UK GIB believes that in many instances it is current actors' perceptions of low-carbon projects that inhibit investment rather than real risks. As such, the UK GIB's investment strategy focuses on providing financing for low-carbon projects at commercial terms to demonstrate that these projects can be profitable at commercial rates, with only the benefit of UKGIB's expert knowledge and without any risk or cost mitigation. The UKGIB also provides other forms of junior and mezzanine debt. However, this is typically offered at a level of commercial return for the UKGIB that is in line with level of risk. The UKGIB is not willing to assume a disproportionate level of risk in providing mezzanine and junior debt at rates significantly below those that other commercial actors would apply.

89. Through direct lending, KfW is able to assist in assembling the necessary volume of finance with a sufficiently long tenor to facilitate large-scale, capital-intensive projects. Working with other private sector actors, KfW contributes up to 50% of the long-term financing for projects through its participation in project consortia, providing financing at market rates. In the case of investments in offshore wind

<sup>35</sup> This rate is set by the French government at as of February 2014 is currently at 1.25%.

projects, KfW requires that commercial banks contribute on the same terms and conditions as KfW, and at least in the same amount. Through direct lending, KfW is providing access to the large amounts of long-term capital needed for projects while simultaneously drawing in private finance to the projects.

### 3.1.2 *Crowding in Private Investment through Equity*

90. A number of public financial institutions are also active in providing equity investment for low-carbon projects. This equity stake can be taken through investment in special purpose vehicles or in some cases through companies involved in the development and deployment of multiple medium- or small-scale projects. To date, equity investment occurs principally in cases of renewable energy with fewer instances in the case of transport and energy-efficiency projects.

91. The involvement of public financial institutions in the provision of equity investment can be linked both to historic investment practices as well as increased pressure on the balance sheets of private or corporate actors in this sector (utilities, project developers). The reduction in the availability of long-term financing appears to have in turn placed pressure on the equity investment sector to either participate earlier in project development or immediately after a project has become operational. However, equity investors themselves are under pressure – both utility and corporate balance sheets do not have the capital needed to achieve the levels of investment necessary. As such, there is an apparent need for third-party equity to foster project development and construction.

92. The two principal equity investors covered in this report, the Caisse des Dépôts and the UK Green Investment Bank, both foster private sector participation in the targeted companies and SPV's through their investment. These institutions only take minority positions in companies in order to attract other actors to the table. Both provide equity investment in sectors and technologies – such as offshore wind – where private actors currently are not active.

93. These two institutions have the same objective – crowding in private sector investments - but take different approaches. The GIB is taking a refinancing approach, i.e. freeing up capital in commercial banks for them to invest in other projects, once the risk of the construction phase is behind them. CDC does the contrary and take over some early construction risk to make sure banks will lend as well. In the case of its equity investment in renewable energy enterprises, the CDC focuses on the injection of capital in small- and medium-sized companies to foster the development of market actors as well as provide the financial base for these companies to move projects forward and access other forms of financing (debt, etc.). On the other hand, the UKGIB applies a philosophy of “capital recycling” to its equity investment strategy. This approach consists of attracting institutional investors to invest in near-completed and operational projects. As described in Box 10, the objective is to free up initial investment equity provided by utilities and project developers to develop new projects.

#### **Box 10. UK Green Investment Bank's “Capital Recycling” model**

The UKGIB's principal investment strategy, particularly in the case of wind investments and other large-scale capital projects, is that of “Capital Recycling.” The approach focuses on bridging the current break the UKGIB has noted between the operational stage of renewable energy and other projects delivering consistent, long-term returns, and the providers of long-term capital. Rather than “pushing” more financing into the construction phase, the UKGIB works to “pull” more capital through the pipeline by fostering the refinancing of completed projects by institutional investors.

As such, the objective of the UKGIB is to attract equity participation and other forms of refinancing during the “Operational” phase of projects. During this phase when the majority of project-based risks have been resolved and the project is producing consistent returns, different classes of institutional investors are better able to meet their risk-return and liquidity expectations, and in the process can free up capital for project developers to invest in new projects. Recipients of “capital recycling” investments are expected to re-commit the money liberated through refinancing into new projects.

94. A number of other public financial institutions are involved in equity investment. For example, the EBRD takes minority equity stakes alongside partner majority sponsors with the objective of reducing the overall equity burden - in general, its share remains no more than 25% (EBRD 2013g). However, in many cases the other PFIs studied invest through subscription to funds, either for transaction costs reasons (inability to directly manage investment in a large number of small-scale projects) or as a means of supporting the development of these structures explored further below.

95. Finally, the European Investment Bank provides financing through a number of fund structures. The EIB contributes capital (equity or debt) in a number of other funds and programs that blend resources - at times from both public and private sources - to support climate-related investments. Often, these programs operate both within the borders of the European Union and in countries worldwide. They are either managed internally by the EIB itself or by an external structure. In some combination of the two, they can invest world-wide. Funds may provide either debt or equity for projects. Furthermore, the involvement of external fund managers fosters capacity building within the private sector. Funds include the Dasos Timberland Fund II,<sup>36</sup> the HgCapital Renewable Power Partners 2,<sup>37</sup> the European Energy Efficiency Fund (see Box 11), the Green for Growth Fund<sup>38</sup> and the Marguerite Fund.<sup>39</sup>

#### **Box 11: European Energy Efficiency Fund**

The European Energy Efficiency Fund (EEEEF) targets investments in the member states of the European Union. The final beneficiaries of EEEF are municipal, local and regional authorities and public and private entities acting on behalf of those authorities such as utilities, public transportation providers, social housing associations, energy service companies, etc. The EEEF contributes through the use of a layered risk/return structure to enhance energy efficiency and foster renewable energy. This structure is in the form of a targeted private public partnership in which EIB provides dedicated financing via direct finance and intermediated financing through partnerships with financial institutions. Investments should contribute significantly towards energy savings and the reduction of greenhouse gas emissions. The EEEF facilitates investments in the public sector where projects are often hindered or decelerated due to budget restrictions and lack of experience with this kind of investment.

*Direct Investments:* These comprise projects from project developers, energy service companies (ESCOs), small-scale renewable energy and energy efficiency service and supply companies that serve energy efficiency and renewable energy markets in the target countries.

*Investments through Local Financial Institutions:* These include investments in local commercial banks, leasing companies and other selected financial institutions that either finance or are committed to financing projects of the Final Beneficiaries meeting the eligibility criteria of EEEF.

Source: (EEEEF 2013)

<sup>36</sup> For this Fund, managed by Dasos Capital SA, the EIB has proposed to contribute up to EUR 30 million of the total EUR 300 million. It targets sustainable forestry and biomass mainly in Europe through equity investments. The fund aims to make a commercial return whilst contributing to climate change and other environmental objectives.

<sup>37</sup> The EIB has proposed to finance upward of EUR 50 million of the total EUR 500 million of the fund. The fund targets investment in the renewable energy sector (primarily solar and wind) in the United Kingdom and Europe.

<sup>38</sup> The Green for Growth Fund Southeast Europe (GGF) is a specialized layered debt fund to advance energy efficiency (EE) and renewable energy (RE) in Southeast Europe, including Turkey. Initiated by the European Investment Bank and KfW Entwicklungsbank, GGF uses public private partnership to reduce energy consumption and CO2 emissions. GGF provides refinancing to financial institutions to enhance their participation in the energy efficiency and renewable energy sectors and also makes direct investments in non-financial institutions with projects in these areas. The activities of GGF are supported by a Technical Assistance Facility.

<sup>39</sup> The 2020 European Fund for Energy, Climate Change and Infrastructure ("Marguerite") was established with the backing of six major European financial institutions to make capital-intensive cross-border infrastructure and renewable energy investments and targets attractive long-term and stable risk-adjusted returns.

### 3.1.3 Other instruments and vehicles to mobilise private finance and investment

96. Low-carbon, climate resilient projects have a number of characteristics that can make attracting private capital difficult, including high up-front capital costs, relatively unproven technologies, high risk profiles, etc. Within this context, PFIs have a role in engaging additional sources of capital (institutional investors, sovereign funds) to leverage additional sources of financing.

97. A number of PFIs studied here use a range of financial projects beyond traditional forms of debt and equity to facilitate access to capital and mobilise private actors. These can include mezzanine finance and quasi-equity as well as the development of off-balance sheet instruments. The EIB and other PFIs are currently exploring structures to transfer assets off commercial balance sheets such as those of banks, utilities and corporate investors. For example, while it is a form of risk sharing, as described below, securitisation<sup>40</sup> and similar structures are also a means of giving PFIs the ability to raise further capital through the sale of the securities created by bundling projects. Furthermore, for those institutions subject to financial regulation, securitisation can also help improve their debt coverage ratios. Capital raised by PFIs through securitisation can be recycled back into project development and investment stages.

98. In addition, the EIB, the EBRD and UKGIB are exploring how “green” or “climate” bonds can be used to develop a green asset class to raise additional financing (see Box 11). Green bonds can assist these institutions in raising further capital from the commercial markets and among different investor groups. The EIB is also exploring how to foster and develop a market for “covered bonds,” or those bonds that are backed by the physical assets of the investment project itself. These bonds hold the potential to allow project developers to finance their projects through bonds rather than loans, thus opening opportunities for new classes of investors for whom bonds are a key part of their portfolio. Covered bonds offer a possibility to provide both initial financing as well as refinancing. Beyond regulatory issues, developing a viable market offer however poses a number of challenges, including the high cost of establishing a credit rating for the bonds – essential to ensure market confidence – as well as how to pool assets together and how project returns and losses are translated into coupons and principal payments for the resulting bonds.

99. The EBRD’s “Environmental Sustainability Bonds” aim at providing an opportunity to invest in environmental and sustainable solutions through a triple-A security that supports state and private sector environmental businesses in the EBRD’s countries of operations. The proceeds from the bonds benefit a specific “Green Project Portfolio” as legally defined in bond documentation. The Green Project Portfolio comprises investments in the following areas: energy efficiency, clean energy, water management, waste management, sustainable living, environmental services, and public transport. As of the end of June 2013, the Green Project Portfolio comprised 261 loans across 28 countries, totalling EUR 4.7 billion of which EUR 2.7 billion was drawn down, with the average tenor of 12 years and the average life remaining of 9.9 years. The EBRD first issued Environmental Sustainability Bonds targeted at Japanese retail and institutional investors from 2010 to 2013. In September 2013, a new bonds issuance worth an equivalent of EUR 370 million targeted international institutional investors. (EBRD 2012a; EBRD 2013c)

100. Furthermore, while this activity is usually limited to the use of public financing to fund concessional loans, PFIs can be involved in the administering of subsidies provided for targeted investment programmes by the State. For example, Caisse des Dépôts is entrusted with managing eight full programmes and ten actions within the scope of the broader French government “Investments for the Future” (*Investissements d’Avenir*) strategy, representing of 7.4 billion EUR in investment subsidies and equity. A portion of this programme is the management of 3.1 billion EUR out of the total of 3.5 billion

<sup>40</sup> Securitisation is the creation of a financial instrument or security by bundling together other assets and then reselling tranches of the new security to investors. This can allow investors to invest indirectly in assets (infrastructure, etc.) that they would not typically invest in either for volume or risk reasons.

EUR dedicated to equity financing: this support can take the form of equity shares in dedicated enterprises (EUR 400 million) as well as in grants (EUR 600 million).<sup>41</sup>

101. Finally, as indicated earlier, the EBRD works with donors to provide further capacity support and financial incentives to facilitate project development and implementation. Through its direct financing facilities, the EBRD provides non-intermediated funds for projects. The loans financed by the EBRD (at commercial rates) are combined with technical cooperation and, in some instance, incentive payments financed by donors for targeted projects.

#### Box 12. EIB as an Issuer of Climate Bonds

The EIB finances itself through the issuance of bonds on the international financial markets. In recent years, the EIB has applied its knowledge of the bonds markets to develop a new market offer in the form of **Climate Awareness Bonds**. The funds raised by the issuance of these bonds are restricted to supporting lending for renewable energy and energy efficiency. As of May 2014, Climate Awareness Bonds have raised EUR 5.6 billion in seven currencies. The EIB has issued the largest green bond in the market to date of EUR 2.6 bn with a maturity in November of 2019. The EIB is playing a role in developing a market for climate bonds, notably by taking initiatives to enhance liquidity and regularity of supply, as well as by offering credibility through a high level of transparency on use of proceeds.

Source: (EIB 2013b; EIB 2014)

Table 14. Instruments for access to capital

	Loans: Direct Senior	Loans: Inter- mediated	Fund of Funds	Direct Equity Investment	Bond Issuance	Debt & Equity Fund Structures	Subsidies (direct/ reduced interest rates)
CDC	X		X	X		X	X
EIB	X	X	X	X	X	X	X
EBRD	X	X		X	X	X	X
KfW	X	X	X			X	X
UK GIB	X		X			X	

### 3.2 De-risking

102. In their role as a catalyst for additional private and public investors, public financial institutions can foster the de-risking of investment and finance activities. While, not all of the PFIs studied are involved in providing de-risking tools, those institutions that are active in this area are developing a number of different approaches to foster the participation of other actors in low-carbon projects (as seen in Table 16).

<sup>41</sup> This example relates to a case of financing a new urban development model (promoting resource-efficient, adaptable, robust, manageable and attractive cities). The financial activities consist of investment subsidies (600 M€) as well as equity investment (400 M€) in dedicated enterprises.



- **Risk sharing** can help attract new investors to projects with certain fund structures, allowing investors with different risk-return profiles to invest in the same project or aggregation of projects.
- **Risk transfer**, or providing ways to assign risk at different stages of the project to those who can best bear risk, and thereby provide a bridge between early-stage and long-term operations.

103. Through de-risking activities and re-allocating risk across project phases, PFIs are leveraging the participation of additional private and public investors.

**Table 15. General approaches of PFIs and different investment risks**

	Development	Construction	Financing	Operation
Political and policy risk	Policy Dialogue with national governments Expertise and input on investment frameworks			
Technical and operational	Capacity building/ Knowledge sharing		Capacity building/ Knowledge sharing	Risk sharing agreements (PPPs)
Financing risk		Access to long term capital (financing) Credit enhancement mechanisms	Access to long term capital (refinancing, liquidity investments)	Access to long term capital (refinancing, liquidity investments)
Reliability of output				Risk sharing agreements (PPPs)

**Table 16. Principal de-risking instruments in low-carbon project investments**

CDC	Holding fund structures PPP
EBRD	PPP
EIB	Guarantees Layered debt funds Structured Finance Facility PPPs
KFW	Loan financing for unforeseen cost overruns (offshore wind energy programme)
UKGIB	PPPs

### 3.2.1 Foster private sector involvement through sharing risk within project

104. Risk sharing can help attract new investors to projects with certain fund structures allowing investors with different risk-return profiles to invest in the same project or aggregation of projects. PFIs can provide different instruments to guarantee large and small projects to make them more attractive to other investors.

### 3.2.1.1 Guarantees for senior and subordinated debt and refinancing

105. A small number of the PFIs studied provide guarantees. For example, the EIB guarantees large and small projects to make them more attractive to other investors. It provides guarantees for senior and subordinated debt, either in a standard form or as a debt service guarantee similar to that offered by monoline insurers (EIB 2013c). Through standard guarantees, the EIB pledges to pay off senior debt or subordinated debt issued by the project if the project defaults, thereby encouraging private investors to buy that debt. Debt service guarantees may take the form of a contingent credit line provided to the project company by the EIB (CPI 2013b). This is described in further detail below in the context of the Europe 2020 Project Bond Initiative. In both cases, beneficiaries can be large private and public projects or partner intermediaries providing SME financing (EIB 2013c).

106. Additionally, PFIs can provide guarantees in their intermediated lending. For example, KfW may choose to provide risk guarantees in the framework of its on-lending system by bearing part of the risk initially held by the commercial bank. In this case, KfW provides a level of “loan guarantee” – in other words, a partial exemption of liability – that varies from 50% to 90% depending on the programme. If the on-lending bank applies for an exemption from liability, KfW bears the risk not retained by the bank and the risk margin is shared pro rata between KfW and the bank.

**Box 13. The EIB and the EU-sponsored Europe 2020 Project Bonds Initiative**

The EIB is involved in the EU-sponsored Europe 2020 Project Bond Initiative. The objective of this programme is to stimulate capital market financing for large-scale greenfield infrastructure projects in the areas of trans-European networks (TEN) in transport and energy, and broadband telecommunications. The programme uses “credit enhancement” techniques to improve the credit rating of bonds issuances by project companies to finance infrastructure. It aims at structuring projects that deliver “A” credit rated senior bonds and other similar senior debt, thus making such projects more attractive for private investors, in particular for institutional investors. The initiative’s pilot phase (2012-14) will cover 5-10 projects, using a EUR 230 million contribution from the EU budget (including EUR 200 million for TEN transport projects).

Within the framework of the programme, bonds are issued by the project companies themselves, not the EIB or the EU Member States. Project companies are generally public-private partnership (PPP) established to build, finance and operate an infrastructure project. This programme is a response to a reduction in issuance of project bonds due to: i) the disappearance of guarantees by monoline insurance companies which in the past have uprated bonds to the investment grade level required by many institutional investors; and ii) tightened regulatory requirements (Basel I, II and III) on bank lending.

The EIB provides credit enhancement in the form of a subordinated debt instrument (either a loan or contingent facility) to support the senior debt issued by the project company. The mechanism for improving the credit standing of projects is based on the separation of the debt of the project company into tranches: a senior and a subordinated tranche. The provision of the subordinated tranche increases the credit quality of the senior tranche to a level at which the EIB estimates that most institutional investors are comfortable holding the bond for a long period. The subordinated tranche – named the *Project Bond Credit Enhancement (PBCE)*, provided by the EIB with EC support – can take the form of a loan, which is given to the project company from the outset, or a contingent credit line which can be drawn upon if the revenues generated by the project are not sufficient to ensure senior debt service. The support provided by the subordinated tranche is made available throughout the lifetime of the project, including the construction phase. (EIB 2013d).

In December of 2013, the Greater Gabbard offshore transmission link was one of the first UK-based infrastructure projects to attract finance from institutional investors using the Project Bond Credit Enhancement initiative. Bonds with a value of GBP 305 million were issued to finance the new transmission link to connect the 140 turbine wind farm off the Suffolk coast with the UK mainland electricity and have been successfully placed with a broad range of investors. The EIB has provided a GBP 45.8 million guarantee, representing 15% of the bond issued, as a credit support under the Project Bond Credit Enhancement model. The A 3 Moody’s rating of the bonds issued for the Greater Gabbard OFTO includes a rating uplift of one notch from the project’s stand-alone credit quality rating due to the presence of the European Investment Bank’s Project Bond Credit Enhancement (PBCE). Under the PBCE model additional liquidity (i.e. bond issuances) will be provided for the project if required, which will allow enhanced recovery for senior lenders by reducing outstanding debt and act as a first-loss piece in the financing structure. The Greater Gabbard OFTO bonds have a maturity of 2032. (EIB 2013g)

Source: EIB (2013) *Project Bonds*. Accessed September 2013 <http://www.eib.org/products/project-bonds/index.htm>.

### 3.2.1.2 Assuming first loss: Subordinated debt, structured finance and layered debt funds

107. A number of the PFIs studied accept a larger portion of the risk profile of projects to draw in private sector actors, for example through the use of junior debt and/or different mezzanine<sup>42</sup> and structured finance<sup>43</sup> products. By taking the lower repayment priorities for the capital they provide, PFIs are able to lower risk for private investors by putting them first in line for repayment. The EIB has established a dedicated facility to provide these products for high-risk priority projects, such as transport (see Box 13).

#### Box 14. Special Activity (ex-Structured Finance) at the EIB

Using dedicated instruments, the EIB can give additional support for priority projects with a higher risk profile than normally accepted through traditional senior lending instruments. These priority areas include trans-European transport and energy networks and other infrastructure, the knowledge economy, energy and SMEs. This support is provided by the EIB's Special Activities (ex-Structured Finance Facility - SFF) using a mix of instruments tailored to a project's risk profile and context such as:

- Senior loans and guarantees incorporating pre-completion and early operational risk;
- Subordinated loans and guarantees ranking ahead of shareholder subordinated debt;
- Mezzanine finance, including high-yield debt for SMEs experiencing high-growth or are undergoing restructuring; and
- Project-related derivatives.

The Special Activities are authorised to provide between 2010-2013 EUR 6 billion annually for higher risk "Special Activities," including approximately EUR 2 billion per year for risk sharing and credit enhancement instruments. An estimated EUR 3.6 billion of financing for Special Activities was provided in 2012. (EIB Group 2012)

### 3.2.1.3 Fund and holding structures

108. In recent years, PFIs have recognised the need to find models for aggregating small and medium-sized projects together to achieve the needed size and risk profiles sought by third-party investors.

109. The European Investment Bank creates layered-debt fund structures through which they can overcome a number of investment barriers linked to climate-related projects, particularly for small- and medium-sized projects.

- **Aggregation of projects:** Fund structures can be used to aggregate small- and medium-scale projects into a single asset portfolio. This portfolio can combine projects with different risk profiles as well as include projects financed through intermediaries or directly by the fund.

<sup>42</sup> Among the institutions studied, there is no common definition of mezzanine capital. KfW's definition is used here to broadly cover a variety of hybrid, flexible financing instruments between ("mezzanino") pure equity and pure debt financing.

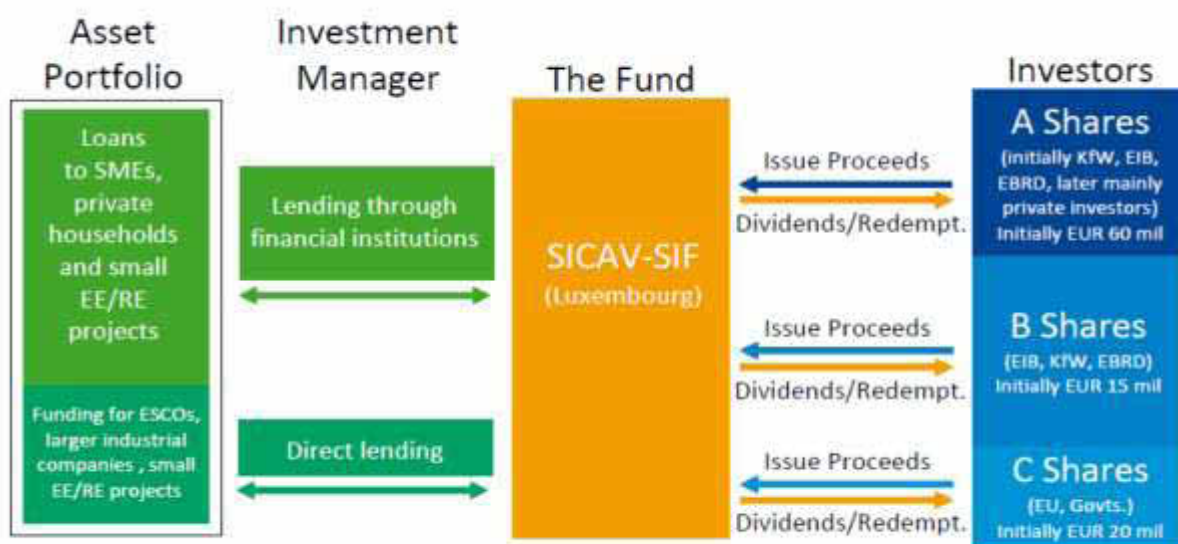
<sup>43</sup> Structured finance involves a number of non-traditional (compared to equity investments and loans) financial instruments such as different types of bonds and securities.

- **Layered debt tranches:** Layered funds can allow for the “aggregation” of different investor types with different risk-return profile appetites, allowing investors to choose between more junior or more senior debt tranches. .

110. The ability of layered-debt fund structures to aggregate projects and attract investors with varying risk-return requirements allows the fund to invest in what today are seen as sub-investment grade products. As described in Box 15, these funds are able to aggregate projects together and to construct tranches with different risk-return profiles that correspond to the needs of different investors, from high-risk to low.

**Box 15. Layered-debt funds at the EIB**

Layered-debt funds are created by constructing different tranches, providing different levels of risk and return to suit investors with different risk-return profiles. This allows them to channel finance and technical assistance (in some cases) to transactions that are too small to be handled on a case-by-case basis.



The EIB currently is active through the two debt funds with a layered structure:

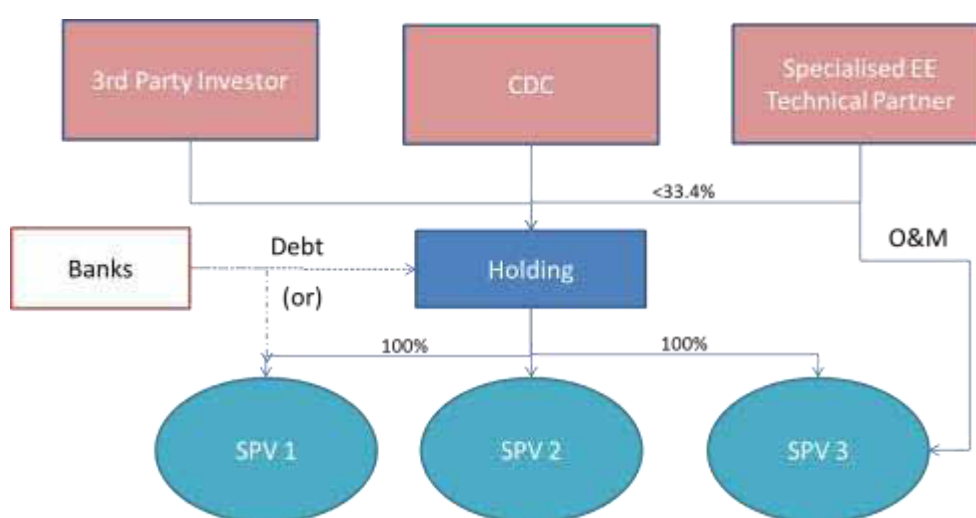
- **European Energy Efficiency Fund:** With a layered risk/return structure and a size of EUR 265m, it provides eligible, commercially viable public energy efficiency and renewable energy projects within the European Union with fast and flexible financing through the use of both debt and equity instruments.
- **Green for Growth Fund:** Initiated by the EIB and KfW and supported by the European Commission, GGF works predominantly through the provision of dedicated financing to businesses and households directly or through partnerships with financial institutions. As of end-2012, the committed funds from investors had reached EUR 194.2m. This fund aims to enhance energy efficiency and foster renewable energy investments in the South-East Europe region and Turkey, in the form of a public private partnership.

To date, these structures have been used effectively to leverage the involvement of EU or donor governments.

Source: EIB (2013) *Innovative climate finance instrument*. European Investment Bank.

111. CDC's subsidiary CDC Climat is exploring means of aggregating and financing industrial energy efficiency and emission reduction projects through equity or quasi-equity investment in special purpose vehicles (SPVs). When fully operational this approach aims to group together several projects developed through SPVs into a single holding structure, thus facilitating risk sharing as well as reducing per-project transaction costs. Currently, projects focus on energy efficiency investments in which the SPVs own the EE equipment. Part of the energy savings from the industrial plant are paid to the SPV based on a fixed rate. Additional returns are based on variable flows and are dependent on the amount of use and performance of the efficient equipment. An intensive use of the equipment will generate higher energy savings and higher revenues for the holding structure. Projects are expected to have a 5-10 year lifetime.

**Figure 2. CDC Climat's investment in industrial energy efficiency holding structure**



112. To date, CDC Climat is a shareholder in a single pilot project,<sup>44</sup> along with another financial partner (Marubeni) and a technical partner (Solvay Energy Services). The energy efficient renovation of a gas turbine at Solvay's rare earth mineral processing factory at LaRoche is estimated to significantly reduce energy use and GHG emissions (Solvay 2013). The objective of this new form of financing for energy efficiency projects is to demonstrate to other investors that this type of project can offer acceptable risk-return profiles as well as significant environmental benefits. The eventual objective is to create a holding company with the partners in order to finance other energy efficiency projects in the Eurozone. National SPVs will be created to implement several projects within a same country. All SPVs will be 100% held by the holding structure.

#### 3.2.1.4 Public Private Partnerships

113. Public financial institutions also have been involved in developing and pioneering public-private partnership models. This has been extended into the areas of low-carbon development where the EIB, the EBRD and the CDC have been active in applying these techniques to low-carbon projects. Through its subsidiary *ExterImmo*, the CDC is exploring new ways to use PPPs to assist local governments to access the up-front capital necessary for energy efficiency projects as well as share the related risks.

<sup>44</sup> In future investments, it is expected that CDC will invest in the holding structure.

**Box 16. ExterImmo**

*ExterImmo*, a small subsidiary of Caisse des Dépôts, is involved in fostering energy efficiency projects of local governments. *ExterImmo* has developed a public-private partnership model through which local governments can outsource the management of a given building. This outsourcing has increasingly been used to support small-scale energy-efficiency renovation projects. Within this structure, the local government pays a fixed rate over the lifetime of the management agreement to *ExterImmo*, which assumes the risk and upfront capital costs related to the renovation and management of the building. *ExterImmo* currently undertakes approximately ten small-scale operations per year (less than 5 million euros per project), although this number is increasing over time.

114. The EIB plays a role in developing and fostering public-private partnership models across the European Union. In terms of low-carbon development, this model is often used for transport projects (see Box 17). For the EIB, ‘Public-Private Partnership’ is a generic term for the relationships formed between the private sector and public bodies often with the aim of introducing private sector resources and/or expertise in order to help provide and deliver public sector assets and services.<sup>45</sup> EIB’s role is to support this increasing drive in Member States towards the improvement of public services through increased private sector participation, structuring its own participation in PPP projects in ways that optimise the ability of the public sector to meet EU policy objectives. A number of fundamental principles underlie the EIB’s approach to PPP projects<sup>46</sup>. EIB designs PPP projects to achieve the overall policy objectives, whilst promoting competition and ensuring that the benefits of EIB involvement are, to the maximum possible extent, passed to the public sector. (EIB 2004)

<sup>45</sup> The term PPP is, thus, used to describe a wide variety of working arrangements from loose, informal and strategic partnerships, to design, build, finance and operate (DBFO)-type service contracts and formal joint venture companies.

<sup>46</sup> These principals include: 1) all PPP projects supported by the EIB are financially robust, economically and technically viable, meet the EIB’s environmental requirements and are competitively tendered in accordance with EU procurement rules; 2) PPP structures must maintain complementarity with other funders (both commercial banks and the capital markets); and 3) the credit quality of the Bank’s PPP portfolio is underpinned by the public sector support for the payment streams to many PPP projects. [http://www.eib.org/attachments/thematic/eib\\_ppp\\_en.pdf](http://www.eib.org/attachments/thematic/eib_ppp_en.pdf)

### Box 17. A PPP for the high-speed rail between Tours and Bordeaux

The high-speed rail line between Tours and Bordeaux in France will be constructed through a public-private partnership between *Réseau Ferré de France* (RFF) and VINCI. A 50-year concession contract signed between RFF and LISEA, the concession company created for the project VINCI, is the world's biggest rail concession contract at a total investment of €7.8 billion, including €6.2 billion of construction works.

The contract covers the financing, design, construction, operation and maintenance of the Tours–Bordeaux high-speed rail line. Financing for the Tours–Bordeaux SEA HSR will come from both public and private sources.

LISEA is providing €3.8 billion of the financing, with:

- €772 million of equity contributed by LISEA shareholders, pre-financed by commercial banks and the EIB;
- €1,060 million of bank debt guaranteed by the French government;
- €612 million of non-guaranteed bank debt;
- €757 million provided by *Fonds d'Epargne*, managed by the Caisse des Dépôts and guaranteed by RFF;
- €400 million of EIB credit guaranteed by the French government;
- €200 million of non-guaranteed EIB credit.

The EIB is contributing €1.2 billion via the combination of the senior debt, a portion of the equity bridge loan and the Loan Guarantee on TEN-T projects (LGTT), an instrument put in place jointly with the European Commission. This is the largest loan ever awarded in France by the EIB.

This financing is also the first to benefit from the French government guarantee mechanism put in place under the 2009 French stimulus package designed to encourage PPP financing for large priority projects. The concession financing also includes public subsidies made by the French government, local communities and the European Union for a total amount approaching €3 billion plus a contribution from RFF of around €1 billion.

Source: (VINCI 2011)

### 3.2.2 Transferring risks across project phases

115. Given the liquidity concerns of commercial banks and similar financial actors, commitments to provide or assist in securing refinancing for a project's post-construction phases can attract finance during early stages. This can assist in scaling up investment for capital-intensive projects with steady future returns, such as low-carbon projects such as renewable energy, sustainable transport and energy efficiency. It also aids in crowding in other sources of finance through reducing capital lock-up risks and ensuring liquidity for investors with shorter time horizons.

116. Given the current limitations on commercial sources of financing for projects, PFIs have identified risk tools as a priority for further development to ensure that long-term finance is made more available to low-carbon projects. Nevertheless, the PFIs studied are not currently extensively involved in this area, although the EIB does provide refinancing guarantees – particularly for transport projects. For example, the EIB has committed to provide approximately EUR 550 million for the Rennes- Nantes high speed rail project. This financing will become available at the end of the construction period in order to refinance a portion of the initial debt contracted with the commercial banking sector. This amount corresponds to approximately 54% of the estimated senior debt to be serviced during the operational phase of the project (EIB 2011).



### **3.3 *Providing and building capacity & expertise***

117. Public financial institutions also play a role in providing and building capacity and expertise among the project developers with whom they work as well as their public and private partners (Table 18). In many instances, attracting additional capital requires more than providing financing. A lack of expertise in low-carbon investments is one of the key barriers for investors. Building capacity and expertise is costly to investors, particularly for investments in that are perceived as more risky than some other investments. It also appears important to assist project developers with technical expertise necessary for low-carbon projects.

118. Furthermore, PFIs can demonstrate to market actors that investment-grade projects and products are available in these sectors. PFIs are working with other market actors to develop financing tools and structures to support private sector involvement in low-carbon sectors.

Table 17. Principal capacity-building programmes

	Renewable Energy		Energy Efficiency				Transport	
	Small Scale	Large-Scale	Small Scale		Large Scale			
			Residential	SMEs	Commercial/ Industrial	Public Buildings		Social Housing
<b>CDC</b>		Internal Expertise		Internal Expertise (no dedicated programmes identified)				
<b>EBRD</b>	Donor finance technical co-operation Policy dialogue (sustainable energy action plans signed with governments) SEFFs (advice to local banks and help to borrowers with the loan application)							
<b>EIB</b>	<ul style="list-style-type: none"> <li>– Internal expertise</li> <li>– Dedicated ELENA Facility</li> </ul>						<ul style="list-style-type: none"> <li>– Internal expertise</li> <li>– JESSICA Facility (urban)</li> </ul>	
<b>KfW</b>			Grants for external expertise	Grants for external expertise	Grants for external expertise	Grants for external expertise		
<b>UK GIB</b>	Internal expertise							

### 3.3.1 *Financing the involvement of experts in project development*

119. To help create sufficient capacity and expertise among project developers, PFIs start by providing grants to support studies necessary for the development of low-carbon projects. For example, KfW has developed a number of programmes to finance the use of experts in the development of energy efficiency projects.

- **Energy Efficiency Advice Programme for SMEs** is a joint initiative with the Federal Ministry of Economics and Energy (BMWE). Grants are provided to cover the costs of an independent energy expert who is accredited under the programme to provide initial advice (i.e. detection of possible sources of energy savings) and/or detailed advice (i.e. building an energy saving concept). This helps address the lack of in-house expertise among SMEs and attempts to limit inefficient renovations. Accredited energy experts, however, do not have a role in measuring ex-post and ex-ante improvements in energy efficiency. Grants covering up to EUR 4,800 for initial advice, 80 % of the costs for an on-site evaluation, and 60 % of the costs associated with drawing up an action plan are provided.
- **Energy-Efficient Renovation – Construction Supervision.** This programme provides grants for professional construction supervision by a technical expert. The grants cover 50% of the total supervision costs up to a maximum of EUR 4,000.

120. Providing technical assistance is a key part of the EBRD's strategy. The EBRD provides grant co-financing (financed by donor partners) to provide appropriate incentives and address affordability constraints. The EBRD's donor-funded Technical Cooperation funds provide clients with technical support across the whole investment life-cycle. This includes undertaking energy audits in order to unlock opportunities to achieve sustainable reforms, and developing capacity building programmes with some clients. Technical Cooperation (TC) funds are used for technical assistance that supports the funding activities provided by the EBRD. They provide advisory services to private and public sector clients: consultancy services for feasibility studies as part of project preparation; procurement assistance during project implementation; development of management skills; legal advice to improve legislation and corporate governance and to promote regulatory development, etc. Such funds come from governments, international institutions and also multi-donor funds, and are complemented by EBRD funds such as the EBRD Shareholder Special Fund.<sup>47</sup> In 2012, donor funding supported 562 technical cooperation projects for EUR 128.7 million (EBRD 2013a, 35). Donors have also contributed to the Sustainable Energy Initiative (SEI) with more than EUR 214 million in technical cooperation funding from 2006 to March 2013: of this total funding amount, 8% supported industrial energy efficiency, 10% cleaner energy supply, 10% renewable energy, 25% municipal infrastructure and 43% sustainable energy financing facilities through local banks (EBRD 2013e).

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<sup>47</sup> The EBRD Shareholder Special Fund (SSF) is a multi-donor fund established to complement existing funding for projects which do not fit the donors' priorities. It provides flexibility, predictability, and additional funding for multi-donor funds where the SSF can provide co-financing.

**Box 18. The “Sustainable Energy Financing Facilities” (SEFFs) of the EBRD’s Sustainable Energy Initiative (SEI)**

The EBRD’s Sustainable Energy Financing Facilities (SEFFs) are used to finance energy efficiency and renewable energy investments in smaller scale projects. They typically target industrial and residential sector borrowers. The SEFF provides borrowers with an intermediated loan through a local commercial bank. This programme also includes free-of-charge technical support to both the commercial bank and the sub-borrower. The project implementation team identifies energy efficiency and renewable energy investment opportunities at the potential borrower’s site, and helps the commercial bank assess the eligibility of the borrower to receive funding. It also provides potential borrowers with information on the facility and the application process. Afterwards, a monitoring team proceeds to the project verification.



To a large extent, the SEI combines technical assistance, projects and investments with policy dialogue. The EBRD thus supports policy, legislative and regulatory changes that contribute to the development of energy efficiency measures and sustainable energy. For instance, the EBRD supported the Ukrainian government during its adoption of a green-power tariff.

Source: (van de Ven 2013)

### 3.3.2 Provision of expertise in project development

121. Public financial institutions have a long tradition of providing technical and financial expertise directly to project developers as well as other actors involved in the project development process. Many of these institutions have developed dedicated teams of engineers, economists and financial advisors to look at aspects beyond financial returns of projects such as broader economic and environmental aspects.

122. PFIs play a role in developing the expertise and tools needed by investors in these sectors. Understanding the impact of individual projects is not always a straightforward task. These institutions have developed different diagnostic tools for market actors to evaluate the greenhouse gas emissions of projects as well as energy use (see Box 19).

**Box 19. The Caisse des Dépôts and low-carbon planning & development tools**

The CDC has developed a number of tools to aid its partners to better understand the carbon implications of investment activities:

- In partnership with the *Agence Nationale de Rénovation Urbaine* (ANRU), the CDC has developed a tool for calculating the impacts of urban redevelopment projects. The *Diagnostic Carbon PRU* is a tool to help project managers take into consideration and address the GHG emissions of their project at all stages (development, construction, operation).
- The *Barometre Carbone* is a free tool for decision making support for urban planning developed by the CDC for use in the Paris capital region (Grand Paris). The objective of the tool is to allow local decision makers to integrate the issue of greenhouse gas emissions into the development planning documents and financing contracts. The tool assists local actors in establishing an ex-ante GHG profile of their jurisdiction as well as different development scenarios.
- The Savings Funds division of the CDC has developed the tool *CDnergy* to provide public housing authorities a means of managing and tracking their actions that have an impact on the national white certification programme (CEE) for energy efficiency. The programme simplifies and centralises the management of certificates. A public housing authority can thus benefit from a database on the energy use within its housing stock to develop a broader strategy.

*3.3.3 Providing dedicated facilities to support project development*

123. Beyond the development of tools, public financial institutions can create dedicated programmes and facilities to work with project developers (public or private) in the creation of low-carbon projects. As presented in Box 20, the EIB has developed a number of facilities to support the development stages of a broad range of infrastructure and energy-related topics.

### Box 20. EIB and EU facilities

The EIB plays an important role in providing and facilitating the development of expertise and capacity building. In addition to the expertise and financial knowledge that the EIB brings to each of the projects and initiatives listed below, the EIB also has a number of dedicated facilities to support and finance capacity-building efforts. While these programmes are not necessarily focused only on climate- and energy-specific topics (with the exception of the ELENA facility), they nevertheless do address these topics.

**ELENA** – The European Union’s “European Local Energy Assistance” covers up to 90% of the technical support cost needed to prepare, implement and finance large energy efficiency and renewable projects. Run by the EIB, the programme can cover feasibility and market studies, programme structuring, energy audits and tendering procedure preparation.

**JESSICA** – Joint European Support for Sustainable Investment in City Areas (EIB, European Commission and Council of Europe Development Bank) – This facility is designed to support and finance sustainable projects in urban areas. In addition to working with Member State and regional governments in the financial structure of projects, the EIB is involved in both evaluation and thematic studies. The evaluation studies look at the country or regional level to analyse the market gap for financial engineering instruments for the support of sustainable urban development in the regions.

**European PPP Expertise Centre (EPEC):** A joint initiative of the EIB, the European Commission and European Union Member States and Candidate Countries, EPEC helps strengthen the capacity of its public sector members to enter into Public Private Partnership transactions. The EPEC Energy Efficiency mandate funded by DG Energy aims to raise the awareness of national authorities on the EU legislation and financing framework related to Energy Efficiency (EE) and Renewable Energy (RE) in buildings and on the use of Structural Funds for investment in EE and RE, with a special focus on public buildings and street lighting. As of October 2012 EPEC’s work became one of the pillars of DG Energy’s Energy Performance Contracting Campaign (EPCC) which promotes and encourages country-specific discussion and capacity building around the instrument of Energy Performance Contracting, to address issues such as balance sheet treatment and grant/loan blending. This serves to increase the confidence of stakeholders regarding the reliability and effectiveness of the EPC model and help Member States in establishing and enabling the legal and financial framework for the energy services market. (EPEC 2012)

#### 3.3.4 *Creating labels and market standards: KfW*

124. Public financial institutions can also play a role in developing overall market awareness on low-carbon issues through the creation of recognised labels. For example, the KfW energy efficiency label for buildings has become a widely-recognised standard on the real-estate market. Due to the alignment of the “*KfW Effizienzhaus*” or “KfW-Efficiency House” label with the German Federal standards, KfW contributes to the comparability of energy-efficiency information across the whole real estate market, and to raising awareness of environmental issues among both private individuals and financiers. As a clear and trusted index for energy efficiency, this label supports the inclusion of a “green value” in real estate pricing.

#### 3.3.5 *Policy dialogue with national government*

125. The PFIs studied also work with national governments to develop the policy framework and regulatory environment necessary to facilitate low-carbon investment. CDC also works with the French government in developing new means of financing low-carbon investment: in 2012-2013 CDC was mandated by the French government to produce a report on different means of financing thermal renovation of buildings. Furthermore, CDC actively supports the development of innovative instruments to finance the transition to a low-carbon economy, providing financing for *CDC Climat Recherche*, a think-tank dedicated to producing public-interest research on these topics.

126. The EBRD also uses policy dialogue in order to create a “transformation impact” that goes beyond the impact of project finance initiatives alone. It works on both top-down policy-making and bottom-up evidence-based policy-making using experience feedback to remove barriers for a future growth. In the energy sector, the EBRD’s *Energy Strategy* describes how the policy dialogue will be used to: “...support the introduction or upgrading of energy efficiency standards such as building codes and the establishment of energy efficiency policy frameworks” (EBRD 2013b, 45). In terms of energy demand management, the EBRD has identified a number of instances where regulatory frameworks do not accommodate objectives: “for example there is typically no provision made for the selling of “negative generation”, in other words reduced demand, as opposed to actual generation. Similarly, distribution tariff methodologies are seldom structured so as to incentivise companies to sell less of their product” (EBRD 2013b, 46). Furthermore, in many instances the EBRD focuses on developing energy markets in these countries in general with the objective of scaling up renewable energy, such as allowing “...the introduction of new participants and new funding models, as well as the development of more sophisticated and market-oriented support mechanisms that integrate renewable generators in wholesale markets and communicate price signals more accurately” (EBRD 2013b, 50). The EBRD also focuses on regulations affecting hydrocarbon fuels and such topics as on reducing gas flaring and laying the foundations for carbon capture and storage.

#### **4. Redirecting financial flows: Mainstreaming a transition to a low-carbon economy across activities and business-lines**

127. Achieving the transition to a low-carbon economy and society will require scaling up financing to low-carbon projects in absolute terms and relative to fossil-fuel intensive, business-as-usual development. A number of the institutions studied here are pioneering means of integrating climate and energy targets, indicators and criteria into their broader business-lines and investment activities, thus increasing the flow and the share of low-carbon projects in their larger portfolio and business offer.

128. All of the public financial institutions studied in this report have developed activities focusing on the low-carbon energy transition in one form or another. However, it appears that in many instances this support for low-carbon development is confined to a small number of programmes. In addition to financing low-carbon activities as described above, these institutions finance traditional, potentially fossil-fuel intensive, projects and companies. Furthermore, a number of PFIs are large asset managers investing billions of euros annually in financial and physical assets. Whether these asset management activities are used to generate revenue to finance public-interest development projects, as in the case of the CDC, or they are used to assure a needed level of liquidity, as in the case of the EIB and KfW, these activities may support economic activity that is incompatible with a low-carbon energy transition.

129. This “brown vs. green” issue is important as PFIs’ business-as-usual investment in brown infrastructure can exceed their investment in and financing of low-carbon oriented activities. As such, the mainstreaming or integration of climate change criteria into investment decision-making will be important. A number of the PFIs studied in this report have taken initial steps to support this mainstreaming. Climate change is often grouped within a broader set of corporate social responsibility and Environment, Social and Governance (ESG) criteria. In some instances, low-carbon considerations are taken into account through different quantified metrics: institution-wide tracking, quantified climate-coherent investment quotas, analysis of the GHG emissions impacts of projects, as well as portfolio-wide “carbon foot printing” tools. While much progress has been made on analysing physical projects and assets with respect to low-carbon criteria, analysis of financial assets is less developed.

130. This section analyses how climate change and related subjects are integrated into performance indicators at the institutional level. It then examines how GHG emissions or other climate-related indicators are being integrated into the analysis of individual projects. For a number of the PFIs studied,

GHG emissions and other energy-related information is often considered by the institution's decision-making bodies when authorising final project investment. Accordingly, this section looks at how this information is taken up in broader investment decision-making. Finally, it considers whether similar analysis is undertaken for these institutions' paper assets and liquidity portfolios.

#### **4.1 *Institution-wide tracking and annual investment indicators***

131. At the scale of their entire portfolio and investment activities, public financial institutions have established a number of performance indicators to track a broad range of ESG and CSR criteria. These indicators focus on the minimisation of the institution's own operational imprint as well as its contributions to climate action, employment and a broad range of other ESG issues.

132. The EIB, the EBRD and KfW have introduced portfolio-wide quantified climate action targets as part of their performance indicators. For the EIB and KfW, this indicator quantifies the annual signatures of projects contributing to climate action (billions of euros) compared to total investments. The EIB's indicator quantifies the annual signatures commitments of projects contributing to climate action (billions of euros) compared to total investments. For its 2012-2014 three-year Corporate Operational Plan, the annual target has been increased to 25% from 20% in 2010. Historically, the EIB has surpassed this target, as in 2011 when climate-related investment accounted for 33% of total investment across activities. KfW aims at investing around one-third of all new commitments in the climate change and environment segment. EUR 22.8 billion in funding for climate and environmental protection in Germany and abroad was committed by KfW Bankengruppe in 2011, accounting for one-third of all promotional funding of the bank.<sup>48</sup> While PFIs' methodologies to classify projects as contributing to low-carbon objectives may vary, both EIB and KfW a positive-list approach based on project type.

133. As described in Box 21, at the EIB this classification occurs in the earliest stages of the project identification stage.

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<sup>48</sup> EUR 7.0 billion was for domestic renewable energy and EUR 9.7 billion for domestic energy efficiency.



### **Box 21. Classification of projects contributing to climate change targets by the EIB**

The classification of projects into climate/non-climate is done at project identification stage according to the list below. Carbon Footprint is calculated at project appraisal.

#### **ENERGY EFFICIENCY**

All projects meeting the energy efficiency definition of the Bank that result in:

- An increase in energy efficiency of at least 20% from the baseline;
- An increase in energy efficiency of less than 20% from the baseline provided that the energy savings justify at least 50% of the investment cost; or
- Investments in cogeneration (CHP) provided they meet the energy efficiency criteria defined in Directive 2004/8/EC.

Examples of eligible projects would include CHP plants and district heating systems, and energy efficiency investments in buildings and industrial facilities.

*Comment: The definition of Energy Efficiency reflects the 20/20 goals (20% reduction until 2020) set out in the EU energy policy and clearly distinguishes between business as usual improvements and projects driven by energy efficiency considerations.*

#### **RENEWABLE ENERGY**

- Projects from renewable non-fossil sources such as wind, solar, aero-thermal, geothermal, hydrothermal and ocean energy, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases – and related component manufacturing facilities and infrastructure subject to EU policy definition;

Hydro above 20 MW, biomass and biofuels may not be considered as climate action projects when its relative carbon balance is to be presumed positive (i.e. resulting in a net increase in emissions of GHGs) at the time of appraisal.

*Clarification: Larger hydro power projects may result in positive net GHG emissions due to potentially large quantities of methane (a powerful GHG) emitted by the decaying biomass in the area flooded by the plant reservoir. The net carbon balance of biofuel projects may also be positive depending on the biocrop used (e.g. studies show that bioethanol from corn or biodiesel from crops planted in deforested areas may result in net positive footprints). Generating power using biomass from unsustainable sources is also considered harmful to the global environment.*

#### **NUCLEAR ENERGY**

Nuclear power plants and related projects (e.g. energy efficiency in nuclear fuel processing plants).

#### **TRANSPORT**

All transport projects that contribute to reducing road and air traffic emissions. Examples of eligible projects would be metro, tramways, bus rapid transit, rail, inland waterway and short sea shipping, as well as investments in rolling stock, vessels, and associated equipment.

#### **FORESTRY AND LAND USE**

Biological sequestration projects that sequester or conserve at least 20.000 tons / year of CO<sub>2</sub>-e. Examples of eligible projects would be afforestation, reforestation, forest and cropland management, avoided deforestation, reduced tillage, and revegetation.

#### **Research, Development and Innovation (RDI)**

Innovative low-carbon technologies in early stages of commercialisation and related manufacturing processes, goods and services, and research and development. Examples of eligible sectors would be photovoltaic, off-shore wind, concentrated solar power, second generation biofuels, low-emission engines, all projects currently under ECTF and carbon capture and storage.

*Comment: ECTF ends in 2010 but RDI on low-carbon technologies will continue to be supported by the Bank and count for in the Climate Action indicator.*

#### ADAPTATION

Adaptation projects, intended primarily as measures taken specifically to anticipate climate change, when these measures either exceed €20 million in value or account for at least 50% of the total project cost. Examples of eligible projects would be flood control and drought management measures, and measures to increase the climate resilience of vulnerable infrastructure or areas (e.g. coastal areas).

*Comment: The OECD/DAC has recently updated its so called marker for Adaptation which, while similar to the definition of the Bank in terms of purpose pursued, does not impose any thresholds in terms of total value or share in total cost. The Bank is thus using a more restrictive definition.*

#### OTHER

- Methane capture or avoidance projects when they reduce emissions by at least 20% from the baseline;
- Carbon funds and other funds that promote energy efficiency, renewable energy, or biological carbon sequestration.
- Projects that eliminate or substantially reduce emissions of greenhouse gases other than CO<sub>2</sub> and methane (i.e. N<sub>2</sub>O, PFC, HFC, and SF<sub>6</sub>);
- Examples of eligible projects would be landfill gas flaring, composting and other methane capture or avoidance projects from solid waste treatment facilities and waste water treatment plants; other projects that reduce methane emissions. Industrial plant modernisation projects, including projects that eliminate or substantially reduce emissions of N<sub>2</sub>O, PFC, HFC, and SF<sub>6</sub>.

Source: EIB (2010) Environmental and Social Practices Handbook, [http://www.eib.org/attachments/thematic/environmental\\_and\\_social\\_practices\\_handbook.pdf](http://www.eib.org/attachments/thematic/environmental_and_social_practices_handbook.pdf)

134. Since the creation of the Sustainable Energy Initiative in 2006, the EBRD has adopted targets for sustainable energy investments and associated quantified GHG emission reductions. Phase 1 of the SEI covered the years 2006-08 and resulted in total Bank commitments of over EUR 2.6 billion. Phase 2 (2009-11) of the SEI featured an investment target of EUR 3 to EUR 5 billion and a physical carbon reduction target of 25 to 35 million tonnes of CO<sub>2</sub> per year. These targets were met, with total investments reaching EUR 6.1 billion out of a total project value of EUR 29.7 billion. Approximately two-thirds of this activity was in the private sector (RICARDO-AEA 2013). For Phase 3, which covers the 2012-2014 time period, the EBRD has set the financing target at EUR 4.5 to EUR 6.5 billion. . It also has set an absolute GHG emissions reduction target for SEI projects over the same time period of 26 to 32 mtCO<sub>2</sub>e per year (see below for the quantification method). For comparison, the carbon reduction impact of SEI activities in 2012 was estimated at 8.8 million tonnes CO<sub>2</sub>e.

135. In addition to the quantified low-carbon investment targets of the EIB, the EBRD and KfW, the UK Green Investment Bank has introduced a double bottom line approach into its accounting practices. In addition to reporting on the pure financial return of projects, the GIB provides “green impact” appraisal reporting which analyses the results of their activities on greenhouse gas mitigation (calculated across the portfolio), waste disposal and other environmental criteria.

136. The CDC also has introduced a number of outcome-based performance indicators, tracking the number of projects per year as well as the cumulative portfolio of renewable energy installed and the amount invested. CDC Infrastructure, a subsidiary of the CDC, has set an objective to reduce its carbon footprint by 2020 compared to 2010. A systematic tracking of low-carbon investment across all of the institution’s activities is under development.

## 4.2 *Mainstreaming of quantified analysis*

137. A number of the public financial institutions studied here have developed or are in the process of developing quantified metrics of mainstreaming low-carbon energy into portfolio- and project-based analysis. This is occurring through the quantification of the GHG impacts of individual projects, the quantification of the carbon footprint of the combined portfolio of projects, and energy-audit and diagnostic tools. The EIB also systematically integrates a “shadow price of carbon” in the economic appraisal of all investment projects. However, only the UK GIB, estimates the GHG emissions mitigation impacts of their entire investment portfolios.

### 4.2.1 *GHG analysis of physical assets at the project and portfolio-scale*

138. A number of institutions studied analyse the greenhouse gas and energy-related impacts of different individual projects as well as of their programmes and portfolio of physical asset investments.

139. Since 2009, the EIB has been developing a methodology and guide for EIB Project Directorate staff for the calculation of the carbon footprint of projects financed by the Bank. The Bank has carried out a 3-year pilot phase from 2009-2011 to measure the GHG impact of the projects it finances. This process has led to the development of methodologies that can be integrated into the broader economic assessment of projects under evaluation and be used to estimate the annual GHG emissions associated from their portfolio of physical asset investments. Given the potentially resource-intensive nature of the GHG quantification of the entire portfolio, the EIB has chosen not to quantify the emissions of all of its projects, focusing rather on those that may potentially influence its carbon footprint the most. As such, the scope is limited to those projects with absolute emissions greater than 100 000 tCO<sub>2</sub>e or relative emissions<sup>49</sup> over 200 000 tCO<sub>2</sub>e. Nevertheless, the methodology is estimated to capture 95% of the GHG emissions of the EIB’s portfolio within the given perimeter.

140. CDC Infrastructure, the subsidiary of the Caisse des Dépôts active in equity investment in infrastructure projects, has developed a tool for assessing the environmental impacts (water, energy, carbon, biodiversity) of infrastructure projects under study for investment. The EvalInfra tool helps CDC Infrastructure to manage asset allocation (i.e. to develop a diversified portfolio of low carbon assets) as well as to conduct discussions with project partners to fully take into account environmental impacts in the development and governance of projects.

141. As part of its green bottom line process and indicators, the UKGIB quantifies the emissions avoided as a result of its investment activities. While the methodologies and sector-specific guidelines are still under development, results from initial 2012-2013 investments are available (see Table 19). The UKGIB Board of Directors will use this information in its statutory duty to ensure that its activities in making, facilitating or encouraging investments in each year and in any previous financial years would (taken as a whole) be likely to contribute to a reduction in global GHG emissions.

142. The EBRD has assessed the GHG impacts of its direct investments (loan and equity) since 2003. Although in most years all direct investment projects with emissions, or emissions savings, exceeding 20 ktCO<sub>2</sub>e per annum have been assessed, the focus has been on large projects mainly in the energy and industrial sectors, which dominate the portfolio GHG footprint (EBRD 2010).<sup>50</sup> Every project that is

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<sup>49</sup> The variation in emissions compared to a baseline, defined by the EIB as the level of emission in the absence of the project (EIB 2012b).

<sup>50</sup> Some sectors are screened out on the basis of low GHG impact. Furthermore, some direct investments involving corporate loans and most projects supported through financial intermediaries (FI) are generally not assessed as there is insufficient information on the precise nature of these investments (EBRD 2010).

expected to emit more than 100 ktCO<sub>2</sub>e per annum undergoes a GHG assessment (scope 1 and 2 emissions<sup>51</sup>), as required by the EBRD's environmental and social policy.<sup>52</sup> In addition to these projects (i.e. typically greenfield projects and capacity expansion in sectors including energy generation), GHG quantification is required for projects that result in a reduction of emissions (i.e. typically SEI projects).

143. The EBRD defines the change in GHG emissions as the difference between the emissions following the implementation of the project investment and the emissions that would have occurred in its absence.<sup>53</sup>

**Table 18. Project-scale GHG emission quantification tools**

	Projects Analysed	Thresholds	Emissions Included	Baseline Comparison
<b>EBRD</b>	All projects, typically excluding corporate loans and intermediated lending	Projects exceeding 100 kt CO <sub>2</sub> e per annum	Operational emissions	Scenario without project, calculated based on appropriate Kyoto flexibility mechanism methodology <sup>54</sup>
<b>EIB</b>	Included: infrastructure; Excluded: RDI <sup>55</sup> , SME and intermediated investment	Absolute emissions: greater than 100 000 tCO <sub>2</sub> e; Relative emissions (either positive or negative): greater than 20 000 tCO <sub>2</sub> e	Operational emissions excluding those stemming from construction	Likely alternative to the proposed project which (i) in technical terms can meet required output; and (ii) is credible in terms of economic and regulatory requirements
<b>CDC (EvaluInfra)</b>	Infrastructure projects	Equity investments over EUR 10 million	Operational emissions Construction emissions	Scenario without project

144. KfW regularly commissions ex-post evaluations of the impact of its key promotional programmes for Germany. These are macroeconomic assessments, comprising a calculation of avoided GHG emissions. For example, evaluation of KfW programmes addressing energy efficiency in buildings over the funding years 2005 to 2010 showed positive results, not only in terms of mobilised investment, energy savings, CO<sub>2</sub> reduction and impact on employment, but also in terms of their cost-effective use of public financial budgets.

<sup>51</sup> Emissions are estimated using the definitions adopted by the GHG Protocol of the WBCSD/WRI. Direct emissions are referred to as 'Scope 1', emissions from grid electricity used are 'Scope 2' while other upstream and downstream emissions are 'Scope 3' (EBRD 2010).

<sup>52</sup> This encompasses aggregate emissions of direct sources and indirect sources associated with purchased electricity for own consumption. The EBRD deems that a lower emission threshold may be appropriate where a project aims to bring about large improvements in production efficiency (EBRD 2010).

<sup>53</sup> In the absence of the project investment by the EBRD, the baseline scenario is usually estimated to be zero emissions for a greenfield project, or the annual emissions of a pre-existing facility annual emissions for project involving refurbishment or upgrading (EBRD 2010).

<sup>54</sup> Clean Development Mechanism (CDM) or Joint Implementation (JI).

<sup>55</sup> Research, Development and Innovation (RDI)

145. Finally, the CDC and the EIB have both developed energy audit tools; these are used to analyse building projects (CDC and EIB) and real estate portfolios (CDC). The CDC holds a portfolio of 5.4 billion euros of real-estate assets, including industrial, commercial, office and residential. In light of French legislation setting a goal of reducing energy consumption by at least 38% by 2020, CDC's real estate management division launched a detailed audit in 2011 of the energy performance of buildings owned 100% by the CDC. The objectives of the audit are to estimate the impact of building renovations and identify inefficient buildings that could be ceded. The audit helped to development of a plan for long-term work (2020-2030).

#### 4.2.2 Integration into project-based analysis

146. Information on GHG impacts is used in different ways by the PFIs studied in the analysis of individual projects. While many decisions concerning the types of projects that PFIs will finance are made by national governments and oversight bodies in line with specific mandates, the PFIs have some discretion regarding the projects they finance based on their assessment of projects' ESG impacts.

147. Over the last five years, the EIB has been proactive in integrating climate and energy issues into project analysis and decision making. As part of their broader strategy, the EIB conducts an *Economic Appraisal of Investment* for each of the projects in which it invests. This analysis plays a role in the EIB's determination of the suitability of the project for financing. The EIB has developed standardised means of integrating a broad range of issues into economic analysis. These include: environmental externalities; land acquisition and resettlement; wider economic impacts; social discount rate; and sector-specific topics such as the value of time in transport; security of energy supply and risk-reduction analysis in water.

148. Climate change, and more specifically the "shadow price of carbon", is integrated into the analysis of external costs within EIB's economic appraisals. The values used for the damage associated with a tonne of emissions in 2010 range between EUR 10 to 40 with a central value of EUR 25 per ton of carbon dioxide equivalent. This base value is estimated to increase annually between 2011 and 2030 by different rates depending on different scenarios, with a cost range between EUR 20 to 80 (central value of EUR 45) in 2030. These values are integrated into cost-benefit analyses for projects as well as cost-effectiveness analyses, particularly for energy projects.

**Table 19. Value of carbon in EIB appraisals (EUR)**

Price Range	Value 2010 Emission	Annual adds 2011-2030
<b>High</b>	40	2
<b>Central</b>	25	1
<b>Low</b>	10	0.5

Source: (EIB 2013e)

149. The EIB and the EBRD both incorporate a shadow price of carbon in the economic appraisal of all investment projects in the same way as they consider any other cost or benefit. The aim is to encourage sound projects that will lead to a drop in carbon emissions. The shadow price of carbon is critical in placing renewable energy investments on equal footing with traditional investments. In general, the EIB will finance mature renewable energy projects which are competitive with conventional sources, after accounting for the shadow cost of carbon, the generation profile and the wider system costs of renewables. The case for financing emerging technologies is assessed in light of the potential for future learning (and hence cost reduction).

150. Given that the EBRD typically funds private sector projects, it rarely undertakes full Cost-Benefit Analysis (CBA) on projects (RICARDO-AEA 2013). Nevertheless, since 2010 internal operational guidelines have mainstreamed climate change and energy efficiency aspects into project appraisal. The EBRD's Performance Requirement 3 requires that clients provide information on potential GHG impacts of projects expected to produce significant quantities of GHGs. This information is to be used during the design and operation of the project to assess technically and financially feasible and cost-effective options to reduce the project's carbon intensity, and to pursue appropriate options. Costs per tonne of CO<sub>2</sub>e saved may vary substantially across size, sector, and location of the project, but need to be considered in the context of each project.

151. Secondly, shadow prices for carbon are used to perform sensitivity analysis of the economic viability of carbon-intensive projects under different carbon price scenarios.<sup>56</sup> Such analysis is typically provided for projects in countries covered by the EU ETS to account for climate risk considerations. A range of carbon prices can be applied - from the current EU ETS price of EUR 4 – 5 per tonne to DECC/IEA shadow prices that range from USD 25 – 80 / tonne (RICARDO-AEA 2013). The EBRD also applies carbon assessment and shadow pricing to projects, in many instances as a means of evaluating their carbon market preparedness and as a means of estimating potential future carbon market flows. Shadow carbon prices are also increasingly used to calibrate subsidy levels to reward low-carbon investment when EBRD funds are combined with donor funds (RICARDO-AEA 2013).

#### *4.2.3 Integrating Adaptation into the Analysis*

152. The EIB is pioneering the incorporation of climate change adaptation criteria into project analysis. Adaptation activities are counted as climate-related projects for purposes of the EIB's target to provide 25% of its funding to climate-related projects. The EIB also is exploring how to integrate in its project assessments the future impacts of climate change over the lifetime of a project through vulnerability assessment. It is currently piloting a screening tool focusing on impacts in sectors that are potentially the most vulnerable to climate change – for example the impacts of rainfall patterns on hydropower installations as well as other critical infrastructure (transport, energy). This pilot process is expected to lead to the development of a larger review system to evaluate and record vulnerability assessments. The EIB hopes to find means to improve existing projects in terms of their climate-related vulnerability by identifying feasible actions when the EIB is involved early in the project cycle, and to improve future projects by being a catalyst for project developers to learn how to incorporate climate-related vulnerability considerations in the development process (Saich 2013).

153. Since 2010, the EBRD has been piloting a toolkit for identifying and managing climate change risks to investments including guidelines for climate change screening and risk profiling, as well as guidance on integrating risk assessment and adaptation into project feasibility studies, environmental and social impact assessments, environmental action plans and water audits (RICARDO-AEA 2013).

154. Today, the EBRD provides clients with technical expertise on climate, water and energy issues specific to the client's industry. Their involvement ranges from initial risk assessment to the design of strategic responses. EBRD technical experts visit the client's site to carry out water and energy audits, climate resilience audits, providing a basis to identify, propose and discuss with the client possible technical and investment solutions.

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<sup>56</sup> The carbon price benchmark used by the EBRD is typically the marginal damage cost from the literature rather than actual carbon market prices due to their current volatility and fragmented nature.

#### 4.2.4 *Use of low-carbon criteria in the finance decision-making process*

155. For the EIB, the CDC and the EBRD, information produced on GHG emissions and other energy-related criteria is often taken up by the institution's decision-making bodies when authorising final project investment.

156. In the case of the CDC, GHG criteria for equity investments in infrastructure projects of a value over EUR 10 million are integrated into the report provided by the Sustainable Development department of the CDC to the *Comité d'engagements* or the Investment Committee of the CDC. Chaired by the General Director of the CDC, the Committee gives a go / no-go evaluation. The sustainable development evaluation is presented with the same weight as the analysis of the finance and risk teams. This analysis typically includes a quantification of the energy and greenhouse gas impacts of the proposed investment as well as other environmental criteria whenever possible. Since 2008, the Sustainable Development department service has produced a report evaluating investment decisions with respect to social, environmental and governance criteria.<sup>57</sup>

157. In the case of the EIB, climate- and energy-related criteria are integrated into the decision-making process in the pre-appraisal screening stages of a project. Based on this information, as well as a number of other criteria, the initial decision to conduct a full appraisal of a candidate project is made. A more detailed review, including both the pilot adaptation screening tool as well as the quantified carbon footprint, is conducted if thresholds are met. The result of the detailed analysis is incorporated into the Board Report used by the Board of Directors to approve EIB financing of projects. Since January of 2013, the carbon footprint is included within the Environmental and Social Data Sheet for the project. The role of the project in achieving the EIB's commitment of 25% of financing going to climate-related projects is included in the Value-Added sheet. As mentioned before, the EIB is still assessing how to best record and include information on adaptation and vulnerability assessment into final documentation for review.

158. Using calculated GHG information, the EBRD assesses the change in annual greenhouse gas (GHG) emissions estimated to result from each year's new investment portfolio signings once the projects are fully implemented. Out of 380 commitments signed by the Bank in 2012, 31 projects met the criteria for inclusion in the GHG Assessment. The EBRD estimates that the projects above this threshold contribute 80-90% of total GHG emissions or savings. The 31 projects assessed in 2012 led to an estimated 2 mtCO<sub>2</sub>e reduction in emissions per year.

### 4.3 *Minimal mainstreaming: financial assets*

159. To date, it appears that less progress has been made in integrating climate and energy-based criteria into the management of financial assets such as stocks and bonds. A number of the public financial institutions studied are large asset managers in addition to being project financiers. The CDC, the EIB and KfW all apply ESG and other corporate social responsibility due-diligence in their asset management. Increasingly, climate and energy are being taken into consideration in this process.

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<sup>57</sup> While it is an important step toward the inclusion of broader sustainable development concerns and climate-related issues in investment decisions, this process is recognized by the CDC to have a number of limitations. First, the process only covers a small portion of the total activities of the Group. Second, incorporating climate change considerations at the investment decision stage backloads the risk analysis process, thus reducing the potential to consider and improve the emissions profile of projects during their development. Third, no thresholds have been set to automatically exclude projects in terms of their emissions, impact or coherence with the energy transition. The CDC is currently revising the methods and indicators used to integrate climate and energy issues across its activities.

**Box 22. A framework for investment: The CDC's responsible investment charter**

CDC has been active in integrating environmental, social, and governmental issues into its investment strategy, cementing its commitment through the approval of its Charter for Responsible Investment in 2011. This document sets out the overarching principles that guide Caisse des Dépôts and its subsidiaries as “accountable” financial actors and calls for the integration of issues directly related to the low-carbon energy transition. The issues specifically relating to energy and climate are the following:

- **Investments in real-estate:**
  - o Favour the acquisition of highly energy-efficient and environmentally-friendly buildings, as well as the renovation of its existing portfolio assets in order to improve energy efficiency performance and obtain the relevant certifications.
  - o Particular attention is paid to projects that may be affected by changes in regulation, notably thermal regulations for buildings and those relating to greenhouse-gas emissions.
  - o The goal by 2020 is for assets in the portfolio to achieve the following: new buildings should generate energy; renovated existing properties should demonstrate low-energy consumption; and all new buildings should be located close to public transport services.
- **Investments in infrastructure projects:** Direct investments in infrastructure projects are made based on the following factors:
  - o an asset-specific impact analysis for energy, CO<sub>2</sub>, biodiversity, and water criteria;
  - o prioritisation of projects emitting the least greenhouse gases.
- **Investments in regional development:** In particular, Caisse des Dépôts lends comprehensive support to urban and regional projects fitting into the framework of its “sustainable cities and regions” approach, consistent with national or local strategies. Its investments also target the development of renewable energies and energy efficiency.

Source: (CDC 2012).

160. For example, CDC's asset management activities are linked to the investment of the different deposits managed by CDC, including EUR 32.6 billion from the French legal professions (notary publics, escrow funds, etc.) as well as the portion of the passbook savings account funds invested to ensure overall liquidity needs. This is divided between two principal portfolios: one of approximately EUR 35 billion in bonds and EUR 14 billion in stocks managed by the Finance division and the EUR 120 billion invested in the financial markets by the Savings Funds division. These financial and asset management activities aim at providing safe and consistent revenues while contributing to the resilience of asset and liability management. The internal investment mandate for these activities is different from that for “general interest” activities, but is also long-term.

161. CDC portfolio managers implement a holistic approach to responsible investment, encompassing environmental, social and governance analysis and active dialogue, and with an objective of preserving the long-term value of their assets. For stock and bond investments, CDC portfolio managers perform an ESG analysis prior to any risk allocation and engage companies in a high-level dialogue to improve corporate performance with regards to specific ESG issues and targets (encompassing issues such as GHG emissions quantitative targets, pollution prevention and management, water management and resource efficiency, the integration of sustainability considerations in corporate governance).



162. The CDC actively examines at least annually the climate and energy strategy – or a relevant environmental performance indicator - of each of the approximately 100 companies in which it currently invests. For listed equities, this information is integrated into the core investment documentation for each company, in addition to other social, environmental and financial analysis used by the investment teams. Concerning the one-third of the CDC's bond investment activities made up of corporate debt (the other two-thirds comprising principally sovereign-debt), the investment teams take a sector-based approach. Each company is compared within its sector on a range of ESG criteria – including GHG emissions and energy efficiency – using the data currently available through Bloomberg, MSCI and the CDP (ex-Carbon Disclosure Project). Through a scoring system, this analysis is used to track a company's evolution and improvement in terms of the different categories as well as the overall changes in the larger investment portfolio.

163. Furthermore, CDC has an active dialogue with the companies in which it invests through its listed equity portfolio. Through this dialogue, CDC works to foster discussion on how to improve energy and climate performance rather than applying stringent exclusion criteria. Thus, CDC aims to incentivise major economic players towards greater resource efficiency in their strategies, business models and operations, and has indicated that it is setting up tools to measure such contribution.

164. The EIB and KfW both have relatively substantial liquidity portfolios. The EIB manages a liquidity portfolio of financial assets. For example, total treasury assets stood at 65 billion euros at the end of 2012 (EIB 2013f) and were principally composed of short-term money market and operational money market assets as well as government bonds and an investment bond portfolio. Given that the vast majority of the overall treasury portfolio is kept in very liquid and short term investments, there may only be limited opportunities to integrate climate and energy criteria in these investments. However, the EIB is assessing the benefits of integrating SRI criteria into the management of the Treasury's medium/longer-term bond portfolios.

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