
MOBILISING PRIVATE FINANCE FOR LOW-CARBON DEVELOPMENT

TACKLING BARRIERS TO INVESTMENTS IN DEVELOPING COUNTRIES AND ACCOUNTING OF PRIVATE CLIMATE FLOWS

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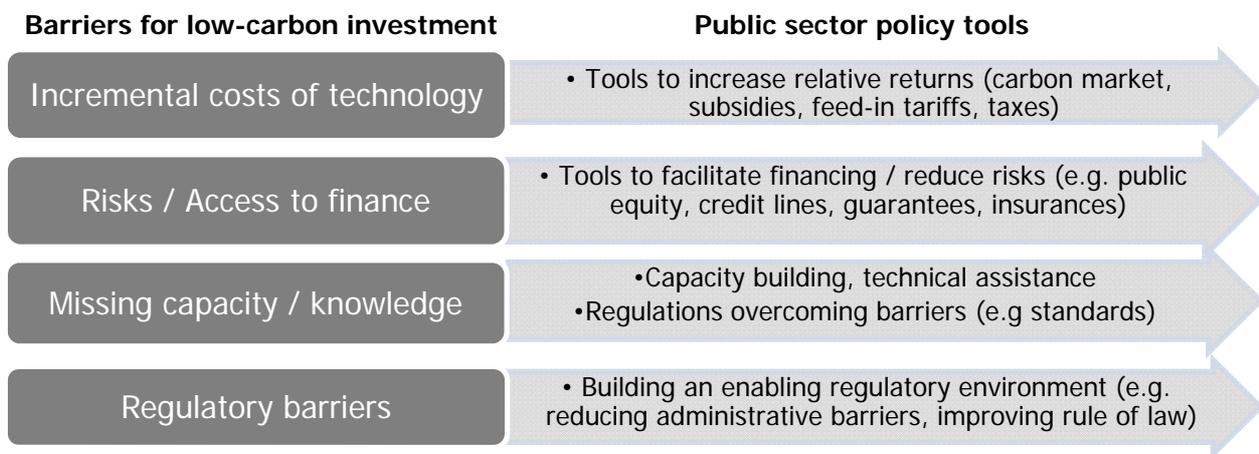
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Executive Summary

The public sector will have to leverage several hundreds of USD billions of private investments per year in order to enable low-carbon development limiting global warming to 2 degrees Celsius. We have studied different tools for leveraging funds, ways to accounting for private funds, and finally whether the ratio of leveraged private funds to leveraging public funds is a good indicator for efficiency.

A mix of international instruments for leveraging investments is needed

Private sector investments in developing countries are impeded by four major barriers. For alleviating these barriers different public sector tools are available, both international and domestic (see Figure below). Our analysis of international instruments has shown that applying one of the tools on its own has often limited impact and should in most cases be complemented by other tools (e.g. finance facilitating tools need coverage of incremental costs and capacity building to reach their full potential).



Tools for reducing incremental costs: why international carbon markets are needed

In most developing countries, political support for introducing national emissions trading and/or carbon taxes is hardly available and domestic subsidies will only be used for specific technologies with development benefits. Therefore, international support is needed to cover some of the incremental costs. International public subsidies are, however, limited and will only be effective if they target low-cost potential with low or no development benefits (e.g. carbon-capture and storage, destruction of HFC-23) and apply stricter verification procedures. Therefore, international carbon markets are needed to covering costs. The Clean Development Mechanism (CDM) is a successful tool in this context, but reforms and new tools are needed to lower transaction costs for small projects and reach further potential in the building, forestry and transport sectors. Apart from the expansion of CDM Programmes of Activities, sectoral market mechanisms will have to be introduced, as an intermediary step towards national emission trading. Still, many challenges for effective sectoral mechanisms have to be overcome, e.g. the avoidance of free-riding, which hampers the efficiency of the current CDM.

Facilitating finance: an important complementary tool but more risks have to be taken

Tools to facilitate financing, e.g. public equity, debt and guarantees, can leverage substantial private investments by “signalling” that interesting investment opportunities are available, by covering a variety of political and commercial risks and by increasing liquidity in non-mature financial markets. The applicability of finance facilitation is, however, limited due to four challenges: lack of deal flow (in-flow of bankable projects), dependence on minimal returns of technologies, risks of crowding-out private capital and moral hazard. Such tools can only harvest their full potential if capacity is built, incremental costs are covered, and the enabling environment is provided. Furthermore, risk-averse public finance institutions need to take more risks when investing in low-carbon development, which can be achieved by backing risks with public money, as applied in new innovative funds.

Capacity building: to be demand-driven and combined with concrete programmes and finance

Capacity building targeting the (low-carbon) business sector is neglected in the negotiations but not by international initiatives. It could certainly be expanded but its effectiveness can also be improved. Past programmes have been most successful when driven by demand, when being clearly targeted and combined with concrete programmes and financing instruments. In case of the CDM, pure awareness raising has been less successful than programmes including concrete project development. While capacity building is sometimes seen as a waste of money, our statistical analysis could not reject the hypothesis that it has an impact on development and registration of CDM projects in Africa and least developed countries. In the future, CDM capacity building programmes can be downsized and focused on LDCs and Programmes of Activities, as basic capacity is available. In contrast, more capacity building is required for new market mechanisms and funding should, in the short term, be focused on pilot programmes and awareness raising, which may help to induce political decisions.

Building an enabling environment: why international actors can do more

Finally, the most important driver for low-carbon investment is an enabling regulatory framework, as already provided for some renewable energy technologies in certain countries. Such an “enabling environment” does not only include specific climate policies but also a suitable core business environment (e.g. low administrative burden) and the right investment climate (e.g. the needed infrastructure, legal certainty). While this regulatory environment needs to be created by developing countries on their own, industrialized countries can support them by providing know-how and advice, e.g. on the benefits of reducing fossil fuel subsidies. Our analysis shows that climate change activities have still a very low share of international activities to improve the enabling business environment in developing countries.

Leverage factor: often overestimated and a questionable indicator for efficiency

The leverage factor is defined as the ratio between mobilised private funding and mobilising public finance (public funds or carbon market payments). While high leverage factors (5-15) are reported by public institutions to show effectiveness of climate finance, our project-level analysis has shown that real leverage is closer to 3-5 in the case of the CDM and the Global Environment Facility. The public sector tends to overestimate its leverage ability, as it includes further public funding as “leveraged” and does not account for the fact that some co-finance may have flown anyway. Furthermore, it is generally questionable if efficiency in leveraging funds, expressed by the leverage factor, is a good indicator for efficiency in reducing greenhouse gases; our analysis of hundreds of projects has not shown any clear correlation between the two figures. We even have some indications that high leverage factors may rather mean lower efficiency in reducing greenhouse gases in the case of the CDM.

Accounting for private finance: data is missing and not all types can be part of the promised USD 100 billion

Our analysis of private finance relevant from a North-South climate change perspective has provided us with three major findings. First, private financial flows are much more diverse than normally discussed; apart from North-South investment flows and carbon market payments, we find investments leveraged by international public sector tools and a variety of voluntary funds. Second, the data quality of private climate finance is low, e.g. the criteria for Foreign Direct Investment to be seen as “low-carbon” have never been defined. Therefore, our estimation of annually USD 60-160 billion of private climate finance (years 2008-2010) is just a proxy. To improve data quality, an international system for defining and tracking private climate finance needs to be set up, with the UN being a focal point for distilling and analysing data. Third, from the perspective that stepping up of climate finance is needed, not all private financial flows should be counted towards the international goal of mobilizing 100 billion USD of “public and private” finance for low-carbon development in 2020 as including all types of private finance would mean that this target may already be achieved today. Similarly politically infeasible is the application of very stringent criteria (additionality, predictability, equity, no double counting, addressing barriers, and data availability) as less than one USD billion would be included, which is well below what most countries had in mind when agreeing to the 100 billion USD figure. Therefore, a middle way has to be searched, which will mean excluding part of the large amounts of private investments. Simply leaving the interpretation “of private climate finance” to parties will lead to disagreements whether the USD 100 billion target has been met.

Introduction: why studying private finance for low-carbon development

This final report is a summary of four working papers and two country case studies conducted for this project. Therefore, not all sources and steps of analysis are included in this final report. For further information on sources and conducted analysis, please refer to the working papers and country case studies on <http://www.climatestrategies.org/research/our-reports/category/71.html>.

Need for leveraging private finance

Several studies have looked at investment needs to build a low-carbon infrastructure (e.g. power plants, buildings) that enables limiting global warming to 2 degrees Celsius. They have concluded that in developing countries alone hundreds of billions of USD have to be invested annually during the next decades (IEA, 2009; World Bank, 2009). Due to the limited availability of public funds, these investments will mainly have to come from private sources. The role of the public sector will be to set the right investment framework (both domestic and international) and use its limited funds to enable private investments and emission reductions.

Research focus on international instruments for mobilising private finance

We will focus in this report on the instruments of the international community, including bilateral and multilateral institutions, to enable low-carbon investments in developing countries. We are aware that without domestic policies and measures, nowadays called “Nationally Appropriate Mitigation Actions (NAMAs)”, the achievement of the 2 degrees target will be impossible. The link between such NAMAs and international climate policy instruments is therefore important but not part of this study.

Among the public instruments to mobilise¹ private funding, we find tools addressing incremental costs, which are traditionally seen as the fundament of any climate policy; but also further instruments such as public investments and guarantees that aim to improving the access to finance and reducing financial risks; capacity building tools; and instruments to create an enabling environment in developing countries. While often examined separately, we also see carbon markets here as public instrument to leverage private finance in developing countries.

This study has explored three areas of “leveraging private finance for low-carbon development” where we see some research gaps; appropriateness and effectiveness of different public sector tools, usefulness of “leveraged funds” as indicator of leveraging efficiency and systems to accounting for private funds.

Appropriateness and effectiveness of international public instruments

First, while several public instruments are used for leveraging private funds, not all of them may be appropriate in all contexts. Therefore, in the next two sections of this report, we examine the diversity of tools available, the barriers they address and also their relative effectiveness depending on the context.

Uncertainty whether “leveraging factor” is a good indicator for efficiency

Second, the study also examines whether large amounts of private investments are always preferable from a climate policy perspective. It has become fashionable to show leverage factors – the ratio between mobilised finance and mobilising public finance² – as indicator of successful use of public funding. However, more private investment may not always mean more greenhouse gas emission reductions.

How to account for (leveraged) private finance?

The third area we have explored is the question how the international community should account for private funds. Accounting for private funds may have several benefits. First of all, knowing climate-related private flows may help to assess progress and gaps in climate finance, and indicate effectiveness of public money in mobilising private finance. Second, accounting for private flows is needed to assess progress towards the “100 billion public and private funds” target that industrialized countries pledged at the Copenhagen climate conference in 2009. Therefore, we have analysed the data availability of private climate flows and examined the advantages and pitfalls of including certain types of private flows in the USD 100 billion figure.

¹ Mobilising = leveraging; in this report, we use the two words interchangeably.

² Therefore, we do not use the “leverage factor” in the same way as in the investment jargon, where the “leverage factor” often refers to „debt to equity“ ratios.

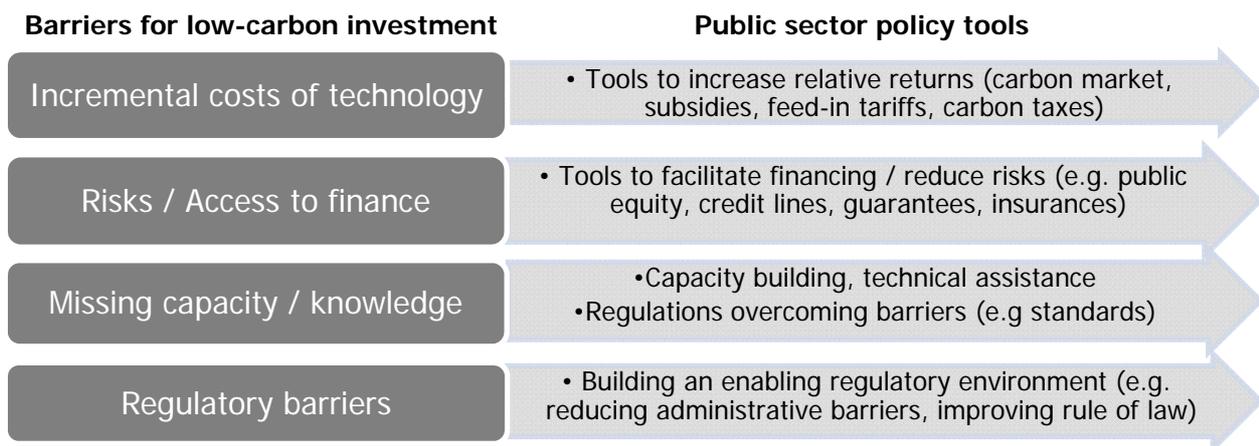
Barriers for low-carbon investments and tools to alleviate barriers

The public discussion on low-carbon development finance has mostly focused on the question how incremental costs of climate-friendly technologies can be met. However, low-carbon technologies may face other investment barriers, which have to be addressed by different public sector tools (see Figure 1).

From an investment perspective, one of the most relevant barriers is access to finance, which is mainly related to higher risks of clean energy investment, particularly in developing countries. Even when projects show a relatively high return, the political and commercial risks in some developing countries may deter foreign investors and lead lenders to ask for a lower debt-to-equity ratio. In such situation, the public sector may facilitate financing by providing guarantees or public equity and loans to make low-carbon technologies attractive for the private sector.

The two other relevant barriers are capacity and regulation. With capacity or knowledge barriers, we mean that technical, financial or regulatory knowledge and skills may be missing (or confidential) and hinder a fast deployment of low-carbon technologies. Public policy tools may provide capacity directly or build-up knowledge centres responding to demand of private actors. With regulatory barriers, we understand a variety of business-hindering tools, ranging from administrative burden, trade regulations and taxes, to the rule of law and more sector-specific issues, such as access to electricity grids. These regulatory barriers can only be overcome by actions of developing countries themselves but international support can provide knowledge and technical support.

Figure 1: Barriers for private sector investments and available public sector tools



Clearly, the framework presented in Figure 1 is a simplification. First of all, the barriers may interact, e.g. regulatory barriers and capacity gaps may increase incremental costs, while incremental costs may impede technology diffusion, which slows the build-up of capacity. Second, not all barriers are included. We found other barriers such as access to technology, missing infrastructure and cultural and social barriers (see Boldt et al., 2010; Brown et al., 2011b). Nevertheless, we consider this simple framework as useful for further analysis, as these four barriers are mentioned in most policy overviews and were also mentioned most in the interviews we conducted with experts from the public and private sectors.

Examples from Peru and Vietnam

Barriers for low-carbon development are often very specific to countries, technologies and sectors. Therefore, we conducted two country case studies on Peru and Vietnam (Stadelmann and Eschmann, 2011; Tatrallyay and Stadelmann, 2011), which certainly provide an important complement to the mostly generic analysis we have conducted in the other parts of this study. Our main conclusion from the two country case studies was that even if all planned public policies and international support programmes (public finance and carbon market) are implemented, only 10-15% of the abatement potential can be harvested by 2020. This is mainly due to several of the investment barriers we have just discussed.

Table 1 shows some of the existing and planned tools to overcome investment barriers in Peru and Vietnam, as identified by expert interviews and a literature review. The most important ways of reducing incremental costs are guaranteed feed-in tariffs (or tenders) and payments through the Clean Development Mechanism (CDM). While electricity tariffs may have to be revisited (Vietnam) and tenders for renewable energies to be expanded (Peru), there is also potential to use CDM Programmes of Activities (PoAs) and new market mechanisms to capture further potential where the project-based CDM fails (e.g. small-scale appliances and efficiency of fossil-based plants).

Interestingly, there are only few programmes providing access to capital via guarantees and public investments for low-carbon technologies. However, some interview partners in Peru made clear that access to capital is, indeed an issue. Improvements could both be achieved by redirecting existing credit lines (e.g. building sector in Peru) or setting-up new finance facilities (e.g. for solar water heaters, also in Peru).

Missing capacity or knowledge are acknowledged as important barriers in both countries and several national and international initiatives have been implemented (e.g. Cleaner Production Centre and CDM capacity building). However, many knowledge gaps remain (e.g. forestry emission data in Peru and rice cultivation methane figures in Vietnam) and further capacity building on new market mechanisms is needed. Finally, the most important leverage ability consists of regulatory reforms. While several policy changes with climate benefits have been implemented (e.g. introduction of energy efficiency labels), many sectoral policies are still not climate friendly. This creates the potential for internationally supported Nationally Appropriate Mitigation Actions (NAMAs) that aim at establishing climate friendly regulatory frameworks. However, complementarity with existing policies and increased ambition has to be assured; particularly in Peru, several climate change plans and programs already exist, but their implementation is delayed.

Table 1: Examples of existing needed leverage interventions in Peru and Vietnam

Barrier	Leveraging tool: existing	Leveraging tool: needed
Incremental costs of technology	CDM payments Feed-in-tariff /tenders	Programmes of Activities / New market mechanisms (both countries), electricity tariff (Vietnam)
Access to capital	Green Trust Funds	Funds for solar water heaters (Peru)
Missing capacity / knowledge barriers	Cleaner Production Centers / Energy Service Companies (ESCOs), CDM (PoA) capacity building	Data improvement: forestry (Peru) & wind, rice cultivation (Vietnam), capacity building for new market mechanisms (both countries)
Regulatory barriers	First EE labels, transport planning (still to be improved)	Efficiency standards (both countries), grid expansion (Peru)

Appropriateness and effectiveness of different tools

While all tools for overcoming barriers for low-carbon development make sense in theory, they may only be appropriate and effective in certain circumstances. Therefore, we have reviewed the most important tools (covering incremental costs, facilitating finance, capacity building and creating an enabling environment) and examined their effectiveness for mobilizing private investment.

Reducing incremental costs

We have not specifically studied tools for reducing incremental costs as the climate policy literature is full of related studies. Therefore, we just present the basic knowledge here, complemented with some findings from our first work package on efficiency in leveraging funds and reducing greenhouse gases (Stadelmann et al., 2011).

Cap-and-trade or carbon taxes would be preferable but political support is not available

Most economists call for a price on carbon to be introduced in order to account for the negative externalities of fossil fuels and eliminate incremental costs of low-carbon technologies. This price on carbon can either be

implemented by introducing a carbon tax, with the tax set at a level equalling the social costs of emitting greenhouse gases (USD/tCO₂eq). The alternative way for carbon pricing is to introduce a limit on CO₂ emissions and issue tradable permits. Both schemes should, in theory³, enable the reduction of CO₂ at lowest costs. There is a vast literature on the comparative advantages and disadvantages of taxes and emission trading; the most obvious trade-off is price certainty in the case of taxes versus emission level certainty in the case of emission trading⁴. In the end, either scheme or a combination of the two could form the cornerstone of an ambitious national climate policy but political support for neither of the two has been easy to win; the most ambitious carbon pricing schemes (e.g. EU ETS, national carbon taxes) have always been limited to some sectors. Therefore, the question is rather how to win political support for carbon pricing rather than whether to use taxes or emission trading.

In developing countries, it has until recently not been imaginable to introduce national carbon pricing schemes⁵, and therefore, international climate policy has mainly relied on direct payments for reducing emissions rather than setting up carbon pricing policies in developing countries and linking them to Northern schemes. This overall situation will hardly change in the next few years⁶ as even ideas to buy-in Southern interests for carbon pricing, e.g. by allowing emission caps above projected emission levels (see e.g. Wagner et al., 2009), have failed to win support in developing countries.

Feasible carbon market schemes – CDM and sectoral emission trading

The scheme that comes closest to carbon pricing in developing countries is the Clean Development Mechanism (CDM), which allows Northern countries to meet their emission targets by reducing CO₂ emissions in developing countries. Under the CDM, Southern companies reducing CO₂ below baseline emissions receive certificates, which they can sell to Northern entities for compliance with national or international regulations⁷. By issuing certificates only ex-post (after emissions have been reduced), the CDM sets an incentive for effective project implementation, which may lead to higher performance compared to upfront subsidies as used in development assistance. The CDM has also engaged the private sector with mushrooming of project developers, consultants and investors, and has mobilised billions of dollars in private capital. However, the CDM has several disadvantages compared to national carbon pricing; it only covers projects but not whole sectors (thereby missing some low-cost mitigation potential⁸), transaction costs are high for small-scale activities (which explains the low uptake of projects in the transport and building sector), and it does not put a price on carbon emissions but rather subsidises low-carbon technologies, which leads to free-riding problems, such as “non-additionality”⁹. Some of the pitfalls – transaction costs for small-scale activities and limitations – can partly be overcome by CDM Programmes of Activities (PoAs), which allows for bundling of small projects under an umbrella programme. However, PoAs have not achieved the breakthrough many have hoped for; substantial regulatory reform will be needed to reduce transaction costs and limit liability of verifiers.

³ The other barriers, access to finance (perceived or real risks), lack of capacity and regulatory hurdles, are some of the reasons why this may not apply in practice. According to economic theory, at least one policy instrument is needed for tackling each “externality” or public policy goal (see the work of Tinbergen). Therefore, the use of several instruments can be justified in this case, as there are different policy goals (covering incremental costs, providing access to capital...) and several externalities (e.g. environmental pollution and imperfect information)

⁴ In a seminal article, Weitzman (1974) explained the advantages of using price-mechanisms if marginal benefits of reducing CO₂ are constant and marginal costs are increasing, while quantity schemes are preferable if marginal benefits are increasing and the cost curve is relatively flat. Which situation applies, is still under debate. Economists worrying about short-term economic costs (e.g. Nordhaus) favour taxes to control costs, while scientists concerned about the risk of catastrophic events rather favour quantity schemes. One political economy argument for quantity schemes is that emission trading allows for winning political support without challenging cost-effectiveness, as permits can be allocated for free to politically-influential industries. However, the same winning of political support while maintaining cost-effectiveness is also possible in case of carbon taxes but rather than tax exemptions (as normally made) policy makers would have to re-allocate the tax revenue in a way that favours influential industries.

⁵ In fact, most developing countries have implicitly a negative carbon tax as they subsidise fossil fuels (which is also the case for some industrialised countries, e.g. the USA).

⁶ First plans for emission trading exist in China, Korea and Mexico.

⁷ CDM certificates are often sold to intermediate traders and also sold on public spot markets.

⁸ The CDM has not been able to harvest low-cost reduction potential through promoting energy efficiency. In this area, public funding (e.g. the GEF) has been more effective. The use of PoAs and sectoral market mechanisms may improve this shortfall (Stadelmann et al., 2011).

⁹ Like subsidies, the CDM faces two challenges: payments may be directed to entities that would reduce emissions anyway, and companies may be tempted to increase production to claim more subsidies (Baumol and Oates, 1988; Hall et al., 2008). The first challenge is widely recognised by the literature as the “additionality” problem, and substantial “non-additionality” has been detected despite the increasing stringency of assessment (Michaelowa and Purohit, 2007; Wara, 2008; Schneider, 2009). The second problem, increasing production, has been detected in the case of HFC plants (CDM Watch, 2010).

In order to overcome further challenges of the CDM - limited sectoral application, transaction costs and the long-term need to move to national emission trading schemes – sectoral crediting and trading have been proposed (Schmidt et al., 2008; Ward et al., 2008). Such sectoral schemes are discussed under the term “new market mechanisms” in the climate negotiations, and have some chances to be implemented. Some newer studies have detected some challenges, e.g. how to transfer the price signal to the private sector and how to avoid the “additionality” problem (Butzengeiger et al., 2010; Reinthaler, 2010).

Is public finance a reasonable alternative for meeting incremental costs?

As alternative to carbon market schemes, incremental costs could also be covered by international public finance. Indeed, the Global Environment Facility (GEF) as major implementing entity of the UNFCCC’s financial mechanism uses public grants from industrialised countries to cover some incremental costs of energy technologies in the South, mainly for demonstration projects. Most funding is, however, used for alleviating other investment barriers, mainly because other tools (e.g. capacity building, technical assistance, finance facilitating tools) are considered to be more cost-effective. Expanding such subsidies will be challenging as public funding is very small compared to incremental costs of low-carbon energy technologies¹⁰. Applying international public funding is probably most meaningful in case of technologies with costs well below the carbon market prices and no development benefits¹¹, such as HFC producing plants. In such cases, the need for international transfers may be lowered when shifting from CDM to public funding or to a fund with private contributions that only pays incremental costs (Wara, 2007; Stadelmann et al., 2011). Compared to the GEF, public funding for incremental costs would have to apply CDM-style ex-post verification of emission reduction, to guarantee performance incentives and the same quality of emission reduction data.

Risk-reducing / finance facilitating tools

In recent years, policy makers and scholars (see e.g. LSE, 2009; UNEP, 2009; Ward, 2010; Brown and Jacobs, 2011) have stepped-up their interest in tools to facilitating finance. The reason is the increasing awareness that low-carbon technologies face a finance supply problem beyond the question of incremental costs; even when low-carbon projects have a return that is comparable to fossil fuel alternatives, they may find it difficult to attract investors because of high investment risks and limited liquidity of financial flows in some developing countries.

We have reviewed the literature and carried out a series of interviews with experts from development banks and public agencies to assess the benefits and drawbacks of finance facilitating tools, such as public equity, debt and guarantees.

Benefits of tools to facilitate finance

In cases of missing liquidity or high risk, tools to facilitate finance have several benefits. First, public equity and debt can “signal” to private actors that risk-averse public institutions are investing in low-carbon technologies. This “signalling effect” may leverage private capital even when public funds are invested in the same terms (risks, expected return) as private funding. Second, public finance instruments can cover risks that hinder private actors to invest, e.g. by setting up partial guarantees or other insurance schemes for low-carbon investments, or by taking first losses when investing. Third, lending to financial intermediaries for on-lending can increase the liquidity of financial flows, particularly in countries with less advanced financial markets. Fourth, when applying innovative structures such as a large public-private fund of funds, public finance may even crowd-in very risk-averse investment capital (e.g. pension funds) and leverage private capital at several levels: at the fund-of-fund, the investee fund and at the project level.

Through all these possibilities, tools to facilitating finance can leverage large sums of private capital, both debt and equity. Some of the interviewees argued that public funding used via finance facilitating tools can leverage up to 10-20 times more private funds compared to mobilising public finance. While these claims may be exaggerated (see reasons below), the potential is significant.

¹⁰ Because of the same reasons (high costs, limited funds), some new ideas to subsidise feed-in tariffs in developing countries with international public funding (Deutsche Bank Group, 2010) will hardly gain attraction.

¹¹ In cases of no or low development benefits, low-carbon technologies are very likely to be “additional” as implementing them provides no local benefits for developing countries.

The just described benefits have yielded hope that finance facilitating tools can leverage the hundreds of USD billions of low-carbon investment needed for the 2-degree-path in developing countries. However, for doing so, finance facilitating tools would have to overcome severe challenges, such as the diversity of risks, lack of deal flow, substitutability of return-enhancing tools and free-riding issues.

Diversity of risks

Low-carbon investors face several risks in developing countries, ranging from policy to commercial risks, such as technology and market risks. Risks of low-carbon investments in developing countries are high, both because of novelty risks of applied technologies (unfamiliarity and real risks) and country-related risks (e.g. rule of law, political stability and financial market). Many low-carbon technologies also face severe policy risks due to the need for public policies to address incremental costs.

Assessing the different available tools (equity, debt, guarantees, and insurance schemes) shows that all types of risks and risks at different stages of technology development can be covered to a certain degree (see Table 2). Still, risk-coverage is only partial because most public finance institutions (multilateral and bilateral development banks) are risk-averse and also try to avoid moral hazard by sharing risks.

Table 2: Types of risk covered by public risk-reduction tools

	Country-related risks				Policy risks	Technology, project risks		Market risks	
	Unfamiliarity	Economic, financial	Stability, rule of law	Currency	Low-carbon	Construction, operat.	Counter-party	Carbon price	Other prices
Senior Equity	X								
Subordinated equity	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)
Senior Loans	X								
Subordinated loans	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)
<i>Guarantees</i>									
- Comprehensive	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)
- Political	(X)	(X)	(X)	(X)	(X)				
- Counterparty risks							(X)		
Foreign Exchange *					(X)				
Carbon insurances								(X)	

* Foreign Exchange liquidity facility; X means that all risks may be covered, (X) means that the risks can partially be covered

Insufficient deal flow

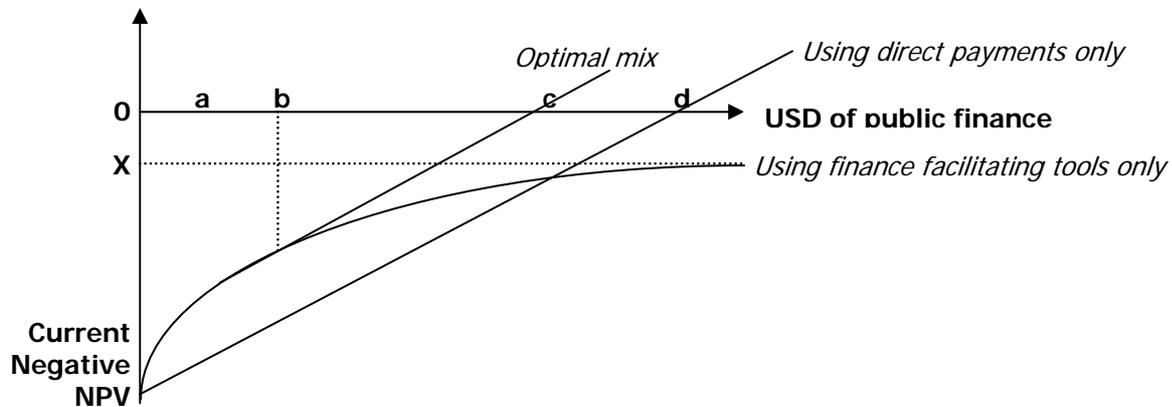
A second challenge for finance facilitating tools is the "deal flow"; or the question whether enough bankable low-carbon projects are available for tools facilitating finance. Currently, the deal flow seems to be large enough for the few existing public finance instruments, particularly in advanced developing countries. However, in less advanced economies, technical assistance and capacity building have to be employed to increase the number of bankable investment opportunities. Furthermore, the deal flow will become a major issue when finance facilitating tools are more widely employed. For assuring enough investment opportunities for a 2-degree path capacity building will not be sufficient; an improvement of the whole enabling environment is needed, including the business environment, the investment climate and ambitious climate policies increasing relative returns of low-carbon technologies (see below).

(Non-) substitutability of direct payment tools

Some finance-facilitating tools (reducing risks) will be more efficient than direct payment tools (addressing incremental costs) as funds can be leveraged by using little or no public subsidies. However, once the most efficient tools are used further risk-reducing tools will be less efficient, which means that finance facilitation has a decreasing marginal impact on increasing the net present value (NPV). In order to use public finance most efficiently, finance facilitating tools should be applied as long as their marginal impact on the financial

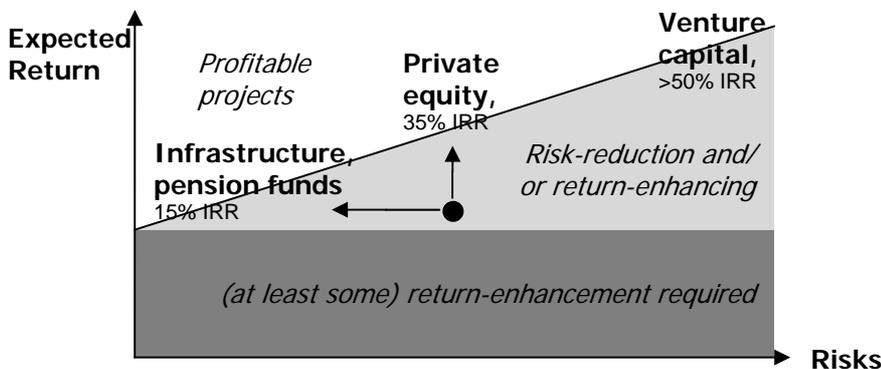
gap is still larger than the marginal impact of direct payments tools (until point **b** in Figure 2), while for the remaining gap, direct payments tools should be employed (**c-b**). By this, the costs of making the Net Present Value (NPV) of a project positive is only **c** and not **d**, as when we would only apply direct payment.

Figure 2: Relative efficiency of finance-facilitating and direct payment tools



This reasoning applies for projects where expected return is already high enough (see light grey area in Figure 3). For many technologies, such as solar photovoltaic plants and carbon capture and storage (CCS), expected returns will be so low (or even negative) that risk-reducing (finance facilitating) tools alone will not be sufficient to make the project bankable. In such cases, direct payment tools are needed. In contrast, for some projects in the light grey area, it will be most efficient to use finance-facilitation (risk-reducing) tools only to leverage funding.

Figure 3: Making projects attractive for different investors



Source: own graph, using required return data from Justice (2009)

Free-riding effects and moral hazard

A fourth challenge for finance facilitating tools is the occurrence of two unintended effects - free-riding and moral hazard. First, free-riding emerges when public finance supports investments that would have happened anyway. This means, in case of finance facilitating tools, that private capital may be crowded out and risks already covered by the private sector are now taken over by the public. Second, in case of guarantees, moral hazard may be a problem – managers may behave more risky when their projects are covered by a guarantee. Existing public finance instruments use several tools to minimise free-riding effects and moral hazard: e.g. only part of the risks are covered and thorough due diligence is applied, which both enables to identify and deter investors that do not really face a finance access problem.

Taking more risks without jeopardizing the credit rating of public institutions

During the interviews, we identified a fifth challenge: Public finance institutions are often very risk-averse due to their need to preserve their high credit rating to raise capital on the financial market. Therefore, they often do not cover substantial risks when employing debt, equity or insurance tools. Only recently, some public funds have started to cover more risks, e.g. the Global Energy Efficiency and Renewable Energy Fund (GEEREF) or the German Global Climate Partnership Fund. The risk-taking is made possible by public grants backing the subordination of public investments. If finance facilitating tools are to realise their full potential, then risk-taking has to be expanded. While purists may oppose “subsidies” for risk-taking, such use of public money may be comparably efficient as public funding can be re-invested once loans are paid back or equity is withdrawn.

Finance facilitating tools as important complement

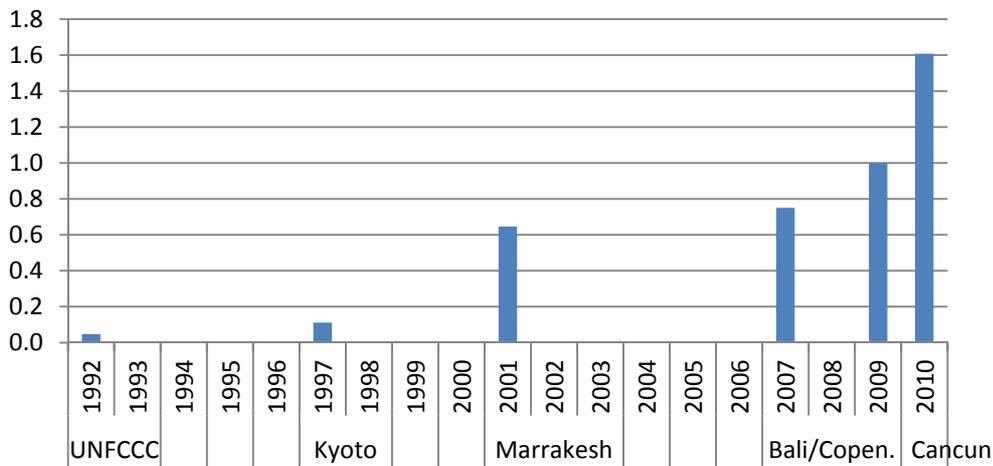
Summing up, finance facilitating tools are an important part of a successful policy mix to drive low-carbon development because they can reduce risks, increase financial liquidity and leverage substantial private capital. However, they face several challenges – deal flow problem, non-substitutability of return increasing tools and free-riding – and are, therefore, not a “game changer” in climate policy. For enabling developing country investments compatible with the 2 degrees target, more ambitious climate policies, including Northern targets and Southern NAMAs, are required.

While finance facilitating tools reducing risks cannot manage the transition to low-carbon development on their own, they are still an important complement to carbon pricing, which cannot address the “access to capital” barrier. This “finance problem” will probably persist, even under very high carbon prices. Therefore, the use of risk-reducing tools may be further expanded. Apart from the further exploration of existing tools, such as public-private equity funds, there is also potential in shifting World Bank guarantees from fossil to renewable fuels. Furthermore, policy makers may explore the use of carbon price insurances and green bonds issued by emerging economies but backed by Northern government guarantees.

Capacity building

Capacity building has emerged from being a side issue in the Framework Convention in 1992 to being a major topic in the Copenhagen Accord and Cancun Agreements (see Figure 4). However, capacity building has been mainly related to emission inventories and adaptation, while the business sector and low-carbon investment have not been at the centre of discussion. Despite this, bilateral and multilateral institutions have also directed capacity building to the private sector in the past.

Figure 4: “Capacity building” mentioned per page of UNFCCC document



Source: Own analysis of UNFCCC (1992, 1997, 2001, 2008, 2009, 2010b)

There are two types of capacity building that are relevant for leveraging private funds. First, capacity building for carbon markets, which may indirectly leverage private capital by improving access to international carbon finance. Second, capacity building targeting the business sector, which can leverage funds by reducing information barriers (e.g. via business development services or information platforms). We have studied the prevalence and effectiveness of these two types of capacity building.

Capacity building for carbon markets: successful but to be downsized and shifted

Capacity building for the Clean Development Mechanism (CDM) has been acknowledged as one of the 14 strategic areas of capacity building in the Marrakesh Accords (UNFCCC, 2001). Soon after the set-up of the CDM in 1997, it became clear that awareness of the new financing tool had to be raised and knowledge on the complicated rules had to be transferred.

With more than 100 million USD spent on CDM capacity building in the last 15 years, major lessons can be learned regarding effectiveness: pure awareness raising workshops have not been sufficient; successful programmes have combined awareness raising, institution building and concrete project development (Okubo and Michaelowa, 2010). Unfortunately, the activities have often been supply-driven and donor competition as well as lack of coordination by recipients has led to overlaps of capacity building programmes. Nevertheless, a preliminary regression analysis we have conducted shows a positive impact of CDM capacity building (invested money) on the number of registered CDM projects in Least Developed and African countries. Similarly, the combination of all three steps of capacity building (awareness raising, institution building and projects development) in a country has a positive impact on the chances to have at least one registered CDM project. To sum up, while CDM capacity building has been important and partly successful, several improvements can be made.

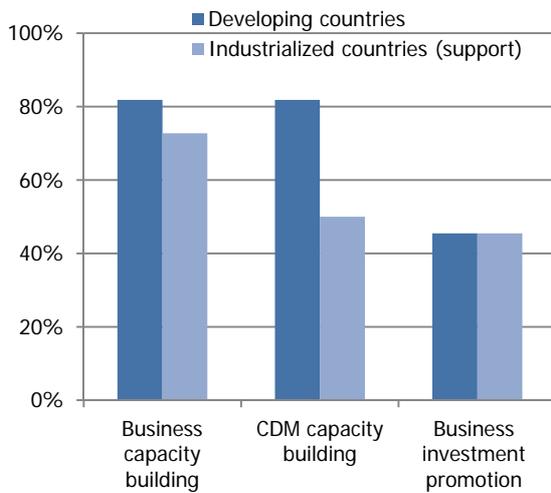
As derived from the literature and some expert interviews, CDM capacity building should be in the future more demand-driven and focus on real needs such as access to finance, data collection and understanding of the E+/E-rule that specifies which domestic mitigation policies need to be taken into account when assessing baselines and additionality of CDM projects. As basic capacity is now available in most developing countries, the level of CDM capacity building funds can be decreased and remaining programmes may focus on Least Developed Countries (who are the only ones with unrestricted supply to the European Emission Trading System post 2012) and Programmes of Activities, which is an interesting stepping stone to NAMAs and sectoral programmes and has not yet reached its full potential.

In contrast to the CDM, capacity building for new market mechanisms will have to be stepped up in the next few years. However, the extent of this will be dependent on the rules and introduction timing of new market mechanisms. Until a major decision is taken at the UNFCCC level, capacity building activities for new market mechanisms can be focused on promotional and pilot-phase testing activities. Later on, large capacity building programmes have to be set up in the areas of data collection, verification, institutions, policies and financing. Initial capacity building for new market mechanisms can easily cost 1 to 5 billion USD and, thus, coordination is needed early on to avoid duplication of efforts.

Capacity building for the business sector: to be acknowledged, researched and promoted

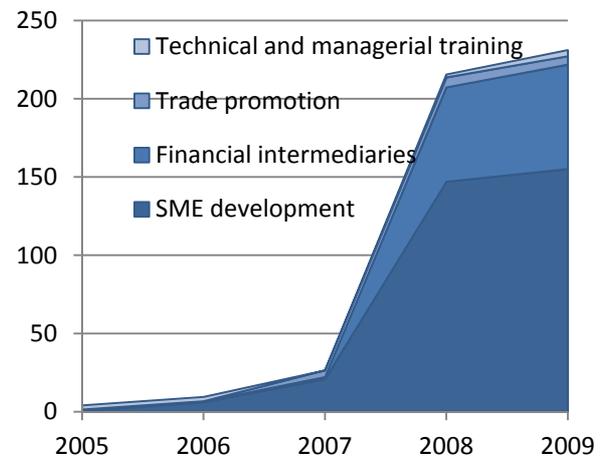
The capacity gaps of Southern businesses are hardly studied and not a key target of the current capacity building frameworks under the UNFCCC. This is somehow in contrast with 80% of examined national communications mentioning capacity building for the business sector (see Figure 5) and the steep rise in ODA disbursement for business-related capacity building activities, particularly the development of Small and Medium Enterprises (see Figure 6).

Figure 5: Share of countries mentioning business-related CB activities in National Communications



Source: for developing countries: sample of eleven 2nd and 3rd national communications of non-Annex-1 countries, as documented on UNFCCC (2011a); for industrialized countries: 5th National Communications of Annex-2 parties, as documented on UNFCCC (2011b).

Figure 6: ODA disbursement for business-related climate change activities (2008 Million USD)



Source: OECD (2011); SME = Small and Medium Enterprises

Business-related capacity building needs are mentioned by at least half of developing countries' National Communications and all four studied National Capacity Self-Assessments (China, India, Kenya, and Peru). Peru even mentions in its NCSA that capacity needs of the business sector are poorly understood (Stadelmann and Michaelowa, 2011). This points to two conclusions; first, the role of private sector capacity should be acknowledged within the climate negotiations and, second, more private sector capacity building activities are needed.

From the few existing capacity building activities targeting the business sector, some lessons can be learned according to the literature: there is a need for realistic capacity building targets, a clear target audience, country-driven processes and the focus on promising sectors. Success has primarily been achieved when capacity building was combined with financing instruments, which also underscores the findings in the CDM section that capacity building has to be demand-driven. Capacity building is an important complement to finance facilitation and coverage of incremental costs but employing capacity building on its own "in the desert" hardly leads to a sustainable impact.

For the future, a more thorough assessment of capacity gaps is needed and successful tools (e.g. energy service companies, and the development of small-and-medium enterprises) should be applied in new sectors and countries. Furthermore, new ideas such as clean technology engineering schools could be tested. Wherever possible, the new Clean Technology Center & Network under the UNFCCC should incorporate and build on existing capacity building initiatives rather than creating new structures.

Building an enabling environment

The creation of an enabling regulatory environment is needed to address the fourth barrier of low-carbon investment: regulatory barriers. "Enabling environment" is a vague concept and understood differently; some authors use other words such as "enabling investment framework" or "investment grade policies". We have understood it in an encompassing manner, including not only the core business environment (e.g. customs, taxes and regulations for operating businesses) but also the broader investment climate (e.g. infrastructure, rule of law, education) and targeted climate-change policies (see Table 3, first column).

Our analysis of existing ODA activities, using data from the OECD (2011), as concluded that climate-change activities focus on targeted policies and sometimes the investment framework, while the core business

environment is rather neglected (see Table 3, second column). In the future, low-carbon businesses may form a testing field for policies improving the core business environment (e.g. by smoother import and export regulations for low-carbon products). This has the double benefit of incentivizing low-carbon investments and test improvements of the core business environment, without having to change regulations in all sectors. For sure, improving the “core business environment” while mainly rely on reforms that are not climate-specific but that address legal and administrative barriers for all types of business.

For the post-2012 climate regime, Nationally Appropriate Mitigation Actions (NAMAs) should learn from existing targeted policies and incorporate them in order to avoid parallel structures. Furthermore, a step-up of activities is warranted in all parts of the enabling environment, which can both be justified by the low share of climate change programmes in ODA activities and evidence from the literature (see Table 3, third and fourth column).

Table 3: Activities improving the low-carbon enabling environment

Component of the enabling environment	ODA spent 2005-09 [USD million]	% of ODA (2005-09) spent on CC-issues [related purpose codes]	Evidence of importance in the literature
Core business environment	[~300]		
Customs (imports and exports)	2	0.4% ↗ [trade policies]	Trade increases # of bilateral CDM projects (Flues, 2010)
Starting, operating, closing a business	[~300]	[12.3% ↗, SME]	} Importance for the business enabling environment, low ratings of developing countries (WorldBank, 2010)
Labour market (“Employing workers”)	-	0%	
Property entitlements, incl. land	-	0%	
Ease contract agreement / investor protection	-	0%	
Taxes	-	0%	Carbon tax (Baranzini et al., 2000), tax breaks (Wordsworth and Grubb, 2003)
Investment Climate	~1100		
Legal institutions, rule of law	-	0%	Low ratings of DC (WorldBank, 2010)
Education policies, human & institutional capacities	~20-30	1.5% ↘ [advanced training], 0.1% [higher education], 0% training in banking sector	Low CC knowledge is barrier for action (Bord et al., 2000; Lorenzoni et al., 2007)
Financial markets, access to finance	~100	0.3-2% ↗↘ [informal; formal financial intermediaries]	Domestic capital formation increases # of CDM projects (Flues, 2010)
Macroeconomic policy framework, political stability	-	<0.5% [democratic stabilization]	Political freedom increases # of CDM projects (Flues, 2010)
Infrastructure (energy, transport, waste)	~950	0%	Infrastructure important for mitigation in several sectors (Metz et al., 2007)
Targeted policies (climate-specific)	~1400		
Cluster / sectoral policies	~950	0.4%, 13%, 34% [industrial, energy, forestry policy]	Many, Altenburg (2011) for insufficient incorporation of CC in industrial policy
Targeted research & development policies	~100	3% ↗↗ [techn. research], 36% ↗↘ [energy research]	Many (e.g. Halsnæs et al., 2007)
International cooperation on low-carbon technology	~10	0.4% ↗ [trade policies]	Grubb (2004), UNEP (2010), Benioff et al. (2010), UNFCCC (2010a)
Business development (services)	~350	0.1% ↗, 1.3% ↗↘, 12% ↗↘ [business support services, industrial dev., SME]	Effective if demand-driven (Sievers and Vandenberg, 2007)

Sources for ODA: OECD (2011). Explanations: CC = Climate Change, DC = developing countries. Arrows shows tendency from 2005 to 2009. Arrows going first up and then down indicate increase between 2005 and 2008 but decrease in 2009 (either disbursements or commitments).

Is the leverage factor a good indicator for efficiency in mitigating greenhouse gases?

While clearly large volumes of private investments will be needed to achieve agreed climate goals (e.g. the 2 degree target), it is not obvious if efficiency in leveraging private funds always means enhanced efficiency in reducing GHG emissions.

To explore the correlation between leveraged funds and reduced emissions, we have studied data of the Clean Development Mechanism (CDM) as market mechanism and the Global Environment Facility (GEF) as public funding instrument. Those two channels just represent a minority of current climate finance flows (also consisting of bilateral grants and multilateral loans). Nevertheless, analysis of CDM and GEF is interesting because of two reasons: First, they provide project level data on CO₂ reductions and leveraged funds, which is missing for other channels. Secondly, they are similar to other funding channels. The GEF's instruments are similar to the ones of other public institutions as its projects are implemented through multilateral agencies. The CDM is the fundament for future, potentially much larger carbon market mechanisms, and has – as private-sector based instrument – similar challenges than public funding aiming to leverage private investments.

Overestimated ability of climate finance to leverage funds

The efficiency in leveraging funds can be measured by the leverage factor (also called “leverage ratio”). While there are different definitions for the leverage factor (see Brown et al., 2011a for a recent overview), we define it here as the “ratio of leveraged (non-climate related) public and private funding to leveraging climate finance (so public funds or carbon market payments)”¹².

Our comparison of actual project level data with leverage factors mentioned in the literature concludes that leverage factors in the range of 8-15 as reported in the literature are probably exaggerated (see Table 4). For instance, the CDM only achieves a leverage factor of 3-4.5, which is less than half of what is sometimes claimed. In case of the GEF, the official leverage factor is 6-7 but only half of the leveraged co-funding is private capital, while the other half are public funds, which will often be invested anyway. Therefore, the real leverage of the GEF is probably in the same range as for the CDM. In case of the Clean Technology Fund (CTF), the official estimate of leveraged funds even includes carbon market payments, which can hardly be seen as leveraged (Brown et al., 2011b). If we also subtract public funds claimed to be leveraged, we arrive at a leverage factor below 3. While the subtraction of all public funds may be too conservative (as some funds may indeed be additional) the amount of leveraged private funds may also be overestimated, as some funds would have flown anyway (see additionality discussion in the CDM).

Hence, policy makers should be less optimistic about the leveraging ability of climate finance: in the end, every funding source claims to leverage the other finance flows, and high leverage factors indicate that the private flows may have been invested anyway; e.g. leverage factors of more than 10 simply mean that more than 90% of the investment costs are covered by other finance sources. Leverage factors of 2-4 as mentioned in the 2009 UN Climate Financing report seem to be more reasonable. Tools for facilitating finance may leverage higher amounts of private finance but additionality has never been studied and finance facilitating tools may face decreasing returns (see above).

¹² We do not distinguish between international and national funds here; both can be “leveraged”.

Table 4: Leverage factors in the literature and according to our own assessment

Leveraging institution	Leverage factor			Leveraged funds (only private in our estim.)	Leveraging funds	Source
	Our estimation*	Self reporting	External estimation			
GEF	3-3.5*	6.2		Private/Public	Grants	GEF (2010)
World Bank			3	Private/Public	Loans	Cundy (2006)
CTF	2.6*	8.4		Private/Public	Loans	CIF (2010)
General			2-4	Private	Grants/Loans	UN (2010a)
Public			3-15	Private/Public	?	UNEP (2009)
CDM	3-4.5		<9-10	Investments	Carbon credits	Hepburn (2009), Hosier et al. (2010)

*Including only private funding leveraged; CTF = Clean Technology Funds

Leverage factors as questionable indicator for mitigation

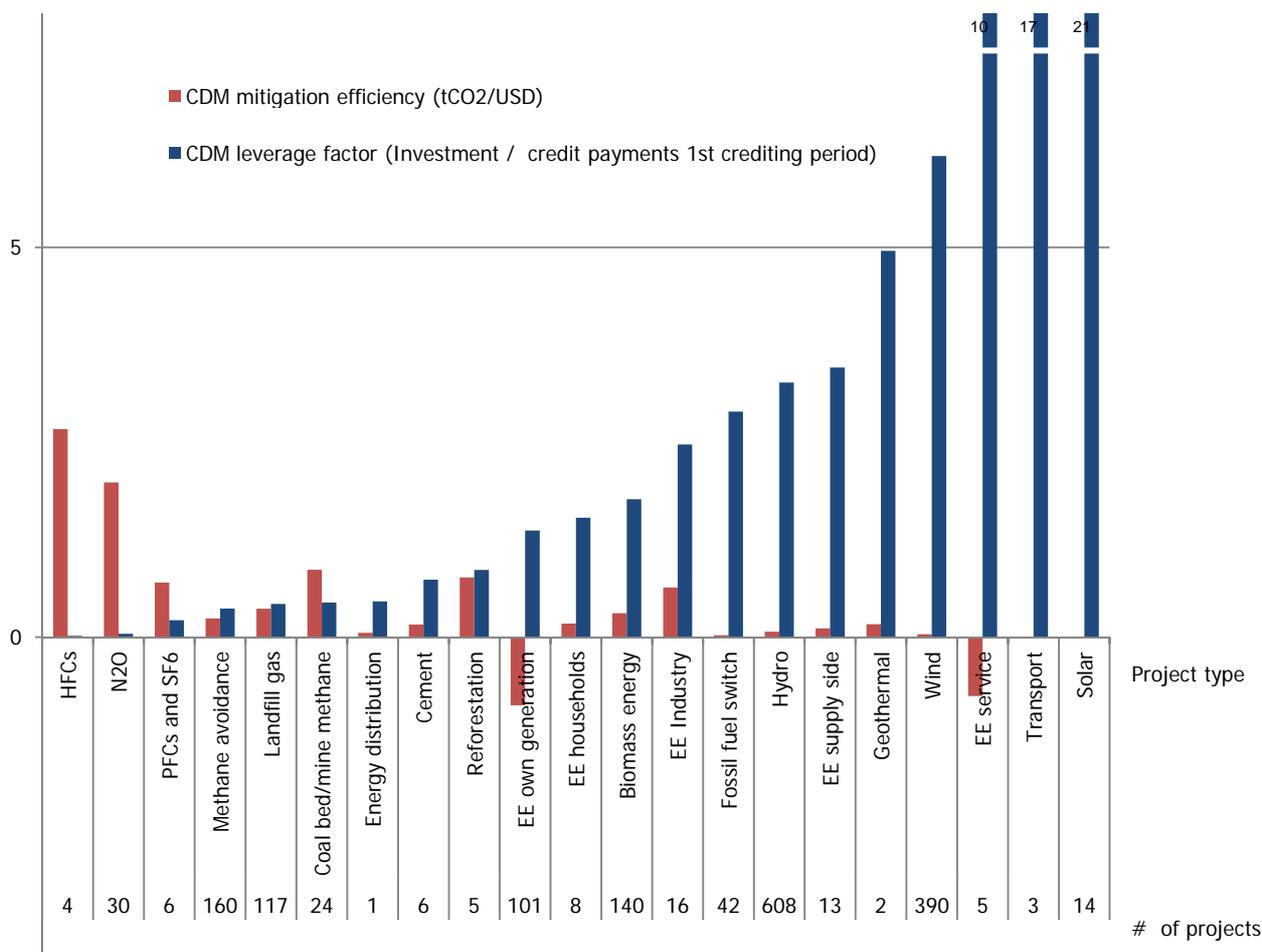
Our analysis of 232 CDM projects and 370 GEF projects concludes that the leverage factor is not a convincing indicator for mitigation efficiency. In the case of public institutions, leveraging funds may be beneficial for enabling more GHG reduction activities, but the correlation between efficiency in leveraging funds and GHG reductions, while positive, is not statistically significant. When only looking at leveraged private funds (analyzed with a sub-sample), the correlation between leveraging and mitigation efficiency is almost significant but a larger sample is needed to confirm this, as the correlation becomes statistically clearly insignificant, if we control for Chinese involvement.

For the CDM, we even have some indications that there is a leverage paradox: a high leverage factor can mean lower mitigation efficiency (see Figure 7). First, industrial gas and methane projects achieve high mitigation efficiency (tCO₂/USD) but only low leverage factors, which makes sense in theory as all investment costs can be covered by the CDM. Second, if we take payments for CDM credits (expected credit value) as leveraging part, low-mitigation-efficiency projects tend to have the highest leverage factors. Thirdly, if we take payments for abatement¹³ as leveraging part, then projects with very high leverage factors have high mitigation efficiency but are also more likely to be non-additional and, therefore, may not reduce emissions at all (not shown in Figure 7). Overall, no matter which definition we take, there is no (statistically significant) correlation between efficiency in leveraging funds and reducing greenhouse gases.

The only type of project where high leverage factors may mean higher efficiency in mitigating greenhouse gases are energy efficiency projects with negative incremental costs. In those cases, very low (or no) payments are needed to cover incremental costs. However, in such cases, other barriers like risks or information barriers exist and overcoming those barriers will require further funding.

¹³ Payments needed for covering incremental costs; CDM payments are often higher (e.g. in case of HFC, methane projects or energy efficiency), while in other cases (e.g. solar energy and other renewables) payments are often lower.

Figure 7: Comparison of leverage factor and abatement achievement per project type (CDM)



Sources: Castro (2010) for mitigation efficiency (we use the inverse of their marginal abatement costs calculation, mean values, for credit income of 1st crediting period), URC (2011) for data on investments and credits. CDM credit value was estimated at 13.3 USD, see Stadelmann et al. (2011) for details. Negative efficiency means that the projects have negative abatement costs.

We conclude that policy makers should hesitate about setting a high leverage factor as a major goal of climate finance. Such a goal could mean that project types with high abatement cost are promoted and low-cost options are crowded-out. While promotion of high cost options with high leverage factors and long-term mitigation potential (e.g. solar energy) is needed as well, this does not mean that high leverage factors are beneficial by themselves.

As the CDM and the GEF represent just a part of the climate finance architecture, it would be desirable to study the efficiency of other mechanisms and instruments to reduce GHG and leverage private funds. Interesting fields of study are loans of development banks, for which data collection may be feasible, while it may be more difficult to collect data on public equity and guarantees.

Accounting for (leveraged) private finance

While studies have closely examined data on *public* climate finance they have left data on *private* climate-related funding flows largely unexplored. This is surprising, as there is wide acceptance for a key role of private finance in achieving low-carbon development, given that the private sector is responsible for the majority of investments in developing countries. Furthermore, accounting for “private finance” has also received a political dimension in the context of the goal of industrialised countries to mobilise USD 100 billion

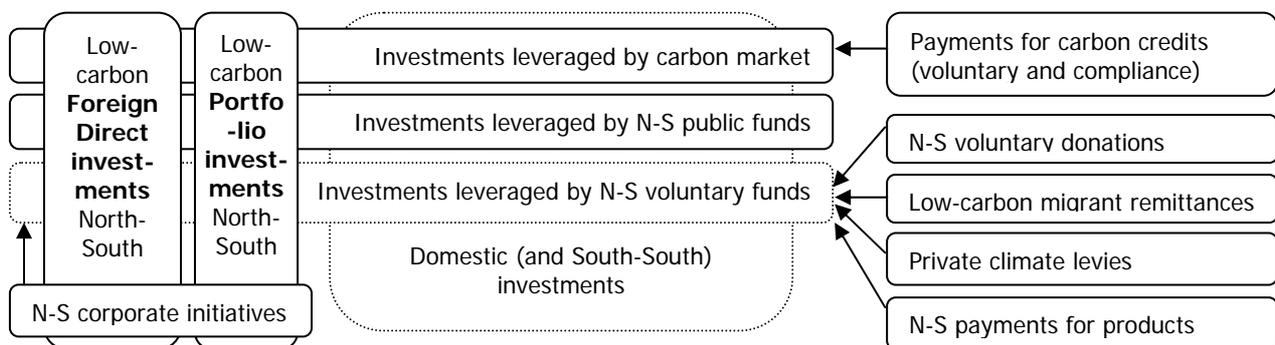
of public and private finance to developing countries by 2020, on an annual basis. In this context, tracking private financial flows for climate finance is a precondition for transparency, improved access to finance and learning from successful programmes.

The existing literature has identified the following research gaps: definition of different private climate funding types, availability of data, the system for tracking flows, and criteria for including financial flows in the USD 100 billion figure.

Private climate flows: more than just FDI and payments for carbon credits

While most scholars and policy makers mainly analyse Foreign Direct Investment (FDI) and payments for carbon credits, we have identified a whole range of private finance related to climate change. Among investments, FDI is complemented by other investment flows such as portfolio investments, which refer to cross-border investments not taking substantial control of foreign companies. Furthermore, rather than focusing on North-South investments, we can also examine investments in Southern projects that have been mobilised by industrialised countries through public funding or carbon market payments. Then carbon market payments can be split into different categories: payments for abatement costs, transaction costs, and rents as well as payments above market price. Last but not least, voluntary climate funds are often neglected: beside voluntary offsets and private climate finance levies we may also think about climate-friendly migrant remittances¹⁴, private donations, corporate initiatives and payments for low-carbon products. Such payments for low-carbon products are relevant, as industrialised countries have increased their import of emissions-intensive products to an extent that their total consumption-related emissions have increased. One of the accounting problems is the overlapping of some types of finance; e.g. funding leveraged by carbon market payments are also accounted as foreign direct investments (see Figure 7).

Figure 8: Overview of private climate-relevant flows for low-carbon development



N-S = North-South

Data on CDM available, while investment figures and data on voluntary funds missing

We estimate that, in the years 2008-2010, annually USD 60-160 billion of private climate finance is flowing North-South or is invested in developing countries as consequence of industrialised countries' actions. The broad range of these estimates indicates the wide uncertainty and low quality of data in many of the categories just mentioned. Quality of data is best for carbon market payments (~USD 2 billion p.a.) and investments leveraged by carbon market payments (USD 15-30 billion per year¹⁵). While the number of carbon credits is exactly known, the credit price is only approximately known and the investment figures would be enhanced by knowing the exact year of investment. Less data is available for low-carbon FDI (roughly USD 30-40 billion p.a., as estimated by UNCTAD(2011)) and investments leveraged by industrialised countries' public funds (USD 20-90 billion p.a. - the large range is due to uncertainty on

¹⁴ We are aware of several cases where migrants invest in or finance low-carbon technologies in their home countries.

¹⁵ This does not mean that the CDM leverage factor is 7.5-15 in case of the CDM (the leverage factor of 3-4.5 (as calculated above) is correct). The reason for the discrepancy in figure is that investments are taken place at the beginning, while credit payments will periodically come in the next 7-10 years. Even if no investments will be leveraged by the CDM any more, CDM payments will still be flowing in for years.

climate benefits of public funds and public-private leverage ratios¹⁶). Even less is known on voluntary funds, where only voluntary offsets and private levies for climate finance are confidently estimated at USD 0.25 billion per year. For other voluntary flows, no data on climate-friendliness is known but billions are potentially paid; e.g. North-South migrant remittances amount to USD 150-200 billion (UNCTAD, 2011) and private donations reach USD 50 billion per year (Hudson Institute, 2011).

Advantages of a decentralised tracking system with strong guidance by the UN

This is a complex area to attempt to fathom, but international financial promises require some kind of system for tracking the level of different types of financial flows. Buchner et al. (2011) provide two straw-man proposals for tracking climate finance, one with all information flowing through national communications to the UNFCCC, and a one involving international institutions directly reporting to the UNFCCC. Our analysis of different institutions concludes that a system relying on data of international organisations rather than national reporting has several potential advantages: experience in collecting data, established tracking systems, speed of release through real-time updating, and consistency of categorisation, which ensures comparability of data. Annual or biennial national communications may have a complementary role, providing additional data where needed and on a voluntary basis. The UNFCCC will certainly have central functions such as analysing (or even verifying) reported data, setting up definitions and procedures for tracking and analysing private flows, and finally providing guidance to data collecting institutions, which may include private actors. Some of the functions (especially the more technical ones) may be delegated to the new Standing Committee on Climate Finance, whose role is still to be defined. Any tracking system will have to deal with the challenges of overlaps in data collection, confidentiality barriers and assuring that the COP has the authority to define climate finance. We imagine that a system where tracking and verification rules are set by the UNFCCC, where experienced and independent institutions collect data and where reporting is regular but organised efficiently may deal with these challenges.

Inclusion in USD 100 billion: the solution is neither none nor six criteria

Including all private climate flows in claims of meeting the international goal to provide USD 100 billion by 2020 will not be meaningful, as private flows relevant from a North-South perspective may already exceed USD 100 billion today, and some private funds may not be steered by climate policy. Therefore, some private funding types may have to be excluded from being counted in meeting that pledge, using criteria that can be politically agreed as valid. As three initial criteria for what should count towards meeting the Cancun Agreements, we propose those which can show *additionality* (mobilized by public actions), *predictability* (some stability over time), and basic *equity* (no negative redistribution and finance to the most vulnerable). Furthermore, three other criteria may be applied. First, that there be "*no double counting* with emission reduction targets," as this would further decrease the already low ambition of international pledges. Second, private finance should "*address barriers*" - as finance flowing after investment barriers have been removed do not make any difference. Finally, it must be required that there be reliable and complete *data available to verify* the level of funding.

Only two funding types fulfil all six criteria (see Table 5): carbon market payments that go beyond the standard market prices, and private levies for private finance, which together amount to less than USD 0.15 billion per year currently. As this may not be the level of private finance envisioned in the Copenhagen Accord, and applying very strict criteria will make industrialised countries unwilling to still strive for the USD 100 billion target, policy makers may have to exclude some criteria. If "double counting" is excluded then carbon market payments are part of the USD 100 billion, but the level of private flows will not exceed USD 2 billion at present. If we exclude "addressing barriers", then leveraged private finance and some low-carbon FDI are included, raising the private finance number potentially above USD 100 billion, already today. This shows that the selection of criteria is absolutely crucial for the relevance of climate funding targets.

¹⁶ We assumed a conservative private-to-public leverage ratio of 2-4 and used public finance data from OECD (2011), Kehler Siebert et al. (2010) and UN (2010b)

Table 5: Types of private climate flows assessed against criteria for inclusion in the 100 billion USD figure

Possible criteria →	Mobilisation by governments	Predictability	Basic equity; finance for LDCs	No double counting w. targets	Addresses barriers	Data (current-> potential)
Type of fund ↓						
Climate friendly investments	x/✓	(x)	(x)	✓/x	(x)	(x)->(✓)
- For. direct investment (BAU)	(x)	✓	(x)	✓	(x)	(✓)
- Other investments (BAU)	(x)	x	x	✓	(x)	(x)
- Leveraged by public agencies	✓	✓	(✓)	✓	x	(x)->(✓)
- Leveraged by carbon market	✓	(x)	(x)	x	x	✓
Carbon credit payments (all)	✓	(✓)	(x)	x	✓	(✓)->✓
- For abatement costs	✓	(✓)		x	✓	(x)->(✓)
- For transaction costs	✓	(✓)		x	✓	(x)->(✓)
- For infra-marginal rents	✓	(✓)		x	(✓)	(x)->(✓)
- Above market price	✓	(✓)	(✓)*	(✓)	✓	(x)->(✓)
Voluntary funds	(x)	?	(✓)	✓	✓	(x)->(✓)
- Migrant remittances	(x)	✓	(✓)	✓	✓	(x)
- Private donations	(x)	✓	✓	✓	✓	(x)->(✓)
- Voluntary offsets	(x)	(✓)	(x)	✓	✓	(✓)
- Corporate initiatives	(x)	?	?	✓	✓	x->(x)
- Payments for products	(x)	?	(x)	✓	✓	(x)->(✓)
- Private GHG levies	(✓)	?	?	✓	✓	(x)->(✓)

✓ = fulfilled, (✓) = almost fulfilled, (x) rather not fulfilled, x not fulfilled, * payments above market price may help to promote more expensive projects in LDCs. Therefore, they may rather fulfil the basic equity criterion.

A meaningful political decision would aim for a private finance figure that requires an increase of public climate funds to reach the USD 100 billion by 2020, but this increase must be achievable. Neither including all private flows nor including very few, as given in the case of applying all six criteria, fulfils this requirement for a meaningful political decision. The largest challenge is to define the amount of leveraged investments to be included; too lenient a definition may make the USD 100 billion figure meaningless.

Conclusions

Annual investments in the range of hundreds of billions of USD will be needed for allowing developing countries to follow an emission path that is compatible with the 2 degree global warming target as agreed in international climate negotiations. This study has examined different ways in which international funding flows, including both public and carbon market flows, can leverage low-carbon investments by alleviating different types of barriers. Furthermore, we have analysed the interrelation between efficiency in mobilising funds and reducing greenhouse gases, as well as ways to accounting private finance flows, which is both important for learning and for accountability.

Barriers for investments and public sectors tools: combination is the key to success

We have identified four major barriers for private sector investments in developing countries; incremental costs of technology, access to finance (mainly due to investment risks and underdeveloped financial markets), capacity and knowledge barriers, as well as regulatory barriers. For alleviating these barriers different public sector tools are available, both international and domestic ones. While we have analysed the effectiveness of these different tools separately (see major conclusions below), we have often found situations in which effectiveness was dependent on progress with other tools. For example, finance facilitating tools have limited potential, unless incremental costs are covered and capacity building as well as regulatory reforms take place. Therefore, successful leveraging of private investment will often not be possible by applying one tool on its own but rather using a combination of tools will be required, tailored to the specific technologies and countries (see our country case studies of Peru and Vietnam).

Tools reducing incremental costs: expansion of international carbon markets is needed

In most developing countries, public support is missing to introduce the most efficient tools for addressing incremental costs (cap-and-trade or carbon taxes); most countries even struggle removing their fossil fuel subsidies. Therefore, incremental costs will mainly have to be met by subsidies, such as feed-in-tariffs, which are less efficient due to free-riding effects. Substantial expansion of international subsidies through public funds is hardly imaginable due to high costs and limited public funds. Using international subsidies would be most effective when focusing on very low-cost potential without development benefits (e.g. HFC plants), similar to the Multilateral Fund for the Implementation of the Montreal Protocol. Furthermore, stricter monitoring and verification processes would have to be introduced.

In this situation, international carbon markets will remain a major tool to cover incremental costs. While the Clean Development Mechanism (CDM) as main North-South carbon market instrument has successfully leveraged substantial private investments and reduced emissions, it suffers from several problems, e.g. free-riding, relatively high transaction costs for small projects and the omission of low-cost potential in the building, forestry and transport sectors. As these problems can only partly be remedied by the expansion to CDM Programmes of Activities, also new market mechanisms, such as sectoral crediting will have to be introduced, which may reduce transaction costs, cover further sectors and be a step towards national level cap-and-trade. Still, these new mechanisms will only be more efficient than the CDM, if they can transmit the price signal to the private sector and avoid free-riding by setting conservative sectoral targets.

Facilitating finance: an important complementary tool but more risks have to be taken

Given problems in covering incremental cost, tools to facilitate finance (mainly by reducing risks), e.g. public equity, debt and guarantees, have become fashionable. Indeed, such tools can overcome "access to finance" barriers, which even exist when incremental costs are covered. Finance facilitating tools can leverage private finance in three ways; by signalling that interesting investments opportunities are available, by covering risks and by increasing liquidity in markets that are not fully developed.

While these tools have the potential to leverage substantial private capital, their application and effectiveness is limited due to four challenges: lack of bankable projects (deal flow problem), inability to leverage funds when returns are very low or negative, free-riding, moral hazard, and hesitance of public institutions to take risks. Therefore, finance facilitating tools will be most useful when complemented with capacity building, coverage of incremental costs, and the right regulatory environment. Their impact may also be expanded if the public covers further risks, as successfully applied in newer public-private funds, e.g. GEEREF or the Global Climate Partnership Fund.

Capacity building: to be demand-driven and combined with concrete programmes and finance

Capacity building has received increased attention in climate negotiations, but programmes targeting the business sector have hardly been discussed. While several programmes are implemented by international public finance, there is still potential for expansion, as suggested by the small share of climate-related in total business sector programmes and the capacity building needs mentioned by developing countries. Major lessons can be learned from existing programmes on business sector capacity building: programmes are more effective if they have realistic targets and target groups, if they are driven by demand and in-country processes, and if they are connected to financing of projects.

These lessons are similar to the one of CDM capacity building, which is another way of indirectly leveraging private funds. Here, programmes including concrete project development have been more successful than generic capacity building workshops. While CDM capacity building can now be downsized and focused on Programmes of Activities, more initiatives are needed for new market mechanisms, with the need to spend USD 1-5 billion for capacity building in the start-up phase.

Building an enabling environment: why international actors can do more

In the long-term, low-carbon investment will rely on the right investment framework, also called the “enabling environment”. Setting up “Nationally Appropriate Mitigation Actions”, with specific climate policies, will be the most important part of this. However, also reforms in the core business environment (e.g. customs, administrative burden) and the investment climate (e.g. infrastructure, rule of law) will be needed to generate the right investment framework. While these reforms have to take place in developing countries, international institutions can have an important role in providing know-how and advice. As the share of climate change activities to improve the enabling environment (all parts, core business environment, investment climate and target sectoral policies) is small, substantial expansion is still possible.

Leverage factor: poor indicator for efficiency in reducing greenhouse gases

The leverage factor, the ratio between leveraged funding and public climate finance that mobilises this funding, is often reported as indicator for successful programmes. However, efficiency in leveraging funds may not equal efficiency in reducing greenhouse gases. Indeed our analysis of hundreds of CDM and GEF projects has not showed a statistically significant correlation between the two. In case of the CDM, we have even some indications that high leverage factors may rather mean higher costs in reducing CO₂. This is because projects with high leverage factors tend to be rather not “additional” and low-cost projects that can be financed by the CDM alone have very low leverage factors.

The second conclusion is that leverage factors are often overestimated. While the funding institutions report leverage factors of up to 10-15, the real leverage factors are closer to 3-5 as shown by our project-level analysis. The overestimation is due to the fact that most numbers assume that all involved funding has only flown because of climate finance. This is very optimistic considering the additionality discussion in the CDM and the fact that leveraged funding often includes public money that is mostly invested anyway.

Accounting of private finance: data is missing and not all can be part of the 100 billion USD

Finally, we estimate that USD 60-160 billion of private finance may be relevant from a North-South climate change perspective (years 2008-2010). These financial flows include foreign direct investments (FDI), carbon market funds, investments leveraged by international public sector tools and, as often neglected, a variety of voluntary funds. For most private finance, data is missing or hardly accurate. Therefore, an international system for defining and tracking private climate funds is needed; international organisations (e.g. UNCTAD) may be suited to collect data due to their experience, while the UNFCCC may be the focal point for data analysis and guidance.

It is still undecided, which types of private finance will be considered as part of the 100 billion USD that industrialised countries have pledge to mobilise by 2020 on an annual basis. Including all considered private financial flows would make this target meaningless, as the goal may already be achieved today. It is also not useful to apply all potential selection criteria (additionality, predictability, equity, no double counting, addressing barriers, data availability), as this would limit private climate finance to carbon market payments above market price and private levies due to public pressure, which account for less than USD 1 billion per year today; such a narrow definition of private climate finance is certainly not acceptable for some parties and may induce them to refrain from pursuing the target. Therefore, some criteria will probably have to be

excluded. The most important question is to which extent private investments are included, as they are responsible for the bulk of private climate flows, and including all these investments would mean private climate finance figures already beyond the USD 100 billion target already today.

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