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Public Instruments to Leverage Private Capital for Green Investments in Developing Countries

Nannette Lindenberg

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Abstract

Considerable amounts of capital will be necessary if a green transformation is to be financed in the coming years. This paper gives a short introduction to the challenge of mobilising the required resources, particularly from private and institutional investors. More specifically, it provides an overview of eight public leveraging instruments that can be used to leverage private capital for green investments in developing countries and emerging economies. It discusses the strengths and weaknesses of these instruments and gives an assessment of their potential for a broader use. Additionally, the paper argues that more data transparency and quantitative research are needed to better assess the implications of the use of these instruments. Finally, it points out research gaps and proposes ideas for further research. The paper concludes by giving some policy recommendations.

Keywords: green finance, financing a green transformation, mobilisation of private capital, public instruments, developing countries, emerging markets

JEL: F21, F30, Q01, Q54

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Bonn, December 2013 Nannette Lindenberg

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Abbreviations

3GF	Global Green Growth Forum
ADB	African Development Bank
AFD	Agence Française de Développement
AIGCC	Asia Investor Group on Climate Change
BMU	German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety
BMZ	German Federal Ministry for Economic Cooperation and Development
BNEF	Bloomberg New Energy Finance
CCXG	Climate Change Expert Group
CDKN	Climate and Development Knowledge Network
CEM	Clean Energy Ministerial
CIF	Climate Investment Fund
COP	Conference of the Parties of UNFCCC
CPI	Climate Policy Initiative
DAC	Development Assistance Committee
DEG	Deutsche Investitions- und Entwicklungsgesellschaft (Germany)
DFID	Department for International Development (UK)
DIE	Deutsches Institut für Entwicklungspolitik / German Development Institute
DPIGI	Dialogue Platform for Inclusive Green Investments
EIB	European Investment Bank
EU	European Union
FSB	Financial Stability Board
G20	G20 Major Economies
G2A2	Green Growth Action Alliance
GCF	Green Climate Fund
GCPF	Global Climate Partnership Fund
GGGI	Global Green Growth Institute
GGKP	Green Growth Knowledge Platform
GIC	Global Investor Coalition on Climate Change
GIIN	Global Impact Investing Network
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (Germany)
GNI	Gross national income
IDB	Inter-American Development Bank
IDFC	International Development Finance Club
IEA	International Energy Agency
IFC	International Finance Corporation
IGCC	Investor Group on Climate Change Australia / New Zealand

IIGCC	Institutional Investors Group on Climate Change
INCR	Investor Network on Climate Risk
IOPS	International Organisation of Pensions Supervisors
IRENA	International Renewable Energy Agency
JICA	Japan International Corporation Agency
KfW	KfW Development Bank (Germany)
LTF	Long-term finance
MIGA	Multilateral Investment Guarantee Agency (World Bank Group)
NEFCO	Nordic Environment Finance Corporation
NGO	Non-governmental organisation
ODA	Official Development Assistance
ODI	Overseas Development Institute (UK)
OECD	Organisation for Economic Co-operation and Development
OPIC	Overseas Private Investment Corporation
PSF	Private sector facility
REFINe	Renewable Energy Financial Instrument Tool
REN21	Renewable Energy Policy Network for the 21st Century
REPP	Renewable Energy Performance Platform
SE4ALL	Sustainable Energy for All
SME	Small and medium enterprises
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNEP BFI CCWG	United Nations Environment Programme Bilateral Finance Institutions Climate Change Working Group
UNEP-FI	United Nations Environment Programme Finance Initiative
UNFCCC	United Nations Framework Convention on Climate Change
WB	World Bank
WEF	World Economic Forum
WRI	World Resources Institute
WTO	World Trade Organization

1 Introduction

Due to imminent climate change, considerable investments, especially in green infrastructure, are needed to green the economy. As public budgets alone will not be able to provide the necessary financing, there is a necessity to mobilise private capital for green investments, particularly in developing countries and emerging markets.

The contribution of this paper is to give an overview of eight relevant public leveraging instruments and to point out their advantages and disadvantages (Section 4) and their relevance (Section 5). Additionally, we identify research gaps and propose ideas for further research (Section 6).

We show that the eight instruments studied in this paper have different advantages and weaknesses. More importantly, they are suited to various situations to differing degrees. The selection of an appropriate instrument depends on many factors: for instance, the overall purpose and the chosen role of the public donor or development bank, the project development phase, the desired leverage effect, and the availability of the instrument. However, much more research, especially quantitative research, is needed to better assess the implications of the use of different public leveraging instruments. To this end, broader knowledge about green finance has to be created and disseminated.

The remainder of this paper is structured as follows: Section 2 presents the statement of the problem and highlights important international processes that have a related agenda. Section 3 gives a short overview of the literature on green finance, especially on mappings of green finance flows and case studies. The above mentioned contribution is made in Sections 4 to 6. The final section presents a summary of the lessons learned and offers policy recommendations.

2 The challenge: financing the green transformation

Internationally we have a broad consensus on the need to change our unsustainable ways of living and to restructure our economies in a way that the planetary boundaries are respected. The transformation towards a sustainable economy, i.e. a green transformation,[1] is not only crucial for combating climate change, but also for improving the health conditions and the security of energy supply for hundreds of millions of people. Moreover, it can help to reduce costs for adaptation to climate extremes.[2] At the Conference of the Parties of the United Nations Framework Convention on Climate Change (UNFCCC) in Cancún (COP16) in 2010, the international community adopted a 2°C target. Global warming beyond this threshold was considered to trigger serious environmental damage with catastrophic consequences for the planet, as well as for mankind. A recent report of

1 A definition of green transformation and some other relevant terms are given in Box 1.

2 See WBGU (German Advisory Council on Global Change) (2011).

the World Bank (2012b) describes the scenario of a 4°C warmer climate with its cataclysmic changes and consequences for hundreds of millions of people.

Greening the economy is an important strategy with which to combat climate change and to prevent worst case scenarios. A green transformation has manifold dimensions, the most important of which is to reduce carbon emissions and to secure sustainable energy for all. This includes offering secure universal access to modern energy supplies, doubling the share of renewable energy in the global energy mix, increasing energy efficiency, and phasing out inefficient fossil fuel subsidies.[3]

Box 1: Key definitions

For many of the terms used in this paper, we do not have internationally agreed definitions. Indeed, in most publications on this issue, the authors either do not define important key terms at all, or apply their own definitions. The inexistence of important definitions, for instance for "green finance", "climate finance", "green growth", or "green transformation" is a serious hurdle - not only for statistical purposes, but also for clear communication and the mobilisation of financial resources. In this paper, however, we do not try to solve this difficulty. Rather we apply broad definitions as working assumptions that do not consider detailed nuances.

- **Green transformation:** the pro-active restructuring of the economy in a way that respects planetary boundaries.*
- **Green finance:** finance flows for investments that respect the planetary boundaries.
- **Green infrastructure investments:** investments in infrastructure that take planetary boundaries into consideration. This includes renewable energy generation and distribution, energy efficient buildings and city planning, water supply and removal, and waste management.
- **Private capital:** capital from private and institutional investors (such as pension funds, assurances, sovereign wealth funds) in a broad sense, including all those that have significant amounts of assets under management. Strictly speaking, private capital in this definition also includes public capital (e.g. of sovereign wealth funds). A negative definition of private capital would be: capital that is not included in government budgets.
- **Leverage ratio:** ratio of total funding to public funding.

* This is the definition proposed by Schmitz / Becker (2013).

A special focus has to be on developing countries and emerging economies for two reasons. First, these countries will suffer exceptionally from climate change. Second, due to the projected growth of these country groups and the related increase in emissions, combined with the strong path dependencies of the infrastructure investment decisions that are to be taken, it is crucial to select the green pathway right now and avoid lock-in effects.

3 See the illustrative sustainable development Goal number 7 of the High-Level Panel Report (UN 2013).

2.1 Financing needs – the search for investors

The estimations of the actual financing needs for a green transformation vary significantly among sources, but it is certain that we are confronted with financing needs of trillions of USD:

- The European Commission estimates that the European Union needs to invest about EUR 270 billion per year in low-carbon energy, energy efficiency and infrastructure.[4]
- The International Energy Agency (IEA) estimates that for a green transformation, cumulative investment in green infrastructure of about USD 36-42 trillion would be needed between 2012 and 2030, i.e., approximately USD 2 trillion per year. Half of this amount, USD 1 trillion, is already being invested today.[5]
- For the next years, and focusing only on the power sector, the IEA projects that USD 6.35 trillion in total investments will be required from 2010 to 2020 for a reduction of energy related CO_2 emissions of 50% by 2050, compared to 2005 levels, and that by 2020 about USD 24 trillion investments would be required.[6]
- The World Economic Forum refers to additional, incremental investment needs in clean energy infrastructure, low-carbon transport, energy efficiency, and forestry of at least USD 0.7 trillion per year to meet the climate-change challenge of limiting global warming to 2°C.[7]
- The World Resources Institute indicates that, in order to reach the 2°C goal, developing countries will need USD 531 billion yearly up to 2050 for additional investments in energy supply and demand technologies.[8]

It seems clear that public budgets alone will not meet the challenge.[9] For instance, the commitment of the industrialised countries given at COP16 to provide USD 100 billion per year from 2020 onwards for mitigation and adaptation actions in developing countries is only a drop in the bucket. Moreover, in the aftermath of the recent global crisis, where industrialised countries all over the world are confronted with the depressing budget constraints of their home economies, the question arises whether this international commitment is deemed to be just another important target that will be cited frequently but reached only by some single outriders – just as the 0.7% ODA/GNI target that was agreed on in 1970.

Public interest has therefore recently concentrated on private investors who might have the capabilities to close the financing gap. Especially institutional investors (such as pension

4 European Commission (2013).

5 International Energy Agency (2012).

6 International Energy Agency (2012)

7 World Economic Forum (2013).

8 Polycarp / Brown / Fu-Bertaux (2013).

9 IFC (2013a) estimate that, from 2010 to 2011, financial flows for green investments have been USD 350 billion.

funds, insurance companies, or sovereign wealth funds) with their long-term investment horizon seem to be – at least theoretically – very adequate sources.[10]

The reason for this is that, first of all, institutional investors have assets of more than USD 70 trillion under management (Kaminker / Stewart 2012) and, thus, constitute a very promising source of funding. Furthermore, institutional investors – at least some of them[11] – have the potential to also finance long-term investments, which are of high importance for the establishment of green infrastructures.

2.2 Investment barriers – not just in developing countries

Unfortunately, the current importance of this group of investors for infrastructure, and even more, for green projects is rather remote. The OECD estimates that less than 1% of the assets of pension funds are invested in infrastructural projects worldwide (OECD 2013a). At the same time, investments in green infrastructure projects in developing countries or emerging markets amount only to a tiny percentage of overall investments, and account, in consequence, only for a minimal fraction of this 1% of their investment volume.

What are the reasons for the degree of reluctance on the part of institutional and private investors to engage in green investments all over the world? The answer is economically straightforward: the risk-return calculus of these investments is not attractive for them. This is basically the outcome to two problems: first, due to high fossil fuel subsidies, the return on green investments is limited; second: the (perceptions of) investment risks are too high. Both problems apply to developing and emerging countries as well as to industrialised countries.

The problem with the fossil fuel subsidies is that they preclude the creation of a fair market price for carbon, making investments in new energies and energy efficiency unnecessary and unattractive. However, abolishment of fuel subsidies is not easy as there are powerful lobbies arguing in favour of them. Strand (2013) discusses and models various political economy aspects of fuel subsidies and gives explanations for the high prevalence of subsidies, particularly in autocracies and young democracies.

While the former problem is easy to identify, investment risks are more complex as there are different types of risks that might form barriers for private sector engagement in green investments, some of which are of particular relevance for developing countries and emerging economies.

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10 Interest in private sector funding, and especially institutional investors, is tremendous. For an overview of institutions and initiatives working on green finance, see Table A1 of the Appendix.

11 Institutional investors are indeed a very heterogeneous group of investors with different investment behaviours and different barriers. See Nelson / Pierpont (2013) for a good overview; and Bernstein / Lerner / Schoar (2013) for the investment strategies of sovereign wealth funds.

The risks that apply to all countries in very much the same way are related to regulation, technology, and financing. Regulation risks include legitimate changes in the regulation of firms, financial intermediaries, and technologies that can change the profitability of a project. For instance, the reduction (or only the discussion about possible reductions) of feed-in-tariffs diminishes the calculated profits of new energy investments. Investments in new technologies in particular entail technological risks typical of the first years of innovations. Investments in green projects most often have a very long time-horizon. Consequently, also the possibility of acquiring additional financing during critical project development phases is relevant. Another financial risk is the liquidity of the investment, i.e., whether it is possible to sell project shares or bonds in financial markets without constraints.

In addition to these general risks, investors in emerging economies and even more so in developing countries are confronted with macroeconomic and political country risks. These include, for instance, exchange rate volatility, inflation, capital market controls, expropriation, or civil disturbances and lead to more or less negative values for the country ratings of credit rating agencies. These ratings, then, influence the possibilities of the rated countries to get the financing they require.

In actual fact, Roland Berger Strategy Consultants (2012) argue that the estimation of country risks are systematically too high, which entails financial harm to developing countries and emerging economies. Also, investors themselves are affected as they miss business opportunities. However, whether the assessment of the risks is correct or exaggerated – and thus, reflecting perceived or real risks, does not really matter for the outcome, as the consequence is principally the same – private investors are often reluctant to invest in green infrastructure projects.[12]

2.3 Enabling green investments – the second-best solution

The first best solution to enable green investments would without doubt be the pricing of carbon emissions. Only if we have clear long-term prices for carbon emissions, will the external damages caused by the use of fossil fuel energies be included in the pricing and investment decisions of private actors. In such an economic environment, green technologies and investments on the one hand and traditional fossil fuel investments on the other would compete on an equal basis. The relative costs of green investments would improve and they would become automatically attractive options. Additionally, other market distortions in emerging and developing countries, the causes for the higher risks mentioned before, would have to be removed to make these countries more attractive for investors.

12 However, it does matter for the policy implications.

Unfortunately, these first best solutions will not be realised – at least not in the near future. Sadly to say, fossil fuel subsidy reforms are very hard to implement. Improving the general investment climate in the developing and emerging economies is not an easy task either. However, if we want to finance the desired green transformation, it seems inevitable that private investors must be on board. Consequently, second-, third- and fourth-best solutions come into play.

One possibility of mobilising private investments is that public donors, development banks, and development finance institutions provide incentives and support to make private investors consider engaging in green investments. This is of particular relevance if they are supposed to invest in developing countries or emerging economies. For this, different public instruments might serve the purpose and a selection of them will be discussed further on in this paper.

Another option – or rather the other side of the coin, as both approaches should go hand in hand – is to improve the enabling environment for green investments. A favourable enabling environment comprises various different aspects: national and international rules and regulations that are relevant for financing flows and investments form an as important part of it as green industrial policies that provide incentives through national policy mechanisms. Prominent examples are feed-in-tariffs that subsidise renewable energy production. But also overall governance performance, financial market development, the removal of technical, legal and administrative barriers for investments, transparency, and jurisdiction have an important stake in what makes up an enabling environment.

Various different international bodies are currently discussing these two options for mobilising private capital. The most important discussions are probably anchored in the G20, the OECD, and UNFCCC, but even within these groups more than one initiative exists. An overview of relevant processes is given in Box 2.

In this paper we will discuss the first option: public instruments to mobilise private capital. We focus explicitly on the mobilisation of private capital from international capital markets. The mobilisation of funds from domestic capital markets is without doubt also very important, but will not be analysed further in this paper.[13] Furthermore, we explicitly exclude policies, policy support, and global dialogues on rules and regulations[14] that help to provide an enabling environment for green investments in development countries and are as important for a green transformation as financing itself. Thus, policy instruments such as, for example, feed-in-tariffs or renewable energy quotas, and standards and regulations are outside the scope of this paper.

13 The IFC (2013a) states that domestic funding is the most important source for financing green projects. Also national development banks have an important role for the mobilisation of funds for climate finance. See Smallridge et al. (2013).

14 See Spencer / Stevenson (2013) for an overview of the implications of new financial sector regulations (e.g. Basel III and Solvency II) on low-carbon investments in the European Union (EU); and Severinson / Yermo (2012) for the effects of recent and planned changes to solvency and accounting regulations on insurers and pension funds.

However, while discussing these instruments, it is crucial to always keep in mind that they are only a replacement – at best, a second-best solution. Unfortunately, public financial instruments to mobilise green investments always imply costs and they never strike at the heart of the problem and eliminate the misguided incentives that prevent investors from engaging in green investments.

Box 2: Selected processes related to green finance

G20 processes

- The G20 Development Working Group established a Dialogue Platform for Inclusive Green Investments (DPIGI) that is to help mobilise public and private funds for inclusive green growth investments in developing countries. For the implementation of this DPIGI, the International Finance Corporation (IFC) has been asked to provide some guidance in two rounds of stocktaking.
- Recently, the G20 Finance Ministers and Central Bank Governors have created a new Study Group on Financing for Investment, which will also focus on the role of the private sector as financiers for long-term investments. This Study Group on Financing for Investment does not focus on "green issues", however, due to path dependencies, nowadays long-term investments should also be green investments to avoid lock-in effects.

OECD research projects

- The OECD Directorate for Financial and Enterprise Affairs has a project on Institutional Investors and Long-term Investment which focuses especially on institutional investors and their possibilities and needs to provide funding for long-term investments. As the OECD hosts the Secretariat of the International Organisation of Pensions Supervisors (IOPS), they do not only have, in particular, expertise and contacts to pension funds, but also study the situation of insurance companies and sovereign wealth funds.
- On behalf of the OECD Climate Change Expert Group (CCXG), the OECD coordinates and hosts the Research Collaborative on Tracking Private Climate Finance, a network of interested governments, relevant research institutions, and international finance institutions. In the short term this initiative aims at developing a common methodology to measure private climate finance flows and at tracking the private climate finance to, between, and in developing countries. In the medium term, they want to advance further and also investigate other related topics of private green finance.

UNFCCC discussion strands

- The UNFCCC work programme on long-term finance (LTF) was implemented during COP17 and extended to the end of the year 2013. The aim of this work programme is to analyse options to mobilise public and private capital for climate change investments.
- Another related discussion takes place within the Board Meetings of the Green Climate Fund (GCF), whose structure and operating mode is not fully defined yet. The GCF will have a Private Sector Facility (PSF) that shall enable the GCF to finance private sector mitigation and adaptation activities. Currently, at the Board Meetings, the design and the financial instruments that the PSF will have are being discussed.

G8 process

- The G8 Social Impact Investment Forum in June 2013 has established a Social Impact Investment Taskforce which aims to report on related questions for the mobilisation of capital for impact investments that also include green and sustainable investments.

Source: Author's compilation.

3 Review of green finance literature

In order to place the discussion of the public instruments to mobilise private investments into the right context and to gain an overview of the existing literature on green finance, we will cite selected publications briefly in the next two sub-sections.[15] Roughly, green finance literature can be divided into mappings of green finance flows; and case studies on green investments.

3.1 Inconsistent mappings of green finance flows

Although various different researchers have made the effort to conduct mappings of green finance flows, a comprehensive picture does not exist so far. The reason for this is that the mappings differ in scope and methodology, and thus combining the different sub-maps is not straightforward.[16]

The first hurdle becomes evident when we search for a generally agreed definition of green finance or climate finance in these publications (compare Box 1) as such common definitions simply do not exist. The same is true for the term "additionality". A further inconsistency is whether the accounting of green finance flows is based on committed or disbursed funds.

These are only the most evident challenges that have to be overcome in order to reach a consistent framework of accounting practices for green finance. Nevertheless, these mappings still provide the best overall information on green finance flows that exists up to today; and in the following table (Table 1) we will give a short summary of the most important ones.

Table 1: Summary of mappings of green finance flows

Publication	Short Summary
CPI's Landscape of Climate Finance	• A quite comprehensive mapping of climate finance has been conducted by the Climate Policy Initiative, published as the "Global Landscape of Climate Finance" and the "German Landscape of Climate Finance" (Buchner et al. (2013); Buchner et al. (2012); Juergens et al. (2012)). While the Global Landscape gives a good overview of international flows of financing, the latter publication focuses on Germany as one of the leaders in the transition to green societies.

15 For a more comprehensive literature review the reader might consult IFC (2012). An updated version of it is part of the second stocktaking for the G20 Developing Working Group concerning the Design of the G20 Dialogue Platform on Inclusive Green Growth. The extended literature review includes more than 160 items and is accessible and easily reachable via a public software platform called "The inclusive green growth brain" (IFC 2013a).

16 Caruso / Ellis (2013) compare different definitions and methods used for the tracking of climate finance.

Table 1: continued	
Publication	**Short Summary**
	• The appealing features of these publications are the many tables and figures to document the financial flows. The authors provide, for instance, tables on the sources and intermediaries, adding extra information with regard to destinations of the financial flows, their estimated values, and some general facts. Their climate finance flows diagrams, also known as "spaghetti" diagrams, try to give a visual picture of the sources, intermediaries, instruments, and uses of climate finance. • The "spaghetti" diagrams in particular have been copied quite extensively into other publications; however, one should bear in mind that they suffer from the same weaknesses as the entire literature on mappings, i.e. lack of clear definitions, lack of reliable data sources, huge amounts of missing data that lead to "guesstimations" and/or gaps in the mappings. Nevertheless, the "Landscape of Climate Finance" is probably the most cited mapping of green finance flows.
WEF's Green Investment Report	• Another well-known paper is the "Green Investment Report" that was prepared by the World Economic Forum (2013) on behalf of the Green Growth Action Alliance (G2A2), a cooperation of more than 50 leading financial institutions, corporations, and nongovernmental organisations (The WEF acts as the secretariat of G2A2). • It is basically a compilation and synthesis of work undertaken by others on green finance and green investments. Publications of Bloomberg New Energy Finance (BNEF), the Climate Policy Initiative (CPI), the International Energy Agency (IEA), the Organisation of Economic Cooperation and Development (OECD), the United Nations Environment Programme (UNEP), the World Bank Group, and the World Resources Institute (WRI) feed into this report. • The Green Investment Report elaborates on the financing gap between business-as-usual investments and the amounts needed to face the climate change challenge, describes ways to unlock private finance for green investments, and gives an extensive overview of their data sources. Just as the CPI publication, the WEF report also contains some illustrative figures that have contributed to further publications in the green finance literature.
WRI's Public Financing Instruments	• The World Resources Institute contributes to the mapping of climate-related investments with a series on public financing instruments to leverage private capital. So far, a paper that focuses on multilateral agencies has been published (Venugopal et al. (2012)). • The authors analyse the available instruments of the Global Environment Facility, the Clean Technology Fund, and the World Bank Group, and show which of these instruments have been used frequently. The paper illustrates the amounts of financing from these agencies according to instrument, region of destination, and sector of project implementation. • In addition, it focuses on the composition of co-financiers for financed projects. Moreover, the authors discuss institutional barriers to leveraging private sector participation and give policy recommendations for public actors that might also be useful for the implementation of the Green Climate Fund.

Table 1: continued	
Publication	**Short Summary**
WRI's Public Financing Instruments	• The World Resources Institute contributes to the mapping of climate-related investments with a series on public financing instruments to leverage private capital. So far, a paper that focuses on multilateral agencies has been published (Venugopal et al. (2012)). • The authors analyse the available instruments of the Global Environment Facility, the Clean Technology Fund, and the World Bank Group, and show which of these instruments have been used frequently. The paper illustrates the amounts of financing from these agencies according to instrument, region of destination, and sector of project implementation. • In addition, it focuses on the composition of co-financiers for financed projects. Moreover, the authors discuss institutional barriers to leveraging private sector participation and give policy recommendations for public actors that might also be useful for the implementation of the Green Climate Fund.
UNEP BFI CCWG's Mapping of Climate Finance	• Since 2008, the UNEP Bilateral Finance Institutions Climate Change Working Group (UNEP BFI CCWG) has documented the annual climate change financial flows to developing countries (UNEP (2012)). The data are provided by the international finance institutions that are members of the group, namely Agence Française de Développement (AFD), Japan International Cooperation Agency (JICA), KfW Development Bank, and the Nordic Environment Finance Corporation (NEFCO). Data are obtained by financial surveys and interviews. • The climate change financial flows of these four international finance institutions are divided into mitigation and adaptation finance and are broken down into regions, sectors, and instruments. The latter include grants, concessional loans, non-concessional loans and others. In their 2012 report, UNEP BFI CCWG claims that 13% of the total flows from multilateral, bilateral, and national development finance institutions are attributable to AFD, JICA, KfW, and NEFCO (as a total they refer to the CPI global climate finance of USD 77 billion).
IDFC's Mapping of Green Finance	• A similar approach has been carried out by Ecofys on behalf of the International Development Finance Club (IDFC) (Höhne et al. (2012)). They have mapped the green finance delivered by the 19 member development banks and calculated a total amount of USD 89 billion in 2011. • As apposed to the approach of the UNEP BFI CCWG, they map green finance and not climate change finance, and due to the differences in methodologies, the total amounts of finance flows cannot be compared easily. • Moreover, they apply a breakdown of the data into mitigation, adaptation, and other environment finance flows, as well as into the sector of investment, and whether the flows originate from OECD countries or not, and whether they are destined for OECD countries or not. However, they do not further distinguish between regions, and they do not provide information on instruments at all.

Table 1: continued	
Publication	**Short Summary**
WRI/ODI/OCN's Fast Start Finance	• Another strand of mapping activities takes a closer look at the fast-start finance contributions, which refer to the USD 30 billion that developed countries have committed under the United Nations Framework Convention on Climate Change (UNFCCC) for the years 2010 to 2012. • The World Resources Institute (WRI), Overseas Development Institute (ODI), and the Open Climate Network produce, for instance, a series of studies on the definitions, delivery, and way of reporting of the fast-start finance commitments of Germany, Japan, UK, and US (e.g. Harmeling et al. (2013)). • For the same set of countries, the ODI has prepared a series of background notes on private climate finance support and the way public finance can mobilise private funds for climate related investments (see, e.g., Whitley / Mohanty (2013)).
Source: Author's compilation.	

3.2 The rag rug of case studies

While in the literature on this topic we find a rag rug of case studies on green investments, the coverage is quite limited.[17] Similar to the mappings of financial flows, there are only a few original research publications and many that just cite research conducted by others. Moreover, the variation of countries and sectors is quite limited, and some of the projects have been studied in different research projects.

Basically, a handful of institutions and researchers provide the bulk of case studies.

- First of all, the World Resources Institute has published quite a number of different studies (see for instance Venugopal et al. (2012) and Polycarp / Brown / Fu-Bertaux (2013)).
- Also, the San Giorgio Group, a working group established by the Climate Policy Initiative with the goal of conducting case studies on effective green finance, offers various case studies (Buchner / Heller / Wilkinson 2012).
- Further studies have been analysed by the OECD, UNDP, and Spratt / Griffith-Jones (2013).
- Many of these studies have been gathered together in the Green Investment Report of the World Economic Forum (2013).

Especially the OECD and the San Giorgio Group currently continue to work on new case studies.

17 As in the previous sub-section, we refer in this paper only to the most important publications.

Figure 1: Country coverage of case studies

Source: Author's representation.

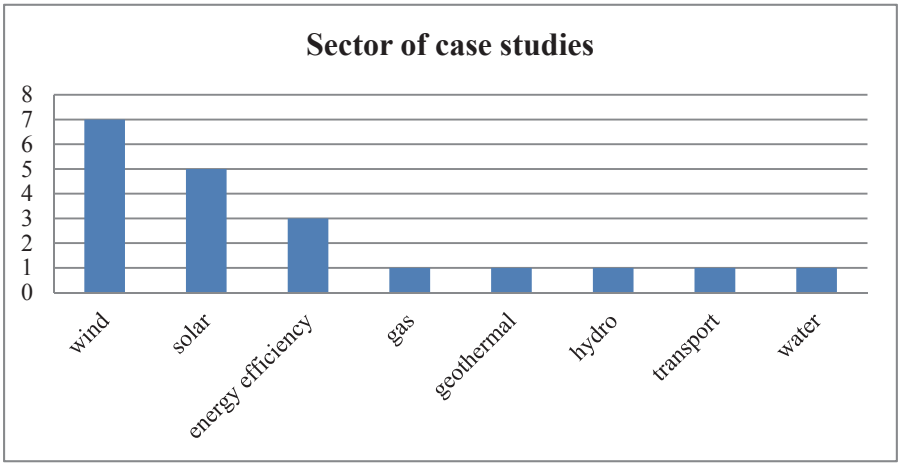
Figure 1 shows the geographical distribution of case studies that have been conducted by the institutions and researchers cited above. Figure 2 illustrates the various different sectors of the projects that are covered by the case studies. The huge majority of the case studies have been carried out in the renewable energy sector, in particular in the wind power sector, followed by solar power. Another important sector is energy efficiency. For other sectors, such as transport or water, only one case study each has been conducted. Based on this limited number of cases, a clear pattern of whether projects are predominantly implemented in a certain sector in a specific region cannot be identified.

In general, most of the case studies analyse one specific project, but the World Resources Institute has also explicitly focused on the role of readiness activities for various different sectors in different countries (Polycarp / Brown / Fu-Bertaux 2013).

The lessons learned from the diverse cases are all very much the same. The well-designed use of the variety of public instruments – in most cases a combination of, e.g. concessional lending or grants plus guarantees – can create attractive investment conditions for private investors even for green projects in developing or emerging countries. All case studies demonstrate that public sector support has been essential for the mobilisation of private funds. Especially in the initial project phase, public support is of utmost relevance.

However, the case studies have also shown that providing finance is just one part of the whole story: the facilitation of adequate enabling environments and the provision of technical assistance for project design and implementation are just as important.

Figure 2: Sector coverage of case studies



Source: Author's representation.

Deducing concrete recommendations for a particular type of project from these lessons learned might, however, be quite challenging as the evidence is still limited to a few specific examples. A first approach to help to profit from the lessons learned of case studies that have been conducted has been undertaken by the World Bank. It has implemented the "Renewable Energy Financial Instrument Tool (REFINe)"[18], an interactive Web tool that supports policymakers in low income countries in better understanding how financial instruments can help to scale up renewable energy technologies. In addition to this interactive application that suggests the adequate instrument for selected barriers and risks, the website stores about 40 case studies that serve as examples for the use of different instruments.[19]

4 Overview of relevant public leveraging instruments

In the following we will present various different public leveraging instruments and elaborate on their weaknesses and strengths as well as the role the public sector is

18 http://www-esd.worldbank.org/refine/index.cfm

19 These case studies have not been included in the overview above because it is not possible to deduce full information on the project volume and possible contributions of the private sector (the website does not focus on the composition of finance contributions). As a consequence, it is not clear whether these case studies can serve as examples for the mobilisation of private funds with the help of public instruments, which is the focus of this paper.

assuming by choosing to use this specific instrument. Moreover, we will try to assess the leverage potential and the perception of these instruments.[20]

We will focus on three different types of instruments: first, instruments that provide financing directly to projects; second, instruments that do not directly transfer money, but transfer knowledge or mitigate risk; and third, instruments that are used to raise additional private funds that, then, can be transferred to green projects via one of the above mentioned instruments. Equity, grants, loans, and credit lines are examples of the first category of public financing instruments; guarantees and technical assistance fall into the second category; and green bonds and structured funds are the selected examples for the final category of instruments. There are certainly still a number of further instruments that the public donor might consider using, however, we will concentrate on this selection as they are the most relevant ones.

These are apparently all well-known and proven development financing instruments. The instruments under study are neither innovative nor tailored especially to the needs of green financing. The reason for this is that there is no necessity to create radically new instruments for green investments. Rather the opposite is important: if they are to attract investors, instruments need to be simple. Thus, instead of trying to be innovative in the creation of instruments, it is preferable to facilitate green investment through new combinations of the present approaches, by applying well-known instruments to the specific context of green investment. This might include combinations of different instruments for different phases of the project cycle of green investments. The next section will elaborate more on this aspect.

This section, which first of all presents the different instruments, builds on the following publications: UNEP (2008), World Bank (2012a), Spratt / Griffith-Jones (2013), Climate Investment Funds / World Bank (2012), and Venugopal / Srivastava (2012) as well as on discussions with several experts.

4.1 Providing funding

Equity

Public donors that provide equity to a project are giving a capital contribution without receiving any guarantee of repayment in exchange. Equity providers acquire ownership of the project; thus, this form of financing constitutes a strong commitment.

20 Unfortunately, development banks like World Bank, IFC, or KfW do not provide data on the use of their instruments nor do they publish detailed project financing information (instruments used, co-financiers etc.). Information on the German climate-relevant ODA is provided in Box A1 of the Appendix. However, the statistics on the instruments are not directly relevant for the purpose of this paper, as information about the instruments that have been applied to the projects is not provided.

There are quite convincing reasons for the use of equity to provide financing to green projects. Equity reduces the risk of other investors, especially of debt investors, as there is full recourse on equity in the case of project failure. For projects, equity is, thus, fundamental to attracting further financing. Moreover, public financiers as equity providers can send out a signal of viability and provide accreditation for the project, which again helps to attract further investors.

However, the opposite might also be true, as public ownership might also signal more bureaucracy and higher standards. There are some more arguments against the use of equity as a leveraging instrument. Providing equity entails significant transaction costs, and only if developed financial markets exist, will it be possible to exit from such investments through the sale of shares. In addition, as mentioned already above, shareholders are the last to be compensated in the case of failure. Being one of the main reasons for the leverage potential of equity, this fact might also be one of the main arguments against the provision of equity.

The mode of action for the potential leverage effect works through the provision of long-term, often initial financing and the signalling of project viability which might crowd-in private investments. Still, the leverage effect of equity is fairly low.

The role of the public sector, when using equity as an instrument, is above all providing finance and only to a lesser degree mitigating risk and increasing reputation. Especially due to the high transaction costs, this instrument is only applicable to larger projects. As the commitment of the public donor is high, and such a donor is consequently selecting only highly qualified projects, it might be difficult to find a sufficiently large number of projects to upscale the use of equity as a leverage instrument. Project developers might also be quite reluctant to choose in favour of equity as they might not want to transfer ownership to the public stakeholder.

EQUITY		
Strength	**Weakness**	**Applicability**
• risk reduction for other investors • gives accreditation	• shareholders are the last to be compensated • high transaction costs	• only feasible for larger projects (due to high transaction costs)

Grants

The next instrument that will be considered in more detail are grants, which constitute provision of financing without costs for the project developer. The funding will not be paid back, and, in contrast to equity investments, no ownership is transferred.

The persuasive strength of this instrument is its simplicity: it is really easy to implement and to manage as there are no ongoing administration costs, besides the monitoring of the project. On the other hand, the use of this leveraging instrument is the most risky one for donors: they have often limited control over the use of the capital and no recourse to it.

Grants do not give incentives to project developers to deliver, and there is no return on the invested capital. Additionally, the risk of creating market distortions by favouring certain projects over others must not be overlooked.

The mode of action of grants as leveraging instruments is to provide long-term finance and to reduce total project costs to make the project affordable. Often, grants are used to cover costs during the highest risk development phase and by this provide confidence to private investors. The potential of the leveraging effect depends particularly on the timing of the allocation. If a grant is given to a running business, it probably replaces possible private financing, and the leveraging ratio will be consequently low. However, if the grant is handed out during the development phase, this instrument has a medium-to-high leverage potential.

The role of the public sector or development bank, again, is providing financing, and grants are very easily applicable to all kind of projects. Thus for the public donor it is a simple instrument. Project developers are most probably very much in favour of receiving a grant as they receive funding without any risks.

GRANTS		
Strength	**Weakness**	**Applicability**
• simple to implement and manage (no ongoing administration)	• most risky for donor: limited control and no recourse • do not give incentives for delivery	• easily applicable to all kind of projects • especially for early project development phase

Loans

Very often public donors resort to lending in order to mobilise private capital, i.e., they are providing a loan that has to be repaid (with interest). In most cases these loans are concessional or flexible and can thus be repaid with a lower than market-rate interest rate or with an extended repayment schedule. Sometimes the loan contract even allows for modifications. But non-concessional loans can also be used to leverage private capital for green investments.

Indeed, all types of loans can serve the purpose of signalling confidence and the viability of a green project. Beyond that, they can lower the financing costs, and by this, increase the profitability of a project. In contrast to grants, loans can even incentivise project viability due to the repayment obligation. For the public lender, an advantage of loans is that the repayment can be used to fund further projects.

However, there are also some downsides of using loans to leverage private funds. First of all, due diligence is needed to verify the financial viability of the projects, which increases administration costs. Furthermore, it is hard to estimate the degree of concessionality that is needed to provide useful funding to the project without wasting public money through

the unnecessary use of subsidies. Another critical issue is the risk of creating market distortions through the selection of projects.

The mode of action of public loans is, thus, above all reducing project costs and providing long-term financing. The leverage ratio, however, is generally low.

The role of the public sector is, first of all, in providing financing, but also in increasing the reputation of the project. Due to the weaknesses of this instrument, especially due to the high demands for project evaluation, the applicability of direct loans is limited to projects of larger scale. Usually public donors, find it difficult not only to select adequate projects, but also to identify generally eligible projects.

LOANS		
Strength	**Weakness**	**Applicability**
• lower capital financing costs • obligation to repay can give incentives for project viability	• need for due diligence increases costs • degree of concessionality is hard to estimate	• projects of relatively large scale (project evaluation) • more developed projects

Credit lines

A solution to the problem of identifying eligible projects might be overcome through the use of credit lines. This is an instrument for the provision of loans through private sector financial intermediaries, i.e., debt is provided for on-lending to local banks that have the freedom to choose the interest rates and charges that will be applied to the customer. Credit lines are used for outreach and diversification and in order to develop local expertise in project finance.

Credit lines have several appealing strengths. Besides the advantages that also apply to direct loans, e.g., providing incentives for project viability, there are some additional ones: The first is that the public donor does not have to spend time and money on the selection of projects. Moreover, it can even be assumed that local banks should have significant advantages in doing this through their inside knowledge of the local business environment. Further, credit lines can increase the comfort and the awareness of the financial intermediary involved in the deal in lending to new sectors or project types. Moreover, the financial intermediary might even complement the funding provided with further own resources. Lastly, as apposed to the projects themselves, the financial intermediaries are fairly stable partners for the public donor as the working relation might last for several years. Credit lines are, thus, in various aspects a sustainable solution for providing project financing.

Analogically to the strengths, the weaknesses of credit lines are very much the same as those of direct loans, i.e., the need for due diligence, and the risk of favouring certain projects. Also, there are a number of additional disadvantages if the lending is executed through the intermediation of local financial entities: The first is that the risk of creating

market distortions does not only apply to the project level but also to the selection of intermediaries, as not all possible financial institutions might participate in the credit line programme. It might, thus, be possible that the public donor facilitates the creation of market power through newly acquired knowledge and skills in the banking sector.

Another problem is that the accounting procedures of the public donor and the financial intermediary might diverge and, thus, implicate additional costs if the local bank has to report in the requested formats. More important, however, are several aspects related to the classical principal-agent-problem: As the financial intermediary is free to choose the applied interest rates and charges, the project might not receive subsidised rates at all. It is possible that all subsidies only go directly to the intermediary. The related uncertainty is, thus, how much concessionality does the local bank need to engage in these lending activities? Moreover, the financial intermediary might take too many risks in lending or the public funds might be used for the commercial interests of the intermediary instead of the actual public policy objective.

The underlying mode of action of credit lines is not only the provision of funds for specific green projects, but also the further development of the financial system. The focus of the public donor when using credit lines is on enabling the partner bank to use a new financial product for a wide range of customers or to facilitate access to financing for certain target groups, such as low-income households or small and medium enterprises. The leverage potential is not very high; however, it is seen more as an investment in future private lending facilities.

The role of the public sector, consequently, is first of all to provide knowledge, followed by alleviating risks and providing funding, respectively refinancing for local banks. Especially, due to the advantages of this instrument, credit lines can be applied quite broadly and they are often the preferred instrument by development banks. From the recipient side, the perception depends on the development phase of the project: at an early stage, a project developer would probably prefer to receive subsidised funding, while at a later stage the advantage of establishing business relations with a local bank might prevail.

CREDIT LINES		
Strength	**Weakness**	**Applicability**
• increased comfort and awareness of financial intermediaries in lending to new sectors/project types • financial intermediary can complement funding with own resources	• principal-agent problems • accounting procedures might diverge and increase costs	• wide-spread use • more developed projects

4.2 Transferring knowledge or risk

Guarantees

Further relevant products that are needed to mobilise private funding for green investments in developing countries are guarantees that help to reduce investment risks, both real risks and perceived risks.[21] Guarantees are offered against a payment of a fee and specifically cover defined risks, such as political risks, e.g. expropriation, currency transfer restrictions, war, or civil disturbances, and also legitimate policy changes, such as reductions in feed-in-tariffs. Often, guarantees are paid to partner banks to make them lend to green projects.

As guarantees are targeted to the specific risks of individual projects, they can crowd-in private financing. Besides, it is relatively easy to obtain political approval for them as there is no need for high upfront funding.

The downsides of guarantees are the high transaction costs. Normally, a guarantee has to be custom-designed for each project and it is not easy to structure the instrument in a way that it provides good incentives. The underlying problem is that the risk has to be assessed properly, which can be very difficult. The liabilities have to be accounted for dependent on the assessment of the risk.

Moreover, as guarantees are not counted as ODA[22], donors might be reluctant to offer them. Similar to all other instruments that are based on cooperation with local banks, guarantees, too, are prone to principal-agent-problems as the banks might not screen the clients with the necessary prudence. Adverse selection might become a serious problem if there is full risk coverage by the public donor and, consequently, windfall gains might be provided to the banks. Generally, the public issuer of guarantees is assuming significant risks without taking control over them.

Box 3: Guarantees provided by MIGA

MIGA, the Multilateral Investment Guarantee Agency of the World Bank Group is one institution that has specialised in the provision of political risk insurance guarantees to private sector investors and lenders. However, the risks that are especially important for green investments, namely commercial and technological risks, are not covered.

The mode of action is not direct financing, as the donor transfers funds only if the guarantee case occurs. Generally, guarantees are custom-designed, but can also be offered for a set of similar projects as a more standardised product. The purpose of these instruments is to crowd-in long-term financing by improving the (perceived) risk-reward profile of green projects.

The leverage ratio of guarantees is usually high and the role of the public donor is clearly defined: it is risk mitigation. Guarantees can generally be applied to all kinds of project;

21 See Box 3 for an example.

22 Guarantees do not represent a financial flow and are consequently not ODA-eligible financial products.

however, due to the high transaction costs, up-scaling of the use of this instrument might be limited. Guarantees are highly demanded by projects and private investors. Public donors, however, are often reluctant to offer them; a problem that might be alleviated if guarantees were better taken into account in ODA accounting.

GUARANTEES		
Strength	**Weakness**	**Applicability**
• crowd-in private financing • easy to obtain political approval as there is no high up-front financing	• high transaction costs • accounting is difficult • not fully accountable for ODA	• for projects in a more developed phase of implementation

Technical assistance

The second instrument that will be considered is technical assistance, which can play an important role as a supplement to the above mentioned financial instruments and might include, for instance, market research, business planning, staff training, or the establishment of technical standards and engineering due diligence. Technical assistance can be provided both to the projects and to partner financial intermediaries that implement, for example, a credit line.

The real strength of technical assistance is that it can help to establish a successful track-record for financing or implementing green projects. If the instrument is targeted to partner banks they should be capacitated to provide additional financing in the future.

The evident weaknesses of technical assistance are the high transaction costs due to the need to custom design them in each case.

The mode of operation is simple: technical assistance should build capacities both for project developers and financial institutions, and by this, signal viability for the specific type of investments.

Just as for most of the custom-designed instruments, the leverage ratio of technical assistance can be high. The role of the public donor clearly consists of providing knowledge, and the potential applicability of technical assistance, again analogous to guarantees, does not have limits. Summing up, technical assistance is useful for projects and banks, and very often, it is an important supplement to the provision of further financial instruments.

TECHNICAL ASSISTANCE		
Strength	**Weakness**	**Applicability**
• facilitates further financing • helps to establish track-record	• high transaction costs	• broad range • also for projects in an early development phase • useful for projects and banks

4.3 Raising additional private funds

Green bonds

Green bonds are fixed income products that are in the majority of the cases related to financing activities that mitigate climate risk.[23]

The strength of green bonds is that they can bundle various projects together in a single security. This has several advantages: Bonds are a financing vehicle that facilitate the matching of investors and small projects, and by this, reduce financing costs. Also, bonds offer the possibility of diversification by including different projects, and they can consequently reduce investment risks. An important advantage is furthermore that they are a fixed income product and therefore best suited for the investment preferences of institutional investors that usually have up to 90% of their portfolio invested in fixed income products.

A shortcoming of green bonds is that sophisticated markets are needed to analyse, price, and trade the bonds. Besides, the administration costs are quite high, especially as identifying eligible projects for the inclusion in the product is not straightforward.

The mode of action of this instrument is as following: A public donor or a development bank issues the green bond that is often managed by a commercial bank. These bonds are then rated and investors can invest and trade them just as other traditional bonds. The leverage ratio of green bonds is high. This is especially true for the green bonds of multilateral development banks as they have an excellent rating.

Box 4: Green Bonds

The Climate Bonds Initiative (2013) has analysed the 2013 climate-related bonds universe. They report that, in 2013, USD 346 billion climate-related bonds are outstanding, thus the amount has nearly doubled since 2012 (USD 174 billion). Most of the bonds are raised for the transport sector (USD 263 billion), followed by the energy sector (USD 41 billion) and finance (USD 32 billion). In their report they only analyse a subset of investment-grade, benchmark-type outstanding bonds (USD 163 billion). Among these bonds, the whole band of rating categories is available, although 66% of these bonds have an AA- or an AAA-rating.

Example: World Bank

Since 2008, the year of inaugural issuance of green bonds, the World Bank (International Bank for Reconstruction and Development, IBRD) has issued about USD 3.5 billion green bonds through 57 transactions. The bonds have been issued in 17 currencies. World Bank green bonds are fixed income investments with a triple-A rating. Eligible projects are selected by environment specialists of the World Bank. The credit quality of the green bonds is identical to any other World Bank bonds and the repayment of the bonds does not depend on project performance. Thus, the investors do not have to assume project risks. Rather they profit from over 60 years of World Bank's experience in issuing bonds.

Example: International Finance Corporation

The International Finance Corporation also offers green bonds. In 2013 IFC issued two times a USD 1 billion green bond supporting climate-related investments in emerging markets. With this second sale IFC's total green bond issuances amount to USD 3.4 billion.

Source: Climate Bonds Initiative (2013), World Bank (2013), IFC (2013b).

23 See Box 4 for examples.

Consequently, the role of the public sector is to offer an adequate product by issuing green bonds, and increasing – depending on the own standing – the reputation of the type of investments that are financed by the bond. The way green bonds are designed, which also makes up most of the appealing attractiveness of them, implies that it is not easy to upscale the use of this specific instrument in the way that would be needed to provide the required financing for a green transformation. Another shortcoming is that institutional investors, one of the main target groups of green bonds, are only interested in these products if they are offered at a sufficiently high scale. Small quantities of green bonds are not attractive for them. Moreover, as these bonds are generally not included in the relevant investors' benchmarks, they are rarely considered by professional fund managers. This might also be due to the fact that green bonds are a relative new instrument with limited experience.[24]

GREEN BONDS		
Strength	**Weakness**	**Applicability**
• potential to bundle projects reduces risk and financing costs	• sophisticated markets required to be able to analyse and price the bonds • high administration costs	• only for developed projects and proven technologies

Structured funds

Yet another instrument to pool projects into one product is a structured fund.[25] Structured funds are instruments that have been used for quite some time for micro-financing; however, for the purpose of green investments they are relatively new instruments. Besides the pooling of projects they also allow for a transformation of maturity, i.e. short-term into long-term, and they can create different risk categories. They have the particularity of comprising different tranches that are tailored to the volume and risk preferences of the potential investors. Thus, structured funds are most useful when information is imbalanced – as in the case of green investments – and consequently risks are overpriced. Generally, structured funds are managed by a commercial bank, and the public donor takes the tranche with the greatest risk and the smallest reward expectations.

Compared to green bonds, structured funds are more suited for individual projects while green bonds are more appropriate for larger projects and more developed markets. While green bonds are the more standardised product, structured funds can offer more variety and diversification. Another distinction between green bonds and structured funds is that the latter is above all interesting for smaller institutional investors, such as pension funds, as they will hardly offer the scale needed by the big players.

24 For instance, the World Bank has only issued green bonds since 2008. See Box 4.

25 See Box 5 for an example.

Structured funds have several advantages. The first are just the same as those for green bonds, i.e., structured funds reduce the investment transaction costs, offer the possibility of diversification, and improve borrowers' access to finance for small projects. Additionally, they offer investment opportunities for investors with different risk-return tolerances. By taking the first loss and subordinated position in the fund, the public donor can improve the risk-reward calculus of private investors. Moreover, the common practice of co-investment by several public bodies (see for instance the box on the Global Climate Partnership Fund (Box 5)) seems to give confidence to private investors. Generally speaking, structured funds provide intermediate funding between equity and debt as they reduce the risk for senior lenders without taking away control from the project developers. They make efficient use of scarce public resources and they are an efficient way of coordinating donor activities. An expert from a development bank that set up such funds goes even further claiming that structured funds can provide the solution for most problems that hinder more private engagement. The knowledge gap is met with the public private partnership structure of such a fund, country risk is reduced by diversification, currency risk by hedging, transparency risk by the regulation under a Luxembourg regime, and the viability risk is reduced by demonstrated profitability.

The outflow side of a structured fund often has different components. For instance, the Green for Growth Fund Southeast Europe has three pillars on the outflow side. They give credit lines for banks and they make up to 30% direct project investments, both at commercial rates. Additionally, they provide technical assistance to their partner banks to build up the capacity and knowledge to invest in energy efficiency and renewable energy. This last pillar makes the cooperation very attractive to those partner banks that want to engage in a new sector.

However, structured funds entail high transaction costs as it is not easy to find many adequate projects or partner institutions for the outflow of funds. Besides, these structured funds are often custom-designed and not easy to copy. Generally, a high number of stakeholders are involved, and thus, the demands in terms of project preparation and review are very high. It takes quite some time to make a structured fund operational in such a way that private investors can be invited to participate: this is only possible once the fund has a sufficient diversification and track-record. Furthermore, public donors take over high risks without receiving much control, as the fund is managed by a commercial bank. Accordingly, this instrument as well entails the risk of general principal-agent-problems. On the other side, some investors might be reluctant to invest in a fund with public participation as they prefer to keep complete control of the fund and the investment decisions.

The mode of operation resembles the one of credit lines: The objective of structured funds is first of all the refinancing of financial institutions with the aim of expanding their range of financial products. An important advantage, however, is that structured funds might not only crowd-in co-financing of the local partner bank, but also of further private investors with more traditional risk-reward expectations.

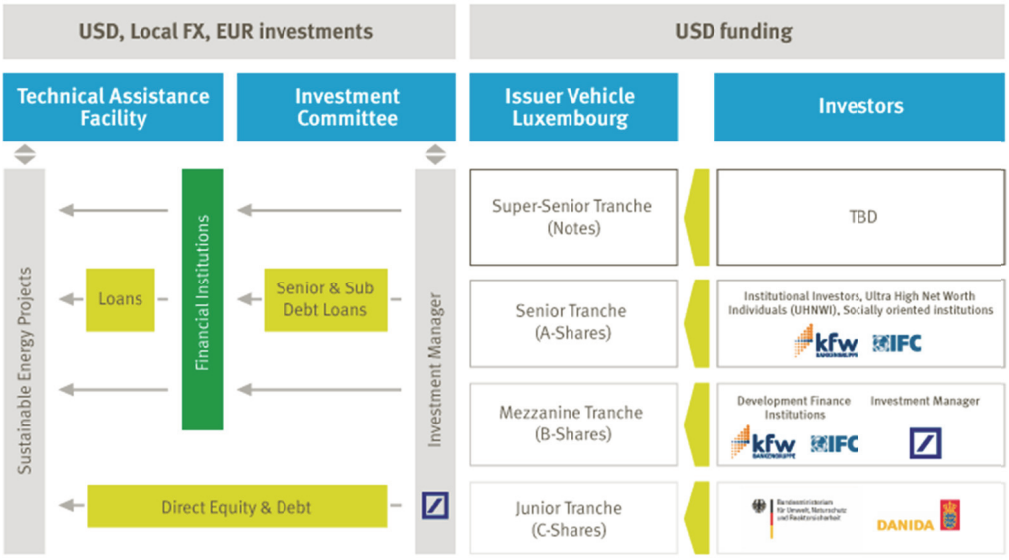
Box 5: Global Climate Partnership Fund (GCPF)

GCPF is a structured fund that aims at providing climate finance to developing countries and emerging economies. It is located in Luxembourg and managed by the Deutsche Bank. Until the end of 2012 the GCPF had a portfolio of USD 150 million. The initial capital – a EUR 32.5 million grant - was provided by the BMU (German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety). Also the KfW, IFC, and the Danish government provided own funds.

At the end of 2012, the first institutional investor, Ärzteversorgung Westfalen-Lippe, one of the Germany's largest pension funds, contributed EUR 30 million to the GCPF.

The fund's capital is given to local financial institutions in developing countries and emerging markets as credit lines for small and medium enterprises (SMEs) and households for investments in energy efficiency and renewable energies. Besides, the GCPF also finances investments directly, for instance the construction of a photovoltaic power plant in South Africa (generating up to 1.8 gigawatt hours of annual power).

Figure 3: Shareholder structure of the GCPF



Source: https://gcpf.lu/

The leverage ratio of structured funds is, consequently, high as crowding-in senior debt is relatively facile. The role of the public sector is manifold. Offering an adequate product might be the most important, followed by alleviating risk, and providing reputation. The pure allocation of financing might be the least important role. But again, similar to the issuing of green bonds, up-scaling the offer of structured funds to the level that would be needed to close the current financing gap might be difficult in the near future. This relatively new, very sophisticated product might be a flagship, but public donors and development banks will probably not lay their main focus on this instrument.

STRUCTURED FUNDS		
Strength	**Weakness**	**Applicability**
• reduce investment transaction costs • possibility of diversification • offer investment to investors with different risk-return tolerances • improve risk-reward calculus of private investors (first loss, subordinated position)	• high transaction cost	• relatively limited due to transaction and coordination costs • only for developed projects

5 The relevance of the presented instruments

5.1 Status quo

After presenting the eight different instruments and pointing out their advantages and disadvantages[26], it is now the appropriate time to give some tentative information on their scope and relevance. Unfortunately, a rigorous assessment is not possible as data on their usage is rarely available.[27] Indeed, development banks often have not extracted the information out of their project documentation at all or they are reluctant to publish these data for external researchers.[28] Even worse, it is not even feasible to get an overview of the practical relevance of the different instruments by now.[29]

As far as transparency is concerned, the Inter-American Development Bank that offers a searchable project-database on its homepage is an exception. Table 2 and Figure 4 show the amounts that the IDB has approved to spend via the different instruments for financing climate change projects. It is interesting to note that the amounts vary extremely from USD 2.9 million in 2006 to USD 918.9 million in 2011. However, there is a clear positive

26 See Table A2 in the Appendix for a brief overview.

27 Consequently, this analysis can only be subjective and descriptive, for a more objective assessment a comprehensive survey of different actors, donors, recipients, and intermediaries would be necessary.

28 For instance, the International Financial Corporation does not publish statistics on the use of their instruments for climate finance. However, Patel / Musić (2013) have published a first overview of their climate-related activities.

29 Using OECD DAC statistics it is possible to gain some information on climate-related ODA by making use of the so-called Rio-markers. However, these statistics only include grants, equity and loans. For Germany, the information that can be extracted is illustrated in an exemplary manner in Box A1 of the Appendix.

trend in the total approved amounts for climate-related investments observable in the last years.[30]

Table 2: Instruments used by the IDB for climate finance

Instruments	Years										
	2003	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Grants	0.50	5.73	1.26	2.90	2.24	9.00	20.80	16.48	25.61	27.00	7.55
– thereof monetary grants	*0.00*	*0.00*	*0.00*	*1.35*	*0.24*	*0.05*	*12.43*	*2.85*	*25.61*	*23.75*	*7.55*
– thereof technical cooperation	*0.50*	*5.73*	*1.26*	*1.55*	*2.00*	*8.95*	*8.37*	*13.63*	*0.00*	*3.25*	*0.00*
Loans	75.00	0.00	200.70	0.00	40.00	69.26	171.50	335.00	893.29	299.51	0.00
Guarantees	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	200.00	0.00
Investments	0.00	5.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	75.50	11.23	201.96	2.90	42.24	78.26	192.30	351.48	918.90	526.51	7.55

Note: In USD million.
Source: Author's representation. Data is from: http://www.iadb.org/en/projects.

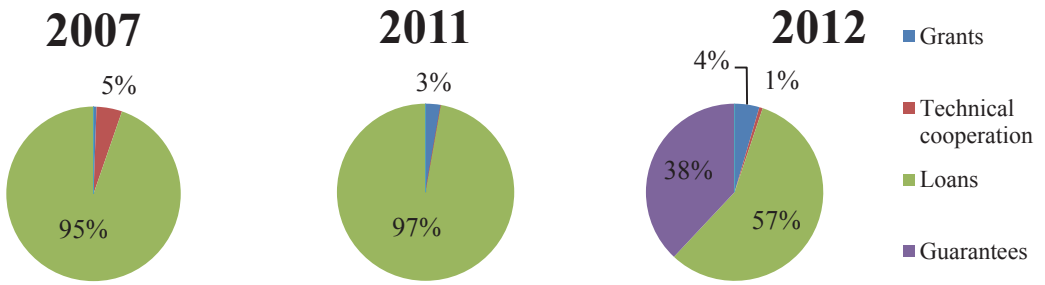
Loans have traditionally been the most important instrument for IDB activities and have accounted for over 95% of IDB's commitments. The relative importance of loans and credit lines is representative for other development banks as these institutions are quite concerned about the outflow of their funds.

Only in 2012 was there important spending through guarantees (38% of the approved amounts) at IDB. The importance of guarantees can easily be over-interpreted, however, when looking at Figure 4, as the USD 200 million were assigned to just one project, namely the "Reventazon Hydroelectric Power Project" in Costa Rica, which consists of the design, construction, operation and maintenance of a 305.5 MW hydroelectric plant. Still, this guarantee is the first one for at least 10 years. It remains to be evaluated in the coming years whether this has been the beginning of a shift in the instrument mix of IDB's activities.

However, similar to using case studies, we should be cautious in drawing any generalisations from the applied instrument-mix of the Inter-American Development Bank as its activities might have a different focus than those of other development banks or development financing institutions.

30 It is, however, unclear whether this increase is due to a real increase of climate-related activities, or just due to better accounting practices, as the IDB as well as other development banks discovered their interest in calculating climate change-related funding only some years ago.

Figure 4: Instruments used by the IDB

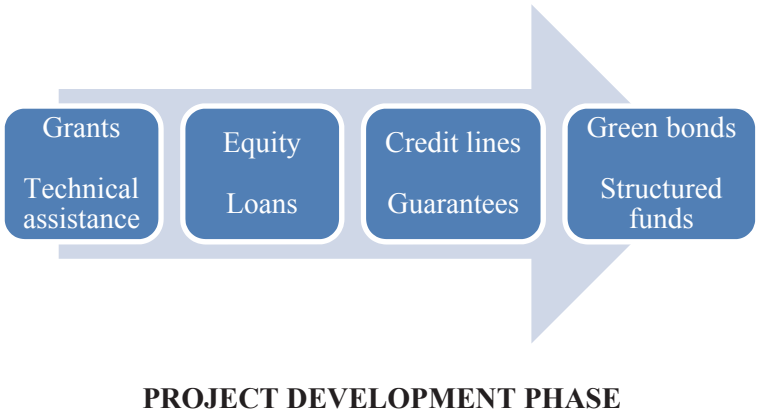


Source: Author's representation. Data is from http://www.iadb.org/en/projects.

5.2 Timing

A very relevant aspect to keep in mind when comparing the various different public instruments is that they are relevant for different project development phases (see Figure 5). For projects in the initial development phase, grants or technical assistance tend to be used and in the initial realisation phase, equity and loans have an important part to play. Only once the project is bankable does it make sense to use credit lines and guarantees, while green bonds and structured funds can only provide financing to quite mature projects.

Figure 5: Relevance of instruments during project development phase



Source: Author's representation.

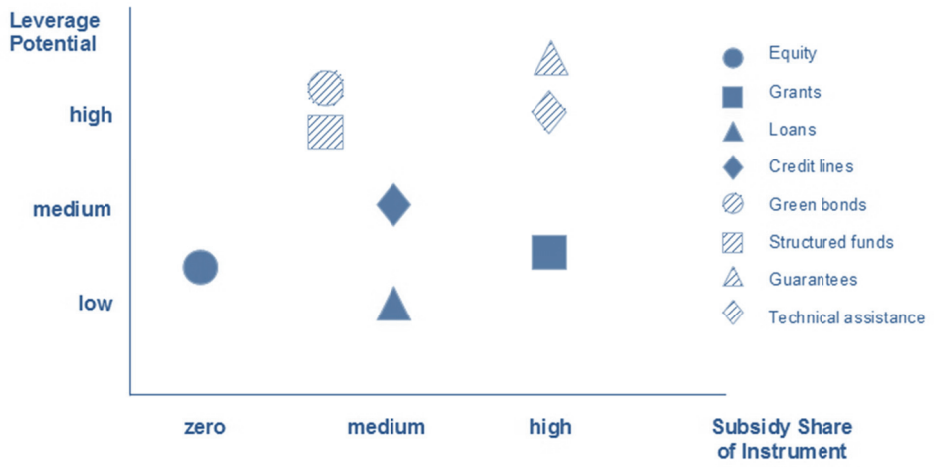
Apart from the general constraint that all debt instruments are only applicable to projects with a financial return and – if private sector financiers are involved – project-related risks that stay under common thresholds, there might be a further restriction especially for very

poor countries. For those countries that have benefited from debt relief in the past, the access to debt instruments might be generally limited as many of them had to commit to staying under certain debt limits in the future. Consequently, for the selection of an appropriate instrument, the timing related to the project itself and also to the overall macro-economic conditions in the country have to be considered.

In accordance with the project development phase, the subsidy shares of the different instruments also vary. Needless to say that instruments that are applied for projects in an early development phase have a bigger subsidy share than those that are used for fully developed projects. The extent of the subsidy, however, does not matter for the instrument's potential to leverage private capital. Figure 6 shows the relation of leverage potential to subsidy share of instruments. Higher subsidy shares do not automatically enhance higher leverage potential.

Still, it is not meaningful to try to draw any conclusion from the relation between subsidy share and leverage potential, as the underlying reason for the different need for subsidising relates to the project development phase. The raison d'être for using subsidies for the mobilisation of private capital for green investments is – apart from the infant industry argument – that market distortions caused by the inexistence of a carbon price and the high fossil-fuel subsidies hamper the development of green industries. In fact, fossil fuel subsidies are still far bigger than subsidies for green investments.[31]

Figure 6: Subsidy share of instruments and leverage potential



Source: Author's representation.

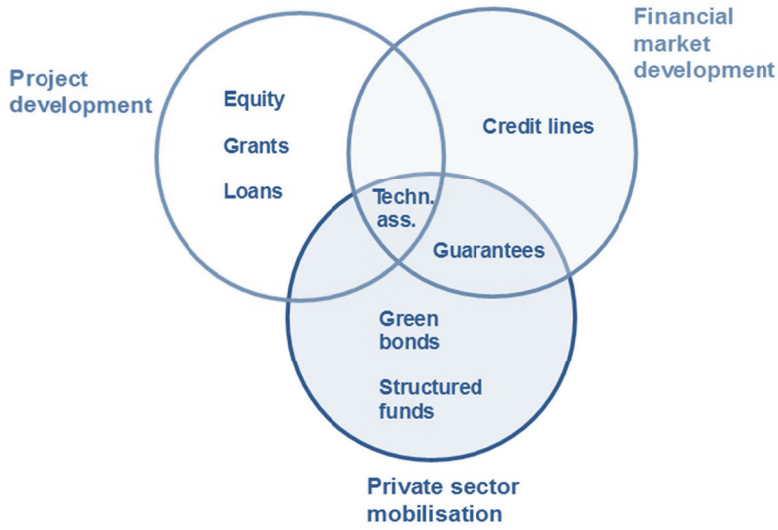
31 Whitley (2013) shows that in 2011 the scale of fossil-fuel subsidies to consumers – at USD 396 billion – was 75 times higher than the average annual approved climate finance of USD 5 billion.

5.3 Goal

Probably the most important aspect when choosing a public instrument to mobilise green investments are the concrete needs of the project as mentioned above. Apart from this, the purpose of the eight instruments under study varies as shown in Figure 7. For instance, the instruments can have the main goal of helping to develop a project further, to make it "investable"[32], or they may aim mainly at developing the local financial market, or at mobilising primarily private sector capital.

To illustrate, it might be possible that the IDB aimed more at mobilising capital from the private sector rather than at developing the project when choosing a guarantee, as instrument for the "Reventazon Hydroelectric Power Project" in Costa Rica.

Figure 7: Primary relevance of instruments



Source: Author's representation.

If the goal is private sector mobilisation, often the leverage ratio is at the centre of interest. As already mentioned, there are many different ways to define leverage. However, independently of how concretely it is defined, focusing on the leverage ratio entails important risks and this often cited ratio should not be over-interpreted for the following reasons: Firstly, it is surely desirable to have a huge leverage effect to obtain maximal outcome of public intervention to mobilise private capital. Simultaneously, one should not forget that at some point a huge leverage ratio implies that the public intervention is such a tiny part of the overall investment that it would have been undertaken anyway, and that the support of the public is not really needed to implement it. Strictly speaking this would, thus, imply wasting the scarce public resources that are available for financing the green transformation.

32 When referring to bank credits, one would use the term "bankable". However, as we are focusing on different types of investors and not just on banks, we prefer using the term "investable".

The second argument is that innovative project types or new technologies might need more aid and have in consequence a much lower public-to-private capital ratio. Just looking at the leverage potential might, thus, discriminate innovative solutions and hamper the necessary progress of the green transformation.

Finally, as IFC (2013a) points out, leverage is important; nevertheless, it is not the only goal. Greenhouse gas reductions, poverty reduction, or job creation might be measures that are not captured by the simple calculation of leverage ratios.

Aside from these desired goals, public intervention – especially when making use of subsidies – always brings with it the risk of creating market distortions. Consequently, the negative external effects of the instruments should be weighed up carefully against the desired goals of the intervention. Market distortions can be created at the level of the project, e.g. among energy producers, but also at the level of local financial markets, if the subsidies are allocated to a partner bank. Table 3 summarises for the different instruments which market is potentially most at risk of suffering some turnovers due to the public intervention.

For grants, loans, and green bonds, the risk of creating market distortions exists above all at the project level, while credit lines and structured funds might distort local financial markets. For guarantees and technical assistance the impact of the negative external effect depends on the allocation of the subsidy, i.e., whether the guarantee or the technical assistance is given to the project or to a financial intermediary. Equity is excluded in this overview, as it does not contain subsidies, but the simple fact that a project has been selected for an equity investment might create market power and consequently unfair competition as well.

Table 3: Creation of market distortions

Project-level	Local financial market
Grants Loans Green bonds	Credit lines Structured funds
Guarantees Technical assistance	

Source: Author's representation.

An important risk is that the public sector is crowding-out private investments instead of attracting them. For example, it became apparent that structured funds that are trying to on-lend their funds at market rates to partner financial institutions in the form of credit lines have problems to identify interested partners. The reason for this is that, in many countries, the best potential cooperation partners are flooded with concessional capital provided by development banks and are consequently not interested in capital lent at market rates. This means that often the most viable projects receive financing from the big development financing institutions at concessional terms and the private sector has

no chance of engaging in the business. In fact, some experts even point out that a proper competition among development financing institutions for providing capital to the few bankable projects takes place, as all want to have show-projects in their portfolio.

5.4 Potential

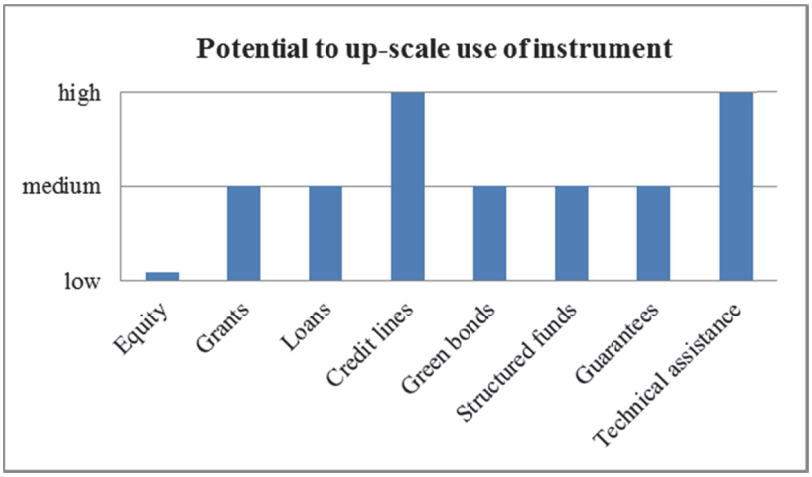
A final aspect for appraising the relevance of the instruments presented is their potential for being up-scaled in order to increase the amount of mobilised private capital (see Figure 8). It is evident that in order to fulfil the commitment of mobilising USD 100 billion a year and even more for financing the trillions of USD that are needed for the green transformation in the next decades, much stronger efforts are needed. While this is true, it will probably be quite challenging to offer certain instruments at massive scale – at least without further research on convenient strategies for doing so.

For instance, the way guarantees are used by now is hardly applicable to a much larger scale. Apart from the fact that they are in most cases designed for specific projects, the non-accountability of official ODA flows is a serious constraint to broader use by bilateral donors. This might, however, change after 2015 as the OECD DAC is currently working on suggestions of how guarantees could be included in the official records of development aid flows.

Both structured funds and also institutions that are offering green bonds face a main bottleneck at the outflow side. In both cases the main challenge consists of building up a good investment portfolio. It is difficult to identify partner banks or projects at a sufficiently large scale. This might be due to a missing project pipeline, but also to the rough competition among international financial institutions for the few good partners or projects. Often it is even difficult to identify good banks that are interested in green investments, as they do not see the need to develop these complicated markets. Even if the management of the potential partner has been convinced, developing the expertise to carefully select project partners is a further lengthy process. Moreover, given the total size of, for instance, structured funds, they can often only have energy-efficiency projects in their portfolio as the huge investments in renewable energy (e.g. a wind park) do not offer sufficient diversification.

For the current size of structured funds' or green bonds' issuances, finding investors is not an issue. However, making this kind of investment product attractive for the big institutional investors with their over USD 70 trillion under management would only be feasible by up-scaling enormously the amount of shares or bonds offered. For instance, issuances have to exceed 500 million to be interesting for big institutional investors as small divisions are not attractive for them. Still, even though the offer of shares, notes, and bonds would be given at scale, it is doubtful whether the huge players would include them in their investment portfolios.

Figure 8: Potential for broader use of instruments



Source: Author's representation.

A first reason for this – as one expert expressed it – is that investors do not like new products. Investors want products that they know, that they can explain easily to their clients, and that are simple to understand. Investors are very reluctant to make experiments with new products. They prefer products with a track-record of sustained profitability, and with a good rating, which is difficult for these financial products to obtain. Even if they had at least three years of proven profitability, it is not quite clear which investments will be made in the future. Moreover, these products are usually not included in the relevant benchmarks, which is a further hurdle. Unfortunately, financial sector exports all confirm that asset managers do not deviate much from these benchmarks as they are explicitly paid to be high-performing relative to benchmarks. As long as there is a bias towards oil and gas in most important investors' benchmarks, and green investment products are excluded, they will hardly make it into the investment portfolios of the big investors. Even more so, it is doubtful whether the absorption capacity of capital markets for far more green investment products is given at the moment.

A further important restriction for the broader use of these financial products is that investors usually do not want to take technology risks and in consequence only invest in proven technologies. This means, that these investment products can only be used for a limited sub-group of green investment projects. Even more so, for financing the protection and maintenance of many public goods, these instruments are not suitable at all.

Needless to say that the up-scaling of those instruments that are provided directly to projects within a sufficient speed and amount is not very probable. Thus, the only two instruments for which a broader use might be relatively easy to implement seem to be credit lines and technical assistance. In fact, these are the instruments that are used massively by German development cooperation. But even if up-scalability is given as for credit lines, it might be doubtful whether this is really what is needed to create more green

investments. A country study in Indonesia (Böhnke et al. forthcoming) shows that liquidity is not the crucial impediment for investments in energy efficiency. The same is true in many other developing countries, even in Africa, where banks are in many cases quite liquid. The bottlenecks would in these cases rather be the unwillingness of financial institutions to take on risks and their lack of knowledge and track-record in lending to green projects.

Consequently, for many of the instruments presented, it will be essential to find solutions for the broader use of them. However, thinking in financing terms alone will not be sufficient. It is necessary to adopt a differentiated approach analysing carefully what is really needed in which countries for which kind of projects. The next chapter will propose relevant research questions to bring the up-scaling of green investment forward.

6 Identification of further research ideas

As our knowledge about green finance and public leveraging instruments is still relatively limited, we will focus on emerging research questions in this section. We will argue for the need for quantitative analyses and then propose emerging research questions that it would be interesting to answer.

6.1 Lack of quantitative analyses

A quantitative assessment of the effectiveness and efficiency of public spending that is aimed at mobilising private funds for green investments in developing countries has not yet been carried out for the simple reason that data is not available.[33] Only a very limited number of data sources for green finance flows exist. Moreover, these are not comprehensive as they cover only specific sectors and a few countries. Data for developing countries are generally not included. Besides, many of the public instruments are quite new and do not have a reliable track-record yet. This is why the different existing publications by various researchers can be resumed under the heading of "stock-taking".

A rigorous quantitative assessment would be very important in order to search for best practices. The reason is that quantitative analysis is a very suitable method for providing general conclusions and making comparisons, and both are needed to better understand green financing and to design targeted policies. It may be that many mappings of green finance flows and case studies have been conducted recently, but econometric analyses have some really convincing advantages over these qualitative analyses: through

33 An exception is the OECD (2013b) which studies the effects of government policies on private finance for renewable energy investments. The authors find that particularly price-based instruments such as feed-in tariffs are positively correlated with the mobilisation of private finance.

econometric analyses it is possible to investigate larger cross-sections and longer time series separately or even jointly.

The disadvantage of qualitative research is that it is really difficult to derive broadly applicable policy recommendations from descriptive and very specific results. In order to widen the scope of green investments, we need to have more general outcomes of research on green finance at our disposal. Using econometric analyses, generalisation is possible as the results are derived at a much more aggregated level. They can thus be used to deduce more general policy recommendations and provide a basis for appropriate policy action.

For instance, we need to better understand the determinants of green public and private finance flows; the causal relation between different kinds of public support and the mobilisation of private capital; the robustness of these relationships over different set-ups; and the relative importance of different forms of support. All this could be analysed econometrically if data were available.

National and international financial institutions as well as governments could provide the basis for these quantitative assessments of the leveraging of private funds for green investments by better collecting relevant data and facilitating the access of external researchers to the data. Today, most institutions are quite reluctant to provide data on green finance flows for various different reasons. For instance, a standard answer is that they would be willing to provide data – but only if all their competitors also do so. In order to move forward and upscale the investments in green projects in a significant way, opening these data sources to research seems to be a necessary condition. Giving researchers access to green finance data and enabling econometric analyses will lead to a more comprehensive understanding of green finance and public support activities for green investments.

6.2 Possible research questions

After making the argument for the need of quantitative analyses we will now give an overview of possible research questions which can be organised within six thematic groups: “public leveraging instruments”, “government support”, “institutional investors”, “domestic perspectives”, “lessons learned from industrial countries”, and “miscellaneous”.

Research on public leveraging instruments

The first set of research questions tries to increase the understanding of public leveraging instruments, the way they are designed, and how they work. For instance, it would be worthwhile to concentrate on the subsidies that form part of different instruments; on how they are included; and, even more importantly, on how they are allocated to avoid negative external effects like crowding-out of domestic private finance.

Furthermore, the causality between public support and the mobilisation of private capital as well as the relative cost-effectiveness of the different instruments with regard to leveraging, but also developing and climate-related goals, could be studied.

A very interesting aspect of the mobilisation of private capital is the trade-off between additionality of private finance and leverage ratio. So far, not only many actors in the developing community but also researchers are concentrating on obtaining a high leverage ratio. However, when this ratio is really high, it is very doubtful whether the private investment is still additional or rather would have been realized anyway, just without the subsidy of the public co-financier.[34]

Research on government support

The next set of questions aims at increasing the understanding of government support: When is government support really required and for what reason? When is government intervention efficient and effective? Governments participate, for instance, in structured funds that are created by development banks without really knowing whether their contribution is providing funds, increasing reputation, alleviating risks, or just supplementing a nice add-on. Often, it is argued that government support is supposed to have a signalling effect for investors that certain types of investments are profitable and secure. However, it has not been analysed whether such an effect can really be observed.

Furthermore, one may ask and analyse when is it that the cooperation of public and private donors is most efficient? What are the circumstances that provoke an increase in the efficiency of investments by the intervention of public donors?

Another open question relates to the transmission channel of public support, i.e., whether providing financing to a project directly or via the transmission channel of a domestic development bank and a domestic commercial bank is the better approach. In other words, one could analyse the trade-off between subsidising the project directly and indirectly. The first option would ensure that the project really gets the government subsidy; while the second option facilitates learning effects and a track-record of lending on the side of domestic institutions and at the same time risks that the subsidized interest rates do not reach the project as every intermediary is charging a surplus to the rate. Applied to the German development system this would relate to the question of whether providing financing through DEG or KfW is the better way.

Research on institutional investors

Another set of emerging research questions deals with institutional investors and their role in green investments in developing countries. First of all, it would be interesting to analyse in greater detail which institutional investors invest in which countries in which sectors with the help of which instrument in which type of project. While there have certainly

34 See Bretton Woods Project (2012) for a critical discussion of this issue.

been many case studies conducted that answer these questions for individual projects, a systematisation of the information is still missing.

Once we have such a dataset, we could continue and analyse econometrically the relevant characteristics for the engagement of institutional investors. A related question would be how much capital institutional investors are really willing to invest in green projects – both in developed and developing countries? Many studies have been conducted on the amounts that institutional investors could possibly invest but so far nobody has analysed the realistic amount of investments that can be expected from them. Moreover, we do not have much information on the types of risks that investors are willing to take for money and which risks are really the knock-out elements.

Another open issue is the role that institutional investors, or private investors in general, could have in the provision of adaptation finance, as these projects are generally less profitable for the investor.

Research on domestic perspectives

One shortcoming of the debate on leveraging private finance for green investments in developing countries is that it mainly addresses international aspects. However, even today a large portion of private capital comes from domestic resources. Domestic investors receive the risks in a different way, first of all because they do not face currency risks, but also because they know the local policy and understand the political risks. The qualitative characteristics of south finance are different as they understand the risk-return at the macro-level and not just on a project-level. Focusing on domestic perspectives provides several research ideas. First of all, it would be worthwhile to analyse how domestic capital can be mobilised. The reason is that, even today, a relevant part of project finance is raised domestically.

Closely related to this aspect is the question of how the enabling environment in the country of project implementation should be designed and how improvements of this environment could be achieved?

When studying domestic financial markets an interesting aspect would be whether green transformation sectors have specific problems to access financing or whether they face any other specific barriers to get funding. Tied to this analysis is the question of whether there are any regional patterns. Thus, analysing regional bond markets would be another option for research.

Investigating domestic perspectives is certainly rewarding, but a holistic approach would be even more interesting: to study the mobilisation of private capital for green investments in developing countries considering both international and domestic finance, regulation, and enabling environment.

Research on lessons learned from industrial countries

As data availability in general is difficult for developing countries (quite apart from the general problem, mentioned above, of accessing green finance data), another set of questions deals with lessons learned from industrial countries. Many of the questions related to effectiveness and causality that have been laid out above could be analysed with a richer data basis for industrial countries in order to deduce recommendations for developing countries.

From a German perspective we could focus especially on the lessons learned in Germany, for example with regard to feed-in-tariffs.

Focusing on green investments more globally, an interesting approach would also be to study volatility of the provision of green finance by the private sector. By this we could find out, how volatile the engagement is, and whether developing countries should really rely on them for funding their green transformation.

Further research questions

Under the category of "miscellaneous" it is possible to instantiate two further questions. The first refers to the demand side of green finance: What do firms in developing countries really need – Is it subsidised credits for green investments or is it just access to finance even at market rate for all kind of investments?

The second question relates to a more political dimension: How could the experiences of the Climate Investment Funds (CIF) be transferred to the Green Climate Fund (GCF)? What are the lessons learnt and which instruments have been the most useful?

Although this collection of research questions is most probably far from being comprehensive, it proposes quite a number of different research foci. Having said that, the overall question remains as to whether financial institutions and governments will provide access to the relevant green finance data that will make these analyses possible.

7 Summary and policy recommendations

Summary

In order to combat imminent climate change, we have to green the economy. As public budgets alone will not be able to provide the necessary financing, additional resources have to be mobilised, particularly for green investments in developing countries and emerging markets. Although climate can be considered a systemic risk for the financing industry, private and institutional investors are very reluctant to invest in green finance products or projects. The reason is straightforward: the risk-return calculus is not attractive enough.

This problem could be solved automatically if a global carbon price existed that was included in all economic considerations. Given the absence of an adequate price for carbon emissions, policymakers have to fall back on second-, third- or even fourth-best solutions to incentivise private investors to provide the necessary capital for a green transformation. This allows governments to make use of various different public instruments with which to leverage private capital for green investments. Eight different instruments that can be grouped into three categories – namely those that primarily provide funding to projects; those that transfer knowledge or risk; and those that raise additional private funds – have been discussed in this paper.

The eight instruments that have been studied have different advantages and weaknesses. More importantly, however, they are relevant for different project development phases, country environments, and purposes. Adequate solutions, e.g. adapted mixes of instruments, will vary within countries, regions, technologies, and projects.

The potential for mainstreaming green finance and using these instruments on a much larger scale is relatively limited. In-depth knowledge about effectiveness and the causal implications of green finance in general, and leveraging instruments in particular, is very incomplete. In consequence, it is not clear which would be the best way to attain this goal.

Much more knowledge of green finance in general and public leveraging instruments in specific will be needed. The fact that there is a lack of internationally agreed definitions of key terms, such as “green finance”, “climate finance”, or “leverage ratio” is a serious hurdle to the discussion and implementation of green finance. It is difficult to make research comparable.

Moreover, we lack data on green investments, as development finance institutions and the private and institutional finance sector are reluctant to publish data on green finance. This hampers the rigorous evaluation of existing experiences and the delivery of lessons-learned about best practices and broadly applicable business models.

Policy recommendations

- We need more knowledge in the field of green finance. A coordinated effort to collect the data related to green financing deals from development banks would allow one to assess the existing experiences quantitatively and deduce more general conclusions and recommendations.
- We need more transparency and cooperation among the various different international bodies that are discussing green finance. More exchange could help to implement consistent, concise and apt policy actions that speed-up the rise of green finance.
- Governments should not forget that green investments necessarily require financing, but that the enabling environment is at least as important. It would be helpful if governments were to set up a mutual green agenda among the various different ministries to align the support to green investments.

- A green transformation is a societal challenge. To make the use of public leveraging instruments more effective, investors – and also their clients – have to be educated and informed.
- Whatever support for green finance is implemented, it must be as simple and easy to understand as possible. This is especially true when considering green investments in developing countries and emerging economies as in this case two investment areas come together that are both considered to be very complicated.
- Governments should make use of all different types of public instruments to leverage private capital as each is useful for different purposes, project phases, and situations. Also, UNFCCC's Green Climate Fund should consider expanding their instruments beyond grants and concessional lending and making use of the whole range of instruments that are available.

Bibliography

Bernstein, S. / J. Lerner / A. Schoar (2013): The investment strategies of sovereign wealth funds, in: *Journal of Economic Perspectives* 27 (2), 219–238

Böhnke, J. et al. (forthcoming): How to make green finance work – empirical evidence from bank and company surveys, Bonn: DIE, forthcoming

Bretton Woods Project (2012): 'Leveraging' private sector finance : how does it work and what are the risks?; online: http://www.brettonwoodsproject.org/2012/04/art-570165/ (accessed 14 Jan. 2013)

Buchner, B. K. / T. C. Heller / J. Wilkinson (2012): Effective green financing : what have we learned so far?, San Francisco, Calif.: CPI (Climate Policy Initiative)

– *et al.* (2012): The landscape of climate finance 2012, San Francisco, Calif.: CPI (Climate Policy Initiative)

– *et al.* (2013): The global landscape of climate finance 2013, San Francisco, Calif.: CPI (Climate Policy Initiative)

Caruso, R. / J. Ellis (2013): Comparing definitions and methods to estimate mobilised climate finance, Paris: OECD (Climate Change Expert Group Paper 2013(2))

Climate Bonds Initiative (2013): Bonds and climate change : the state of the market in 2013; online: http://www.climatebonds.net/files/Bonds_Climate_Change_2013_A3.pdf (accessed 14 Jan. 2013)

Climate Investment Funds / World Bank (2012): Financing renewable energy : options for developing financing instruments using public funds, Washington, DC: Climate Investment Funds

European Commission (2013): Long-term financing of the European economy (Commission Staff Working Document); online: http://www.true-sale-international.de/fileadmin/tsi_downloads/Sonstiges/staff-working-paper_en.pdf (accessed 14 Jan. 2014)

Harmeling, S. et al. (2013): The German fast-start finance contribution, Washington, DC: WRI (World Resources Institute) (Working Paper 4/13)

Höhne, N. et al. (2012): Mapping of green finance delivered by IDFC members in 2011, Cologne: Ecofys

IFC (International Finance Corporation) (2012): Private investment in green growth and climate-related activities: Bibliography : Prepared for: G20 Development Working Group; online: http://www.ifc.org/wps/wcm/connect/2108a2804d5b730faae1ea2389a1bab4/IFC+G20+-+Private+investment+in+green+growth+and+climate-related+activities+-+Bibliography.pdf?MOD=AJPERES (accessed 27 Jan. 2014)

– (2013a): A dialogue platform for inclusive green growth investment : an expanded stocktaking for the G20 development working group, Washington, DC: IFC, World Bank Group

– (2013b): IFC thematic bonds, Washington, DC: IFC, World Bank Group

International Energy Agency (2012): Energy technology perspective, Paris

Juergens, I. et al. (2012): The landscape of climate finance in Germany, San Francisco, Calif.: CPI (Climate Policy Initiative) (CPI Report)

Kaminker, C. / F. Stewart (2012): The role of institutional investors in financing clean energy, Paris: OECD (Working Papers on Finance, Insurance and Private Pensions 23)

Nelson, D. / B. Pierpont (2013): The challenge of institutional investment in renewable energy, San Francisco, Calif.: CPI (Climate Policy Initiative)

OECD (Organisation for Economic Co-operation and Development) (2013a): The role of banks, equity markets and institutional investors in long-term financing for growth and development : report for G20 leaders, Paris

– (2013b): Using public policy to induce private finance for renewable energy projects : evidence from micro-data, Paris

Patel, S. / R. Musić (2013): Climate-Related Investment at the International Finance Corporation: A Review of 8 Years of Investment Activity (2005-2012), Washington, DC: IFC (International Finance Corporation)

Polycarp, C. / L. Brown / X. Fu-Bertaux (2013): Mobilizing climate investment : the role of international climate finance in creating readiness for scaled-up low-carbon energy, Washington, DC: WRI (World Resources Institute)

Roland Berger Strategy Consultants (2012): Profits through progress, Hamburg (think:act CONTENT)

Schmitz, H. / B. Becker (2013): From Sustainable Development to the Green Transformation - A Rough Guide Briefing Paper, Brighton: Institute of Development Studies

Severinson, C. / J. Yermo (2012): Implications for insurers and pension funds, Paris: OECD

Smallridge, D. et al. (2013): The role of national development banks in catalyzing international climate finance, New York: Inter-American Development Bank

Spencer, T. / J. Stevenson (2013): EU low-carbon investment and new financial sector regulation : what impacts and what policy response?, Paris: IDDRI (Institut du développement durable et des relations internationales)

Spratt, S. / S. Griffith-Jones (2013): Mobilising investment for inclusive green growth in low-income countries, mimeo

Strand, J. (2013): Political economy aspects of fuel subsidies : a conceptual framework, Washington, DC: World Bank Group (Policy Research Working Paper 6392)

UN (United Nations) (2013): A new global partnership : eradicate poverty and transform economies through sustainable development : the report of the High-Level Panel of Eminent Persons on the post-2015 development agenda, New York

UNEP (United Nations Environment Programme) (2008): Public finance mechanisms to mobilise investment in climate change mitigation, Paris (Final report)

– (2012): Bilateral finance institutions and climate change : a mapping of 2011 climate finance flows to developing countries, Nairobi

Venugopal, S. / A. Srivastava (2012): Moving the fulcrum : a primer on public climate financing instruments used to leverage private capital, Washington, DC: WRI (World Resources Institute)

– *et al.* (2012): Public financing instruments to leverage private capital for climate-relevant investments : focus on multilateral agencies, Washington, DC: WRI (World Resources Institute)

WBGU (German Advisory Council on Global Change) (2011): World in transition : a social contract for sustainability, Berlin

Whitley, S. (2013): At cross-purposes : subsidies and climate compatible investment, London: ODI (Overseas Development Institute)

– / *R. Mohanty* (2013): Germany's private climate finance support : mobilising private sector engagement in climate compatible development, London: ODI (Overseas Development Institute) (Background Note)

World Bank (2012a): Green infrastructure finance : framework report, Washington, DC

– (2012b): Turn down the heat : why a 4°C warmer world must be avoided, Washington, DC

– (2013): Green bond fact sheet (Updated June 2013); online: http://treasury.worldbank.org/cmd/pdf/WorldBankGreenBondFactSheet.pdf

World Economic Forum (2013): The green investment report : the ways and means to unlock private finance for green growth, Geneva

Appendix

Table A1: Institutions and initiatives working on green finance

Acronym	Name	Description
3GF	Global Green Growth Forum	A global public-private partnership consisting of the Governments of Denmark, South Korea, Mexico, China, Kenya, and Qatar together with a number of leading global corporations and international organisations. The idea behind this forum is as simple as it is promising: Bringing all relevant parties together in order to intensify large-scale public-private action to accelerate the transformation to a green economy. Each year in Copenhagen, 3GF convenes the leaders of established and emerging public-private partnerships clustered around different growth sectors within the green growth spectrum.
CDKN	Climate and Development Knowledge Network	Supports decision-makers in designing and delivering climate compatible development. It does this by combining research, advisory services and knowledge management in support of locally owned and managed policy processes. CDKN works in partnership with decision-makers in the public, private and non-governmental sectors nationally, regionally and globally. The Climate Development Knowledge Network is managed by an alliance of organisations lead by PricewaterhouseCoopers LLP (PwC), and including Fundación Futuro Latinoamericano, INTRAC, LEAD International, the Overseas Development Institute, and SouthSouthNorth.
CEM	Clean Energy Ministerial	A high-level global forum to promote policies and programmes that advance clean energy technology, to share lessons learned and best practices, and to encourage the transformation to a global clean energy economy.
CPI	Climate Policy Initiative	A global policy effectiveness analysis and advisory organisation. Its mission is to assess, diagnose, and support nations' efforts to achieve low-carbon growth. An independent, not-for-profit organisation supported by a grant from the Open Society Foundations, CPI's headquarters are in San Francisco and regional offices are situated in Beijing, Hyderabad, Rio de Janeiro, and Venice. Main publication: "Global Landscape of Climate Finance".
FSB	Financial Stability Board	Has been established to coordinate at the international level the work of national financial authorities and international standard-setting bodies and to develop and promote the implementation of effective regulatory, supervisory and other financial sector policies in the interest of financial stability. FSB is focused on financial regulatory factors affecting the availability, cost, time horizon and other terms of LT finance.
G2A2	Green Growth Action Alliance	Includes over 50 of the world's largest energy companies, international financial institutions and development finance banks working to deliver greater investments into clean energy, transportation, agriculture and other green investments (Secretariat is WEF). Above all it has a facilitating role, conducting workshops in pilot countries.
GGGI	Global Green Growth Institute	A new kind of international organisation. GGGI provides support for the development of green growth plans (GGPs) when it receives a high-level request from a developing or emerging country government. GGGI's Research Programme is designed to support the delivery of GGGI's Green Growth Planning and Implementation programmes. Some of GGGI's research is generated primarily by in-house researchers and draws heavily on GGGI's green growth planning and implementation experience in developing and emerging countries. Other research is conducted in partnership with leading economic policy institutes and research centres in both developing and advanced countries, especially on more theoretical and technology-focused issues (among others, Brookings Institution, London School of Economics, OECD, World Bank, and UNEP). GGGI jointly serves as the GGKP Secretariat with UNEP. ADB, DFID, GIZ, BMU, 3GF, GGKP, OECD, WB, WEF among others are partners (role not further specified).
GGKP	Green Growth Knowledge Platform	A global network of researchers and development experts that identifies and addresses major knowledge gaps in green growth theory and practice. It is a core partnership between GGGI, OECD, UNEP, and the World Bank. Through widespread consultation and world-class research, GGKP provides practitioners and policymakers with better tools to foster economic growth and implement sustainable development

Table A1: continued

Acronym	Name	Description
GIC	Global Investor Coalition on Climate Change	The four regional climate change investor groups IIGCC (Europe), INCR (North America), IGCC (Australia & New Zealand) and AIGCC (Asia) have formed a global coalition. The coalition will conduct shared initiatives on climate policy, international agreements and international projects of common interest. Domestic policy positions and services to members will remain the purview of the regional member groups. Called the "Global Investor Coalition on Climate Change", the coalition will provide a global platform for dialogue between and amongst investors and governments on international policy and investment practice related to climate change.
GIIN	Global Impact Investing Network	A non-profit organisation dedicated to increasing the scale and effectiveness of impact investing. Impact investments are investments made into companies, organisations, and funds with the intention of generating measurable social and environmental impact alongside a financial return. They can be made in both emerging and developed markets, and target a range of returns from below market to market rate, depending upon the circumstances. The GIIN addresses systemic barriers to effective impact investing by building critical infrastructure and developing activities, education, and research that attract more investment capital to poverty alleviation and environmental solutions. IRIS is a set of standardised metrics that can be used to describe an organisation's social, environmental, and financial performance.
IDFC	International Development Finance Club	A new network of renowned national and sub-regional development banks.
IFC	International Finance Corporation	Undertook stock-takings for the G20 DPIGI (extended literature review; mapping of ongoing efforts to track finance flows; building a repository of success stories to leverage private finance; review of initiatives to engage institutional investors).
IGCC	Investor Group on Climate Change Australia/New Zealand	The IGCC represents institutional investors, with total funds under management of approximately USD 900 billion, and others in the investment community interested in the impact of climate change on investments. The IGCC aims to encourage government policies and investment practices that address the risks and opportunities of climate change, for the ultimate benefit of superannuates and unit holders.
IIGCC	The Institutional Investors Group on Climate Change	A forum for collaboration on climate change for European investors. It provides investors with a collaborative platform to encourage public policies, investment practices, and corporate behaviour that address the long-term risks and opportunities associated with climate change. IIGCC currently has over 80 members, including some of the largest pension funds and asset managers in Europe, representing around EUR 7.5 trillion in assets.
INCR	Investor Network on Climate Risk	A network of 100 institutional investors representing more than USD 10 trillion in assets committed to addressing the risks and seizing the opportunities resulting from climate change and other sustainability challenges.
IRENA	International Renewable Energy Agency	An intergovernmental organisation that supports countries in their transition to a sustainable energy future, and serves as the principal platform for international cooperation, a centre of excellence, and a repository of policy, technology, resource and financial knowledge on renewable energy. IRENA promotes the widespread adoption and sustainable use of all forms of renewable energy, including bio energy, geothermal, hydropower, ocean, solar and wind energy in the pursuit of sustainable development, energy access, energy security and low-carbon economic growth and prosperity.
ODI	Overseas Development Institute	UK's leading independent think tank on international development and humanitarian issues. Research focus in climate finance: (i) Mapping the delivery of programmatic funding for climate change at the national (and sub-national) level so that the needs of the poor are met; (ii) Defining the international architecture that will best support strengthened national governance of climate finance; (iii) Determining the scope of the private sector's role in transferring financial resources to vulnerable countries.

Table A1: continued

Acronym	Name	Description
OECD	Organisation for Economic Co-operation and Development	The OECD Secretariat collects and analyses data, after which committees discuss policy regarding this information, the Council makes decisions, and then governments implement recommendations. It is currently conducting case studies on institutional investors investing with the help of national development banks (NDBs) in green infrastructure and analysing the BNEF data. It offers the possibility of organising events to convene different stakeholders.
OPIC	Overseas Private Investment Corporation	US Government's Development Finance Institution. John Morton is focusing on standardisation of securitisation.
REN21	Renewable Energy Policy Network for the 21st Century	REN21 is the global renewable energy policy multi-stakeholder network that connects a wide range of key actors to facilitate knowledge exchange, policy development and joint action towards a rapid global transition to renewable energy. REN21 promotes renewable energy to meet the needs of both industrialised and developing countries that are driven by climate change, energy security, development and poverty alleviation.
REPP	Renewable Energy Performance Platform	REPP is jointly developed by the European Investment Bank and UNEP as a response to the United Nations' SE4All initiative. The platform will be structured as two separate, complementary vehicles to support first mover projects which are developed to operate in newly established policy environments – 1) the Performance Facility and 2) a Debt Facility. The Frankfurt School-UNEP Collaborating Centre for Climate & Sustainable Energy Finance was given the assignment in October 2012 by the European Investment Bank (EIB) to conduct a market study for the REPP to assess the renewable energy (RE) and energy efficiency (EE) investment potential and the regulatory environment for RE and EE investments in Africa.
SE4ALL	Sustainable Energy for All	UN Secretary-General Ban Ki-moon is leading a global initiative on Sustainable Energy for All to mobilise action from all sectors of society in support of three interlinked objectives to be achieved by 2030: providing universal access to modern energy services; doubling the global rate of improvement in energy efficiency; and doubling the share of renewable energy in the global energy mix.
UNEP-FI	United Nations Environment Programme Finance Initiative	A global partnership between UNEP and the financial sector. Over 200 institutions, including banks, insurers and fund managers, work with UNEP to understand the impacts of environmental and social considerations on financial performance. While they do some research, they mostly organise events and offering training and networking opportunities.
WRI	World Resources Institute	Centre for policy research and analysis addressed to global resource and environmental issues in Washington. WRI focuses on the technical and institutional aspects of three major questions: (i) How to SHIFT finance from high carbon to low carbon and climate resilient investments (mainstreaming); (ii) How to LEVERAGE private flows using public climate finance (domestic and international) and (iii) How to ASSESS the impact or effectiveness of climate finance, whether positive or negative.
	Climate Funds Update	A joint initiative of the Heinrich Böll Stiftung (HBF) and the Overseas Development Institute (ODI). The team monitors dedicated climate change funds from the stage when donors pledge funding, through to the actual disbursement of financing for projects, in an effort to increase the transparency of climate finance flows. Provide data on homepage.
	San Giorgio Group	A working group established in 2011 by CPI, World Bank Group, China Light&Power and OECD to conduct case studies on climate finance.

Source: Author's compilation.

Table A2: Short overview of public financing instruments

Instrument	Strength	Weakness	Applicability
Equity	• risk reduction for other investors • gives accreditation	• shareholders are the last to be compensated • high transaction costs	• only feasible for larger projects (due to high transaction costs)
Grants	• simple to implement and manage (no ongoing administration)	• most risky for donor: limited control and no recourse • do not give **incentives** for delivery	• easily applicable to all kind of projects • especially for early project development phase
Loans	• lower capital financing costs • obligation to repay can give incentives for project viability	• need for due diligence increases costs • degree of concessionality is hard to estimate	• projects of relative big scale (project evaluation) • more developed projects
Credit lines	• increase comfort and awareness of financial intermediaries in lending to new sectors/project types • financial intermediary can complement funding with own resources	• principal-agent problems • accounting procedures might diverge and increase costs	• wide-spread use • more developed projects
Green bonds	• potential to bundle projects reduces risk and financing costs	• sophisticated markets required to be able to analyse and price the bonds • high administration costs	• only for developed projects and proven technologies
Structured funds	• reduce investment transaction costs • possibility of diversification • offer investment to investors with different risk-return tolerances • improve risk-reward calculus of private investors (first loss, subordinated position)	• high transaction cost	• relatively limited due to transaction and coordination costs • only for developed projects
Guarantees	• crowd-in private financing • easy to obtain political approval as there is no high up-front financing	• high transaction costs • accounting is difficult • not fully accountable for ODA	• for projects in a more developed stage of implementation
Technical assistance	• facilitates further financing • helps to establish track-record	• high transaction costs	• broad range • also for projects in an early development phase • useful for projects and banks

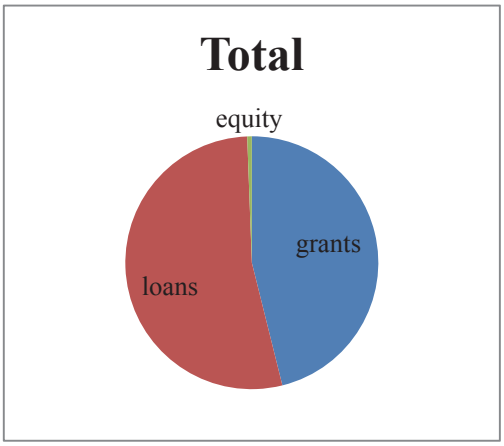
Source: Author's representation.

Box A1: Climate-relevant ODA from Germany

In 2011, Germany committed a total of EUR 3,468,795,092.67 to climate-relevant ODA. This figure includes all flows that have at least a value of 1 for one of the four Rio-markers. The total sum can be divided into

- EUR 1,599,352,437.69 for grants,
- EUR 1,849,442,654.98 for loans, and
- EUR 20,000,000.00 for equity investments (see Figure 9).

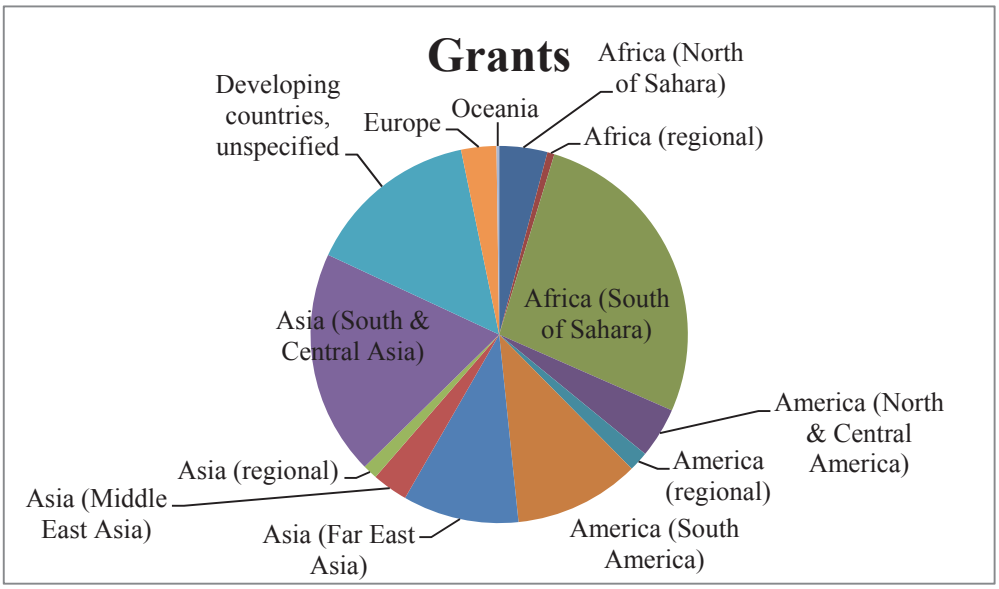
Figure 9: Total climate-relevant commitments in 2011 (German ODA)



Source: Author's representation.

The recipient countries vary according to the instrument. For instance, nearly half of the loans have been directed to Asia (see Figure 10 and Figure 11). There is only one equity investment that took place in Europe.

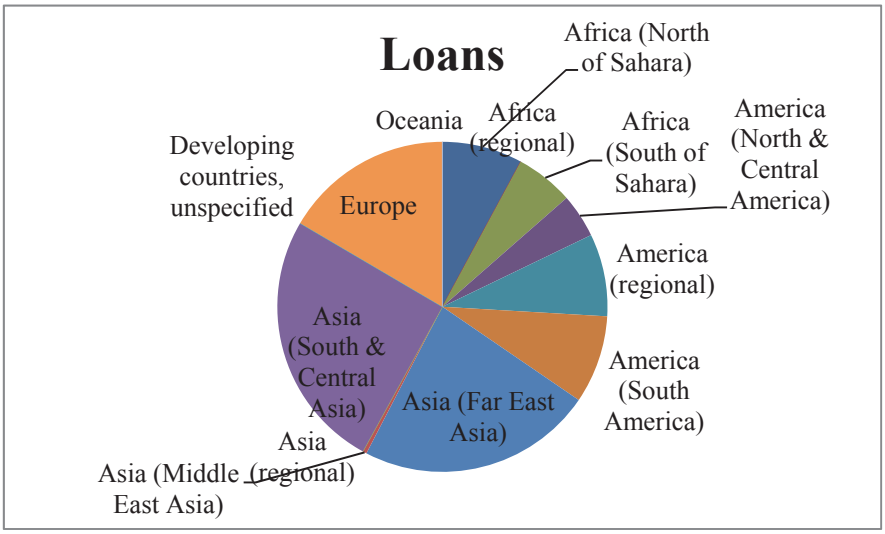
Figure 10: Recipients of grants (German climate-related ODA, 2011)



Source: Author's representation.

Box A1: continued

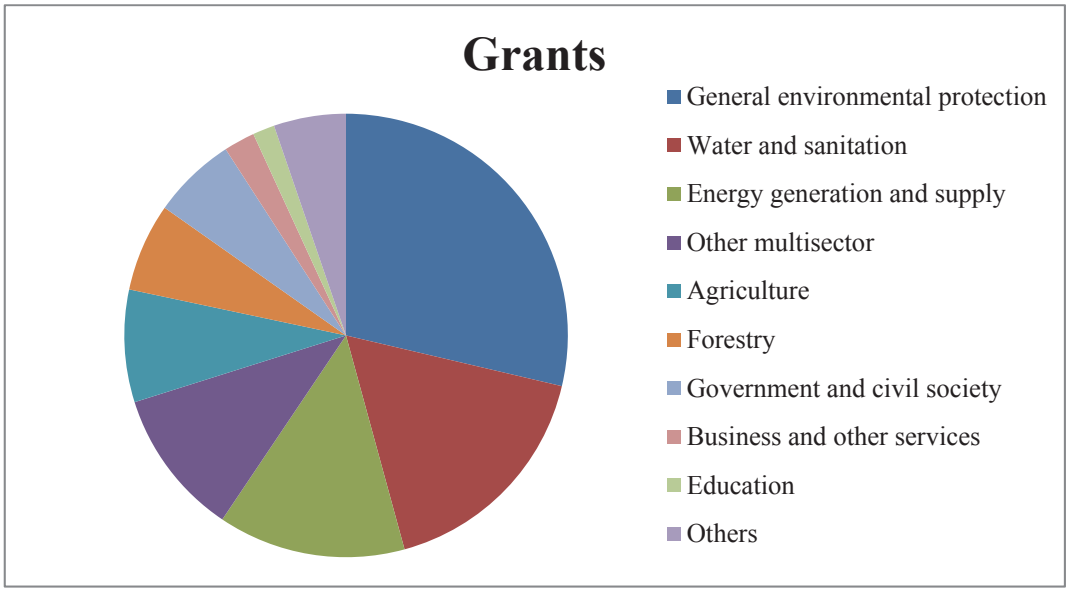
Figure 11: Recipients of loans (German climate-related ODA, 2011)



Source: Author's representation.

The most relevant sectors for grants have been general environmental protection, followed by water and sanitation and energy generation and supply (see Figure 12).

Figure 12: Grants sector (German climate-related ODA, 2011)

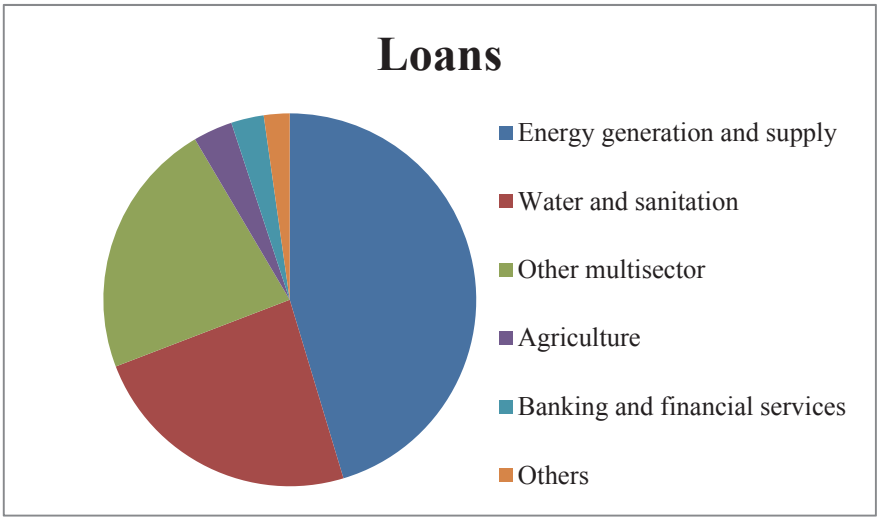


Source: Author's representation.

Box A1: continued

The majority of the loans have been directed to the energy generation and supply sector, followed by water and sanitation (see Figure 13).

Figure 13: Loans sector (German climate-related ODA, 2011)



Source: Author's representation.

An important limitation of these statistics on the German ODA flows is that we do not have the information by which instrument the projects themselves have been financed. Neither, whether - and if this is the case - how much private finance has been leveraged. For instance, the money that has been provided by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) for the Global Climate Partnership Fund has been a grant (see Box 5). Consequently, the German ODA statistics report a grant, even though the relevant financial product to mobilise further financing has been a structured fund.

Source: Data provided by the BMZ, Referat 414 (OECD/DAC, ODA-Statistik).

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