

IMPROVING THE EFFECTIVENESS OF CLIMATE FINANCE: A SURVEY OF LEVERAGING METHODOLOGIES

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This paper is part of a joint study led by a consortium of researchers from Environmental Defense Fund, Climate Policy Initiative, Brookings Institution, and Overseas Development Institute focused on the topic of the effectiveness of climate finance. Other papers in the series set out the current practices used to estimate, measure, monitor and disseminate the impact of public and private climate finance.

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Introduction

Public climate finance interventions often demonstrate the extent to which other public and private money has been 'leveraged' or catalysed as a result of their investment: it is often argued that the higher the ratio, the more effective the use of limited public funds and the more attractive an investment. High leverage ratios can demonstrate that public finance was used to de-risk investment and overcome barriers to encourage greater flows of finance to climate-friendly areas. Yet 'leverage' means many things to different people.

How are different public finance instruments and institutions performing in terms of leveraging further investment to address climate change? While leverage ratios offer a seemingly useful indicator which can demonstrate the relative success of public instruments in encouraging and unlocking further investment, it is almost impossible to compare leverage ratios across different instruments as each calculates leverage differently. This paper surveys the different ways leverage ratios are calculated and reported for climate finance instruments and projects. The survey is meant to serve as a useful starting point to understand what is meant by leveraging, and to offer some guidance around how to create a single methodology that could be used more universally to assess leveraging.

This briefing note is part of a longer research project led by a consortium of researchers from Environmental Defense Fund, Climate Policy Initiative, Brookings Institution, and Overseas Development Institute focused on the effectiveness of climate finance.¹

Understanding leveraging: narrow and broad definitions

Leverage ratios are applied to a variety of financial instruments, financial institutions, and sectoral interventions. The most narrow definition of leveraging (used in generic financial terminology) refers to the ratio of debt to equity financing for an investment - the debt which can be raised against a given equity contribution. This applies across projects and companies, but the same terminology applies to how financial institutions (such as development banks) raise money. Financial institutions apply leveraging terminology to understand how their core contributions (for example money provided by donor governments to a multilateral development bank (MDB)) can be invested in capital markets to create an internal multiplier effect. Similar to leveraging equity to raise debt for a project, a financial institution has the ability to leverage its own capital base against outstanding borrowings and guarantees. So an institution's leverage ratio can be seen as the ratio of outstanding borrowings and guarantees to its capital base.

This raises a key point about leverage of developed country finance, if channelled through multilateral or bilateral development banks: *giving money to such banks for onward lending provides automatic leverage*, since it can be used in call-in capital which then allows much larger lending to occur.

In addition to this type of leveraging, the term is often more broadly applied to a set of instruments provided by a financial institution that encourage and catalyse other public and private investment by reducing investment risk or increasing project returns enough to attract private investors. For example, evidence suggests that a long loan (which can be repaid over many years) offered by an MDB makes a critical difference in the debt service ratio and can tip the balance in an investor's decision to invest. Another example of risk reduction instruments is the issuance of guarantees or subordinated stakes in financing. Such financial instruments can help improve the

¹ Published background papers in the series can be downloaded at the following link: <http://www.climatepolicyinitiative.org/publications>.

risk-return profile of projects and leverage private finance throughout the investment chain, to share and reduce perceived and known risks and therefore enhance access to capital. MDBs also support specific project interventions which can be seen to leverage other investments (for example through support of demonstration projects which reduces technological and regulatory risk).

AGF's methodology on leveraging private sector investment

The report of the United Nation's High-Level Advisory Group on Finance (AGF) marks a prominent example of the use of the concept of leveraging (AGF, 2010), and has derived a methodology for calculating the potential leverage ratio of public interventions to stimulate private investment in addressing climate change. Given that the AGF is neither an investment institution nor type of financial intervention, but rather provides commentary on the available institutions and interventions, it provides a useful starting point for the discussion.

The AGF report (in Work Stream 7 Paper: Public Interventions to Stimulate Private Investment in Adaptation and Mitigation) uses the concept of leveraging to determine the magnitude of total private flows to address climate change. The AGF comments that the magnitude of private finance depends on several assumptions, including the overall estimates of private sector potential based on negative and positive cost opportunities, the total amount of public flows available and the proportion of such public funds used to support instruments which aim to leverage private investment, the amount of carbon market finance available, and finally the leverage factors for both public instruments and carbon market finance.

The report calculates an average leverage factor of 3x for private investment in mitigation activities (AGF Workstream 7, 2010). This leverage factor is derived from an array of public financing instruments at the disposal of donors and interna-

tional financial institutions (IFIs) and the leverage ratios associated with the varying instruments (recognising that the amount of private investment leveraged by public funding instruments varies considerably according to the barrier being addressed, location, instrument used, and project specific characteristics):

- **Non-concessional debt:** AGF reports that the leverage factor is typically in the 2-5x range for non-concessional or partly concessional debt, meaning that annual spending of \$1 will generate private capital investment of \$2-\$5.
- **Debt financed via grant (concessional) funds:** AGF report that grant funds can leverage between 1:8 and 1:10. If invested via MDBs to co-finance projects together with the private sector, grants can raise significant leverage because they can take a high risk without demanding the corresponding returns. It is unclear how the AGF arrived at this leverage ratio of 1:8-10.
- **Equity and guarantees financed via grants:** According to data from the International Finance Corporation's Financial Mechanisms for Sustainability, equity and guarantees financed via grant funds can lead to a leverage of 1:20. Equity investments by MDBs in projects with private sponsors can leverage about 1:8 to 1:10 times debt and equity.
- **Donor financed climate funds (part concessional):** Experience of the multi-donor Climate Investment Funds shows that every dollar of spending results in around \$3 of private sector investment for sovereign guaranteed (public sector) projects and \$8.5 of private sector investment for private sector projects.
- **Carbon offset financing:** The AGF reports that carbon offset mechanism results in significant capital investment leverage. The leverage ratio is taken from the World Bank Development Report 2009 which estimates that 'in addition each dollar of carbon revenue leverages on average \$4.6 in investment and possibly up to \$9 for some renewable energy projects.

It is estimated that some \$95 billion in clean energy investment benefited from the CDM over 2002-08.' Hence the AGF report a leverage ratio for carbon offset financing is 1:4.6 to 1:9. However the World Development Report does not explain how they derived the CDM leverage factor.

- **Forestry:** AGF applies a ball park leverage ratio of 1:5 for forestry projects. This is an interesting approach given the rest of the leverage assessment is done based on financial instruments as opposed to sectors, and does not fit the same methodological framework. The leverage ratio appears to come from the IFC's investment in forestry, which is \$1.2 bn of direct investment over the past 4 years in projects with total capital value of \$6.3bn (1:5 leverage). *This indicates that the leverage ratio is based on the comparison of IFC's investment to the overall capital value of the projects.*

AGF thus applies an 'average' private finance leverage factor of 3x for positive cost mitigation measures as a relatively conservative average of this leverage ratio range, which can be stimulated via MDBs, public instruments, and carbon market flows.

It is important to note that the leverage ratios which form the basis of the AGF average leverage ratio of 3:1 are all derived using different methodologies. It is also important to note that in most cases these leverage ratios are based on generic investments, rather than climate-specific investments, which may play an important factor. Thus, the AGF does not provide a clear methodological approach for leverage ratios but rather takes an average of existing ones applied by a variety of financial institutions and instruments; it takes existing leverage ratios as given, rather than questioning how such ratios were derived.

Different definitions of leveraging in climate and development finance

The following section describes leverage ratio methodologies that have been used by various investment institutions and for different types of finance, and included in various climate finance and development finance literature. This section is organised according to the following studies, financial initiatives and instruments which apply leverage ratios:

- Carbon finance
- Global Environmental Facility (GEF)
- Clean Technology Fund (CTF)
- Multilateral Investment Guarantee Agency (MIGA)
- World Bank Group Infrastructure Financing
- Feed-in Tariffs

Before detailing the different approaches taken in the abovementioned examples, it is useful to provide some general guidance on the leverage ratio methodologies most often used and what this implies (Table 5 towards the end of this paper details the different approaches used by specific funds and financial institutions):

Carbon finance

Most references to leverage ratios of carbon finance come from The World Bank. In their 2010 Issues Brief (World Bank, 2010a) the reported leverage ratio of carbon finance projects to private investment is on average 1:9. The World Bank reports carbon finance leverage based on the ratio of the net present value of the primary transactions of certified emission reductions (CERs), as reported in the Emissions Reduction Purchase Agreement (ERPA), to the total capital investment needed to get the project off the ground (based on the ex-ante projected investment, not on actual project investment). The data comes from The World Bank carbon portfolio where they have confidential information on ERPAs. Because the revenue streams for carbon, as reported in the

Table 1. General leverage ratio methodologies

Leverage definition used	Used by who/applied to what type of public finance	What this approach implies about the finance
Debt to equity ratio	General leveraging methodology used by all financiers	A higher ratio implies that more money has been borrowed to support the equity investment and therefore can increase the scale of the proposed investment.
Ratio of public and private co-financing to climate finance	GEF/CTF/etc for public climate finance	A higher ratio implies that public climate finance has encouraged other public and private investment in climate-specific activities, increasing investment in climate-specific outcomes, which may have discouraged investment in dirtier activities (though causality and additionality of climate finance is either insufficiently demonstrated or not at all demonstrated).
Ratio of total private FDI flows to the net public guarantee coverage issued	MIGA for investment guarantees	A higher ratio implies that the investment guarantee allowed more FDI to flow into the developing country (though causality is often insufficiently demonstrated).
Ratio of the NPV of the carbon finance unit (primary CERs) to the overall capital investment needed for the project	World Bank/carbon finance	Leverage ratios are often assumed to demonstrate how carbon finance catalyses private investment in mitigation projects, yet in reality, the higher the leverage ratio is for a specific project, the lower the likelihood that carbon finance added significant financial value to the project (because the incremental rate of return of that carbon finance is reduced in proportion to additional money leveraged in). The causality and additionality of the carbon finance often cannot be demonstrated. However, it is possible that the carbon finance helped reduce risk for other project investors.
Ratio of overall expected capital investment to the annual incremental cost of financing for a clean project (based on marginal abatement costs)	AGF's analysis of feed-in tariffs	A higher ratio implies that by covering the incremental cost, public climate finance catalyses an increased scale of investment in clean projects and directly shifts the overall capital investment from the dirty to the clean investment. This approach is based on an economic modelling exercise and does not ex-post demonstrate leverage.

ERPAs, are future revenue streams, the calculation involved bringing them to net present value, and then compared against the upfront capital investments needed for the projects. The leverage ratio of 1:9 essentially means that, for the average carbon project, future revenue streams of carbon finance represent 10% of overall project investments.

However, this leverage ratio depends a lot on the given technology. For example, for HFC projects which can be financed solely by carbon finance, there is almost zero leverage because the value of carbon is huge compared to the overall investment needed. In comparison, renewable energy projects have a much higher leverage ratio because such

investments are expensive and the future revenue stream of carbon is only a small portion of the total investment required.

Despite these figures many experts argue that in most cases carbon finance provides a false claim on leverage and that reporting on leverage ratios can be misleading. Leverage ratios are often assumed to demonstrate how carbon finance catalyses private investment in mitigation projects, however in reality, the higher the leverage ratio is for a specific project, the lower the impact of the carbon finance on project economics and therefore the lower the importance of carbon finance for that particular project (Stadelmann et al, 2011;

Table 2. Ratio of investment to net present value of ERPA in World Bank CDM portfolio

Technology/project type	Ratio of investment to NPV of ERPA
HFC	0.02
Energy Efficiency in households	0.76
Landfill gas	1.04
Other waste management	3.84
Land Use and Forests	6.95
Biomass energy	12.22
Wind	11.60
Hydro	16.47

Source: Adapted from Kossoy and Ambrosi (2010)

personal communication with Alex Kossoy, 2011). The causality (or additionality) of the carbon finance therefore cannot be demonstrated and carbon finance tends to be the 'icing on the cake' rather than providing any real financial leverage.

Any interrogation into how carbon payments change project returns demonstrates that in many cases, financial returns are hardly impacted at all (Schneider *et al*, 2010). Project leverage ratios are inversely proportionate to the carbon finance contribution to the internal rate of return, because the lower the ratio of the carbon finance is to the overall investment, the lower the internal rate of return (IRR) share will be for the carbon finance. This means that from a financial perspective, projects with high leverage ratios cannot demonstrate that the carbon finance had a significant impact on the overall IRR of the project and therefore on the project's profitability. Therefore the higher the leverage ratio, the lower the carbon finance contribution to the IRR,² and the less likely that carbon finance can prove financial additionality to the project.

This points to the fact that, while leverage factors may be one useful parameter, it should certainly not be the only parameter to assess the utility of finance flows, as carbon finance can influence project economics in a number of ways. In partic-

² Conversely the lower the leverage ratio, the higher the IRRs on carbon finance, as is the case with HFC investments.

ular, carbon finance can help absorb or allocate risk differently. Project equity provided through carbon market finance, for instance, can absorb many of the risks that could trouble debt investors and therefore catalyse additional project debt or even equity. There is substantial evidence that low-carbon projects have benefitted (in different levels of magnitude) from carbon finance revenue streams that allowed several of them to access underlying finance (with debt or local equity) and become operational (personal communication with Alex Kossoy, 2011). Carbon revenues are a source of hard currency revenues (US\$ or EUROS) to several projects that are exposed to currency devaluation risk in developing countries (i.e., electricity tariff in energy projects is set up and adjusted in local currency), and thus have not been attractive to international banks. Thus, in order to assess the impact of a carbon finance programme, the analysis of leverage must also consider the structure and conditions of the carbon finance and their impact on risks and returns faced by potential private sector investors.

Global Environmental Facility

The Global Environmental Facility has in the past used the term leveraging to imply co-financing. GEF requires that co-finance from other public agencies is provided for GEF projects as it (a) expands the resources available to finance environmental objectives; (b) is a key indicator of the strength of the commitment of the counterparts, beneficiaries, and Implementing and Executing Agencies to

Table 3. Incremental IRR from carbon revenues in the World Bank CDM portfolio

Project type	Emission reduction prices	Purchase period	
		5y	10y
Renewable energy	\$10	1%	2%
	\$20	2%	4%
Solid waste	\$10	52%	62%
	\$20	124%	129%
HFC23	\$10	177%	177%
	\$20	270%	270%

Source: Adapted from Kossoy and Ambrosi (2010)

those projects; and (c) helps ensure the success and local acceptance of those projects by linking them to sustainable development, and thereby maximizes and sustains their impacts (GEF, 2002).

The GEF document 'Financing of GEF Projects' (1996) defines leverage as *'the process which occurs when the use of specified resources for a given objective causes more financial resources to be applied for that objective than would otherwise be the case'* (GEF, 1996). According to this GEF leverage occurs in two ways: *additionality*, when additional resources are mobilized for the objective or *substitution*, when existing resources are channelled to activities consistent with that objective rather than to other activities. GEF therefore considers that project co-financing is evidence of leverage *'only when the co-financier pays for part of the incremental cost (additionality) or, more commonly, pays for part of the non-incremental cost of an activity that is a substitute for the baseline activity'* (GEF, 1996).³ For example, by providing incremental cost financing for a *substitute*, rather than the full cost of just an *add-on* component, GEF can effectively re-direct the non-incremental cost financing and create leverage. Take the following scenarios (GEF, 1996):

- If GEF were to invest in an end-of-pipe water pollution filter for an international waters project, the only new funds flowing to protect the global environment are those provided for the add on component, because the baseline activity is presumed to remain the same. No leverage is obtained through any project co-financing for the associated baseline activity.
- A solar power station costing \$550 million that substitutes for and is equivalent to a coal fired power station costing \$500 million (and assumes the same amount and quality of power would be available for either alternative). In this example, a \$50

million GEF grant leverages another \$500 million that now also flows to the solar technology rather than the oil technology.

Leverage can also occur beyond the project - for example, when the project is replicated or when programmatic benefits are realized. Beyond the project, both additionality and substitution could occur. In the GEF Council co-financing document (GEF, 2002), the following definition of leveraging is applied, and made distinct from co-financing: *'Leveraged resources are the additional resources [...] beyond those committed to the project itself at the time of approval [...] that are mobilized later as a direct result of the project, e.g. for further replication or through programmatic influence. As such, leveraged resources do not form part of the committed financing plan at the outset and so they are not defined as "cofinance."*

Therefore, based on these two documents (GEF, 1996 and 2002), it appears that GEF defines leveraging as finance which:

1. Is additional (when co-financing covers part of the incremental cost)
2. Substitutes finance from one project to another (as in covers the non-incremental cost of an activity that is a substitute for the baseline activity)
3. Is mobilised later as a direct result of the GEF project (e.g. for further replication)

There appears to be some confusion internally within the GEF's definition as to whether or not co-financing can be considered as evidence of leveraging. While one document states that certain type of co-financing can be defined as leveraged finance, the other document (which refers to Definition 3 above) implies that only financing which is mobilised after the fact can be considered as leveraged finance.

An independent assessment of the GEF (GEF, 1998) found that there are important differences between co-financing and leveraging as

³ The non incremental (baseline) cost cannot be said to be additional because the baseline (with respect to which incremental costs and global environmental benefits are estimated) is by definition financially feasible. So co-financing of baseline costs can only be leverage when the GEF supported activity substitutes for a baseline activity, rather than just adds to it.

A few observations about 'highly leveraged' GEF projects

An assessment of the project documents of 20 'highly leveraged' GEF projects was carried out to understand how such projects differ from the less leveraged projects in the GEF portfolio (GEF, 2009). Each of these projects had a promised co-financing of more than US \$240m and a co-financing of more than \$7 per \$1 of GEF grant - was carried out. The highly leveraged projects tend to focus on GEF supported themes such as energy efficiency, transportation, waste water management and land degradation that involve production of a higher level of local and national benefits vis-à-vis generation of global environmental benefits. A high percentage of these highly leveraged projects were implemented by international financial institutions (95%). The assessment shows that highly leveraged projects tended to have:

- Low 'GEF-ability' of co-financing: although on average for these projects \$26 of co-financing was promised per dollar of GEF grant, less than one dollar was for activities that GEF normally supports from its own resources.
- Lower level of integration of co-financing with the GEF supported components. Compared to the other projects where co-financing for non GEF components accounted for 14% of the total co-financing, for the highly leveraged projects 41% of the total co-financing was for components in which GEF had not invested a single dollar.

The fact that highly leveraged projects have low 'GEF-ability' and lower level of integration with GEF components may imply that, given GEF supports only those investments which provide a global environmental benefit, the investments that offer a more direct local or national benefit are likely to encourage more financial leverage.

strictly defined and that the GEF Council and its Implementing Agencies were applying the term in different ways. The independent study team therefore suggested that the following formal and more rigorous definition of leverage should be applied - '*financing in conjunction with a GEF project that supports activities producing global environmental benefit and that would not have been spent in the absence of the GEF project or that would otherwise have been spent in ways that would have contributed to global environmental degradation.*'

Clean Technology Fund

The first cohort of investment plans endorsed under the Clean Technology Fund (one of the flagship funds under the Climate Investment Funds) report a leverage ratio of roughly 1:8.6. In other words, anticipated CTF investments of roughly \$4.3 billion have been linked to other investment resources valued at \$36.7 billion (Zhang, personal correspondence 2011). The following table demonstrates the CTF leveraging calculation:

Table 4. CTF funding

Country	CTF		Co-financing source (\$ mn)			Total cofinancing	Ratio cofinancing to CTF
	Funding (\$ mn)	Government (domestic)	Private	MDBs	Other sources		
Colombia	150	770	1,250	726	100	2,846	19
CSP-MENA	764	740	1,290	1516	1,308	4,854	6.4
Egypt	300	176	636	617	143	1,572	5.2
Indonesia	400	35	1,100	1575		2,710	6.8
Kazakhstan	200		536	534		1,070	5.4

Country	CTF		Co-financing source (\$ mn)				Ratio cofinancing to CTF
	Funding (\$ mn)	Government (domestic)	Private	MDBs	Other sources	Total cofinancing	
Mexico	500	1,425	2,318	1,647	307	5,697	11.4
Morocco	150			800	1,000	1,800	12
Philippines	215	280	165	1,150	935	2,530	11.8
South Africa	500		540	760	550	1,850	3.7
Thailand	245	2,083	1,380	500		3,963	16.2
Turkey	250	640	160	1050		1,850	7.4
Ukraine	350	450	230	1575		2,255	6.4
Vietnam	250	265	1,500	1,180	750	3,695	14.8
Total	4,274	6,864	11,105	13,630	5,093	36,692	8.6

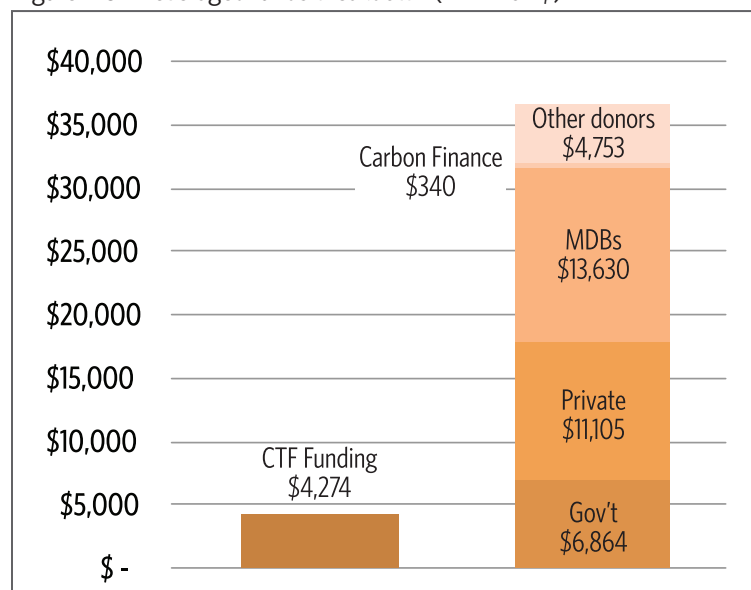
Source: Zhang, 2011

These figures are based on the information provided by the CTF country investment plans. Given that these are *planned* investments, once the different project plans are submitted, there will need to be a reassessment of the figures and leverage ratios, as project financing is likely to be revised. The leverage ratios are calculated based on a straightforward assessment of the planned (gross) co-financing for the investments. Some

of this financing may be viewed as underlying baseline investments, and some may be newly leveraged, additional financing from other sources. In essence (and similar to the GEF experience), there is no difference in understanding between co-financing and leveraging in the CTF context, as it is hard to know if, without the CTF investment, the clean technology projects would still go forward. There is some evidence (based on discus-

sions with CTF civil society observers) that many of the planned investments under the CTF were already planned MDB investments, and that CTF financing opportunistically adds value to these planned investments based on their ability to subsidise costs and provide a financial anchor to the investment plans. Moreover, the pressure for the CTF funds to be programmed quickly added a strong incentive to the MDBs and recipient countries to look for projects that were already in the pipeline to see if any such projects could be 'leveraged' as a CTF investment as it meant the project is able to move to implementation much faster than new projects.

Figure 1. CTF leveraged funds breakdown (in million \$)



Project-level examples of leverage for the GEF, CTF, and World Bank carbon finance

The World Bank's Issues Brief 'Beyond the Sum of Its Parts: Combining Financial Instruments for Impact and Efficiency' (World Bank, 2010a) assesses the leveraging effect of the financial instruments provided by the GEF, CTF and the carbon finance unit of the World Bank. The report highlights project-based leverage ratios, and includes the following project examples:

Project	Dedicated climate finance used			Development finance used	
	GEF	CTF	CF	IBRD/IDA	Other
China Renewable Energy Scale-up Project (CRESP)	\$40m		\$15m or about 1 mtCO ₂ e	\$173m	
climate vs development finance		24%		76%	
China Energy Efficiency Program	\$14m		\$12m or 750 ktCO ₂ e	\$200m	\$371m
climate vs development finance		4%		96%	
Morocco Municipal Solid Waste			\$30m or 2 mtCO ₂ e	€100	
climate vs development finance		19%		81%	
India Chiller Energy Efficiency Project	\$6.3m		\$5.8m or 485 ktCO ₂ e		MLF \$1m IDBI/private \$70m
climate vs development finance		15%		85%	
Mexico: Efficient Lighting and Appliance Project (ELAP)	\$71m	\$50m	TBD	\$320m	\$123m NAFIN + \$22m GoM +\$180m consumers
climate vs development finance		8%		92%	
Mexico Urban Transport Transformation Program (UTTP)	\$13.8m	\$200m	\$50m or about 3 mtCO ₂ e	\$200m	\$868m Fonadin + \$732m private sector + \$225 from cities
climate vs development finance		12%		88%	

These leverage calculations are based on the ratio of the incremental cost to overall capital cost of the project, and equate co-financing with leveraging.

MIGA leverage methodology

The World Bank Group's Multilateral Investment Guarantee Agency (MIGA), an organization that offers political risk insurance to promote foreign direct investment (FDI) in developing countries applies a leverage ratio to its guarantees to demonstrate its ability to promote FDI. The MIGA leverage ratio is the quotient of estimated FDI facilitated by MIGA guarantees and the net guarantee coverage issued. Between 1990 and 2004, MIGA has issued 711 contracts of guarantee for a total

gross exposure of \$12.8 billion. MIGA estimated that the projects it has supported have resulted in FDI of \$51 billion, on average four times the amount MIGA insured for all guarantees (MIGA OEU, 2004).

World Bank Group Infrastructure Financing - leveraging methodology

The World Bank utilizes a methodology to measure project leverage of WBG infrastructure financing.

Project leverage is defined as project cost divided by WBG financing. WBG financing includes lending or grant, IFC private equity, guarantees, GEF financing, and WB carbon finance. Project costs include the WBG financing, the borrower’s contribution, and co-financing by third parties that is part of the project’s legal umbrella. Parallel financing is not factored in because its relationship with the WBG project is hard to determine and available data is often incomplete. In the case where the WBG offers guarantees (such as through MIGA), the amount of the guarantee will be shown as WBG financing, and the WBG-guaranteed amount of financing by other sources will fall under non-WBG financing. The guaranteed amount will be netted out to generate total project cost (World Bank, 2008). Hence, the WBG methodology is focused on overall co-financing, and includes both public and private investors. The methodology looks like it is empirically derived from ex-post data.

Feed-in Tariff (FiT)

A FiT provides income support for technologies that are not yet economically competitive. Often such support is structured as a \$/KWh payment guaranteed for the lifetime of a project. The enhanced income streams are intended to improve the investor returns with the aim to attract significant amounts of private sector capital to build those projects. By financing the incremental cost of a renewable energy, the FiT should enhance returns and thus attract a large amount of private finance. Preliminary theoretical estimates for the leverage factor of a FiT are available based on the McKinsey Global Abatement (Investor) Cost Curve. On this basis, it is expected that \$1 of (annual) incremental cost financing for solar power could leverage about \$8 of (upfront) investment capital (AGF, 2010).

The following table compares current approaches to climate finance leveraging along different dimensions:

Table 5. Comparison of different approaches to climate finance leveraging

Financial instrument assessed	Reported by	Definition of leveraging	Methodology	Leveraging What?	Is the instrument assessed climate specific?
CTF	CIF Admin Unit	A combination of public and private co-financing (total co-financing to CTF financing)	Quantitative, ex-ante assessment	Both public and private investment	Yes
GEF	GEF Secretariat, GEF Council,	Where public and private co-financing is: <ul style="list-style-type: none"> • Additional (covers part of the incremental cost) • Substitutes finance from one project to another • Or where finance is mobilised later as a result of GEF project 	Appears to be loosely defined, no formal methodological approach	Both public and private investment	Environment-specific
GEF	GEF independent evaluation office	Financing in conjunction with GEF project that supports activities producing global environmental benefit and that would not have been spent in the absence of GEF project or that would otherwise have been spent in ways that contribute to environmental degradation	Empirical, based on interviews with GEF project managers, ex-post	Both public and private investment	Environment-specific

Financial instrument assessed	Reported by	Definition of leveraging	Methodology	Leveraging What?	Is the instrument assessed climate specific?
Carbon finance	World Bank Carbon Finance Unit (State and Trends 2010)	Ratio of the overall capital investment needed for the project to the NPV of primary CERs	Quantitative, ex-ante assessment	Private capital	Yes
Feed-in Tariff	AGF (based on McKinsey)	Based on marginal abatement costs. Calculates the annual incremental cost for renewable energy, and considers how much upfront investment capital would be leveraged based on the incremental cost financing. Assumption that the upfront investment capital would shift from dirty projects to renewable energy projects.	Theoretical assessment	Private capital	Yes
Infrastructure investments	World Bank	Overall project cost divided by WBG financing	Quantitative, ex-post assessment – based on public and private co-financing	Both public and private investors	No
MIGA	MIGA Operations Evaluation Unit	Quotient of estimated FDI facilitated by MIGA guarantees and the net guarantee coverage issued	Quantitative assessment	FDI	No

Note that, in addition to these leveraging definitions currently applied, Buchner et al (2011) propose another definition to be used for donor reporting to the UNFCCC, as 'the incremental private investment over the aggregate international public finance flow (concessional and non-concessional).'

Lessons learned on leveraging

This working paper demonstrates that there is not one singular definition of financial leverage and thus it is almost impossible to compare different instruments to understand their effectiveness as evidenced by their ability to leverage public and private finance. A strict assessment of leverage is often difficult, because the additionality or causality of finance is difficult to prove, and investors may have planned to invest without the climate finance and are simply taking advantage of the subsidy. In other words, the climate finance which is meant to act as a leverage point may not be the main reason for encouraging new investments.

This paper raises four key points about leverage:

- 1. Leverage often simply equals co-financing.** While we have critiqued the view that co-financing is synonymous with leveraging, it is true that, from the point of view of each institution, the impact of their spending is much larger than it would have been had they been the only spender. In that sense their money has a greater impact than it would have done without co-financing. In many cases it is also true that without their money, the money from other institutions and investors would not have been forthcoming. This leads to the next point:
- 2. The various ratios used have different audiences who are asking different (though equally important) questions.** The co-financing ratio helps demonstrate to financial stakeholders that the financial institution or instrument is using their own balance sheets in a way that maximises the balance sheets of other financial institutions. So, something that captures this indicator is very important to the storyline of the financial institutions and for accountability to their stakeholders. Other audiences want to have a more specific account for how much actual investment was leveraged as a result of concessional finance which helped mitigate risk or buy down costs.

It is important to acknowledge that different audiences will have different needs which are important to reflect. It is therefore all the more important to be clear about the leveraging terminology and methodology used.

- 3. It is important to consider the counterfactual to demonstrate leveraging.** Beyond the simple concept of co-financing, the concept of leverage generally implies that public finance attracts money that would not otherwise have been invested. In order to accurately demonstrate leverage, this needs to be proven in each case. As Brown and Jacobs remark (2011), there are two main types of leverage: buying down the incremental cost, and mitigating risk. In both cases, claimers of leverage must prove that their investment has targeted one of these objectives and therefore helped to leverage further investment.
- 4. Leverage is a significant factor, but is not the only indicator of significance.** While public finance institutions promote their leverage factors as an indication of better spending, it is important to remember that, by the very nature of the types and size of investments, different kinds of investments will foster different leverage ratios. It will not always be the case that the 'best' or most efficient investment will be that which has the highest leverage ratio. Moreover, the public good value of the investment is not measured simply in cash terms. Therefore there may be very sound reasons to support investments which foster lower leverage ratios.

What's next? Towards a common approach to leveraging⁴

A more methodical approach to assessing leveraging is needed in order to understand and compare the impacts of different public interventions. A proposed approach might be to evaluate the finance according to some basic principles which can help demonstrate leveraging:

1. **No double counting** - For public finance, avoid counting the same dollar twice (often two MDBs will each claim to have leveraged each other's money).
2. **Demonstration of the counterfactual** - would the investment have still been made without the climate finance?
3. **Evidence of financial risk mitigation and/or buying down the incremental cost** - Is there demonstration that financial risk has been mitigated and therefore investors are encouraged, interest rates lowered, or greater debt provision as a result of the climate/carbon finance? Has the incremental cost of the investment been lowered as a result of the investment?
4. **Evidence of replication** - Is there evidence that money has been mobilised after the initial investment but based on the climate finance as replication of the demonstration project?
5. **Substitution** - has the finance been substi-

tuted from one project to a 'climate friendly' as a result of the climate/carbon finance? This is only likely to be a useful principle in some cases, e.g., for renewable energy, while many other cases the substitution criterion is likely to be less relevant (e.g., for energy efficiency or forestry projects).

A better understanding of what types of public interventions catalyze further investment best is critical for helping steer future efforts to address climate change most efficiently. Much work needs to be done to define an agreed methodology for calculating leveraging ratios. Given the need for a fundamental redirection of investment towards low carbon growth, a more credible and rigorous way of calculating what additional climate finance investment has been leveraged will be an essential task in monitoring the extent to which such a redirection is happening. This paper provides a first step towards a deeper understanding of leverage estimates; what they do and do not imply; and some first indications of an approach towards an agreed methodology to understand leveraging.

⁴ It is important to note that this discussion pertains to project level leveraging ratios. Increasingly, more and more of the climate finance discussion will be geared towards how to move climate finance through budgetary systems (e.g. via budget support) as part of the movement to support direct access, country ownership and alignment. In such a context, the term leverage will have a very different connotation. The objective here will be to "leverage" by supporting the transformation via public policy and public spending. Therefore, the type of project level 'leverage' ratios discussed in the paper will not capture this broader objective and instead other criteria of effectiveness need to be considered as well.

Glossary of terms

AGF	The United Nation's High-Level Advisory Group on Finance: established in 2010 to study potential sources of revenue to achieve the levels of climate financing promised in Copenhagen.
CDM	Clean Development Mechanism: a mechanism defined in the Kyoto Protocol that allows industrialised countries (defined as Annex I countries in the UNFCCC) to invest in emissions reductions in developing countries (defined as non-Annex I countries in the UNFCCC).
CERs	Certified Emissions Reductions: a verified emissions reduction unit generated by and issued for CDM projects.
Debt service ratio	The ratio of a country or a company's debt service payments to its earnings.
HFCs	A class of organic chemical compounds used in refrigerants and other industrial process that has a very high global warming potential, equivalent to nearly 15,000 times the same weight of CO ₂ . Emissions of HFCs are covered under the Kyoto Protocol.
IFIs	International Finance Institutions: financial institutions established or chartered by more than one country and subject to international law. Prominent IFIs include the World Bank, the International Monetary Fund and various Regional Development Banks.
Incremental cost	Also known as the marginal cost, it is the cost of producing each additional unit of a given product. For climate finance, the incremental cost is the cost of additional capital that low-carbon and climate-resilient technologies require in comparison to alternative investments.
IRR	Internal rate of return: a rate of return used to measure the profitability of investments.
MDBs	Multilateral development banks: institutions created by groups of countries to provide finance and professional advice to support development. Prominent MDBs include the World Bank and various Regional Development Banks.
Subordinated stakes	A loan that has secondary security against existing assets (subordinate to senior debt claims), often used to finance acquisitions, expansion or restructuring, and riskier for the lender.

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