# Evaluating Methods to Estimate Private Climate Finance Mobilised from Public Interventions

*World Resources Institute*

*Research Collaborative on Tracking Private Climate Finance: Part B, Work stream 2*

**FOREWORD**

Authors at the World Resources Institute (WRI) drafted this report to inform the May 2014 submissions of developed country Parties to the United Nations Framework Convention on Climate Change (UNFCCC) Secretariat on appropriate methodologies and systems used to measure and track climate finance. It builds on a previous background paper circulated amongst members of the Research Collaborative on Tracking Private Climate Finance (RC) that highlighted preliminary findings. This report explores how to estimate causality between public and private climate finance and also outlines a preliminary framework of options to estimate and report mobilised private climate finance. It has not been formally peer-reviewed. Results will however be combined with findings from other research activities under the RC towards the preparation of a peer-reviewed, synthesised report, intended to be published in advance of the 2014 UNFCCC Conference of the Parties in Lima, Peru.

The report was prepared as part of WRI's involvement with the RC, but the views expressed herein are solely WRI's. As an independent mission-driven research organisation, WRI's involvement in the RC is driven by our goal to ensure that the developed country Parties employ reporting methodologies that incentivise ambition, effectiveness, and accountability in the deployment of climate finance to developing countries.

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## EXECUTIVE SUMMARY

Developed countries have committed to jointly mobilising $100 billion annually by 2020 from the public and private sectors to help developing countries reduce greenhouse gas emissions and adapt to the impacts of climate change. In 2010, Parties to the United Nations Framework Convention on Climate Change (UNFCCC) established a Standing Committee on Finance to assist the Conference of Parties in exercising its functions in relation to the financial mechanism of the Convention, including taking stock on progress toward tracking the $100 billion target and considering ways of strengthening methodologies for reporting climate finance through biennial assessments. However, estimating and reporting these "climate finance" flows in a manner that reflects reality, is standardised, and is practical, while also incentivising contributors to take effective actions more broadly is a challenging endeavour. The challenge is especially apparent—as detailed in this paper—when estimating what private sector flows are to be counted toward the $100 billion as "mobilised" by developed country governments.

This report aims to provide contributor countries and the UNFCCC's Standing Committee with a deeper understanding of the linkages between public interventions (whether targeted policy support, technical assistance, or finance in the form of grants, loans, equity, or de-risking instruments) and private climate finance.

### Review of Past Results: Gaps in Existing Methodologies

The background paper to this report, which evaluated current methodological gaps using seven market test cases, demonstrated that **current methodologies to report mobilised climate finance flows may contribute to a misperception of progress toward the $100 billion goal.** Specifically,

1. **Current project-focused methodologies disincentivise critical market development support.** Current reporting methodologies typically only consider gross financial contributions at the project level at a specific point in time. Thus, contributor countries are less incentivised to provide broader, long-term, and early-stage market development support like policy support, R&D support, technical assistance, and capacity building. However, these "indirect" interventions are critical to creating markets that mobilise private investment.

2. **Inconsistent and non-standardised methodologies preclude aggregation.** Current methodologies run the risk of double counting mobilised private finance, and may overestimate progress toward the $100 billion annual goal. Examples of inconsistencies include varied (i) accounting methods for financial instruments; (ii) definitions of what counts as mobilised finance; (iii) ways to measure the extent of mobilisation; and (iv) points of estimation (that is, where in the financial chain mobilised finance is estimated and reported).

3. **Current methodologies may undermine ambition and skew public finance flows.** As current reporting methodologies do not consider additionality (defined in this report as climate finance attributable only to *new* and *additional* public sources); nor incrementality (defined in this report as private climate finance beyond business as usual trajectories), contributors may be incentivised to provide support to more established markets (such as those in richer economies);

to repurpose existing development assistance commitments; and to disregard the possibility of crowding out private investment.

**Outlining a Reporting Framework: Pathways Forward**

Broadly, there are four issues that reporters will need to consider when reporting mobilised finance:

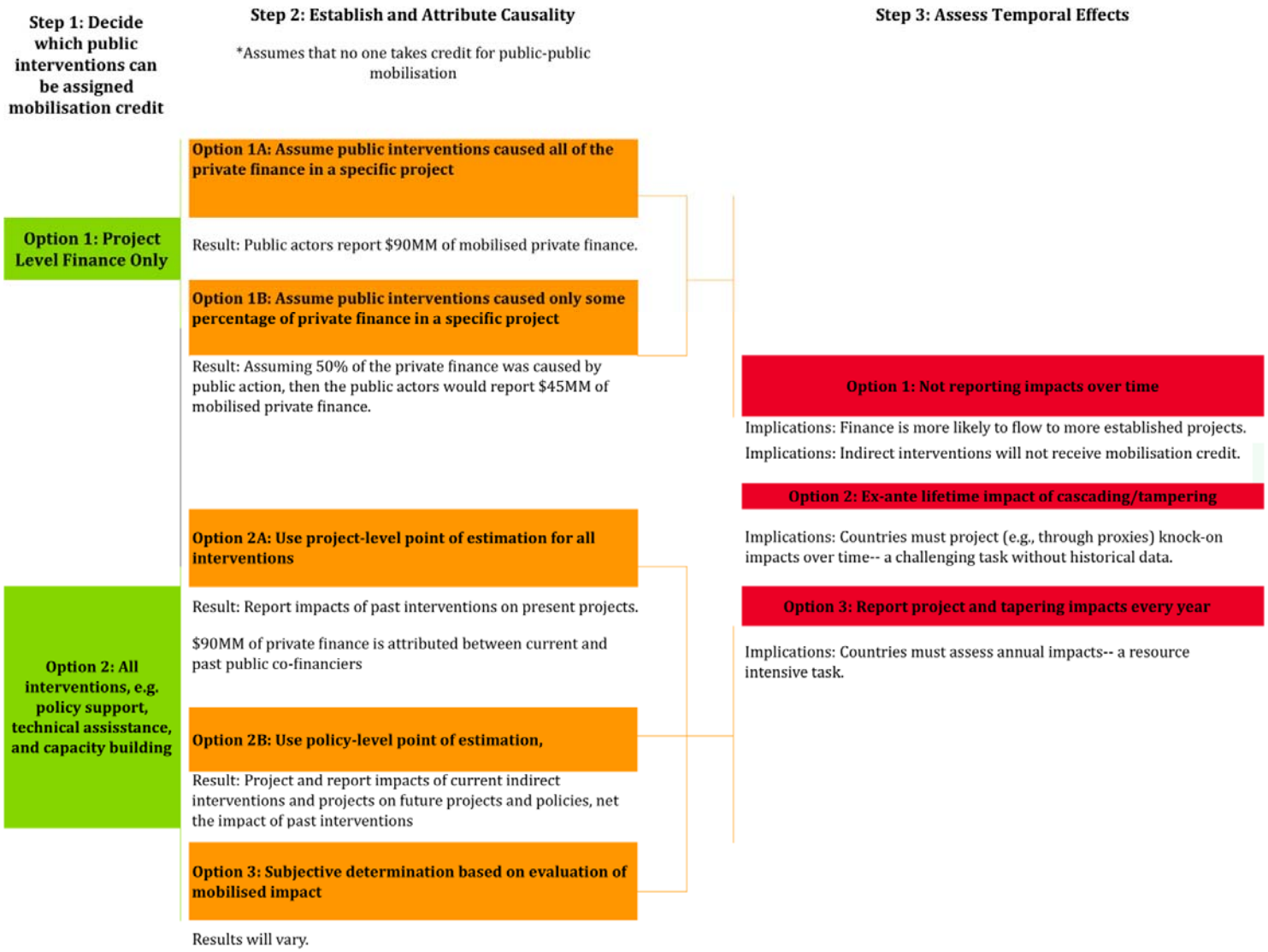
1. *Definitions:* What flows count as "climate finance;" as public sector versus private sector finance, as "mobilised" finance, and from/to which countries?
2. *Analytics:* How do we establish and value the link between public and private climate finance flows, especially over time?
3. *Calculations:* How do we calculate and report public and mobilised finance given variations in public interventions, financial instruments, points of estimation, currencies, and more?
4. *Data:* How can we apply methodologies given data constraints, particularly in the case of private finance flows, and the link between public and private flows?

This report—which builds on the background paper—proposes a *preliminary* framework of options for the *Analytics* reporting consideration, but also considers the *Definitions* and *Calculations* issues, since these are integral to the *Analytics* issues. We look at three factors in detail within *Analytics*:

- Causality: This factor considers how to establish and estimate the link between public interventions and mobilised finance. Relevant decision points include what types of interventions to consider, and to what extent we assign mobilisation credit to these interventions to different public actors and interventions. Options range from focusing only on project-level finance and assigning credit for any private co-finance to public actors, to adjusting mobilisation credit to public actors based on other market interventions.
- Attribution: This factor considers how we fairly assign mobilisation credit to various public actors. Decision points include how various financial instruments create incentives for subsequent co-finance, and how different types of indirect interventions (for example, demonstration projects) should receive credit for future impacts.
- Temporal Dimensions: In both causality and attribution, how we consider both the impacts of past interventions on current projects, and the impacts of current interventions on future projects, are central to evaluating the link between public and private finance.

Figure 1 outlines a simplified *Analytics* decision tree to illustrate some of the decision points and options that reporters will face in reporting mobilised finance.

*Figure 1: Decision Tree to Estimate and Report Causality, Attribution, and Temporal Dimensions of Public Interventions and Mobilised Finance*




Source: WRI

In this report, we evaluate the range of *Analytics* decision points and associated options against four criteria—(1) integrity; (2) incentives (for effective deployment of finance); (3) standardisation; and (4) practical feasibility[1]. This evaluation highlights the balancing act contributor countries will have to contend with when reporting mobilised finance. As methodologies increase in complexity, integrity and positive incentives improve, but sometimes at the expense of standardisation and practical feasibility.

**Recommendations for the UNFCCC and Contributor Countries**

Balancing the gaps and weaknesses inherent in existing methodologies with the practical challenges (such as data availability) of improving these methodologies, we recommend that the UNFCCC and countries take the following actions:

1. **Bolster methodological foundations in the short run, including:**
    a. **Establishing common definitions and calculation practices.** In this report, we outline key definitional and calculation issues that must be tackled prior to estimating "mobilised" public and private climate finance. Section II outlines options to do so, drawing from existing practice and peer reports.

    b. **Investing in data tracking systems** for private climate finance. Countries currently face significant data challenges, particularly in tracking private climate finance flows, and isolating/linking these flows to public interventions. Filling these data gaps will allow countries to adopt improved reporting methodologies.

    c. **Reporting *aggregate* private finance investments rather than individually "mobilised" private finance.** The margin of error associated with estimating and reporting "mobilised" finance with today's data gaps and methodologies may unintentionally overestimate progress toward the $100 billion goal, especially given the double counting issues associated with prevalent methodologies. This margin of error is likely to be greater when estimating and reporting "mobilised" finance at individual contributor levels rather than at an aggregate level for all contributors. In coming years, countries should initially focus on aggregate reporting of total private climate finance investment, rather than individual countries' "mobilisation." In effect, countries would then *initially* report only public contributions and aggregate private finance until data and methodologies improve (see below).

2. **Develop proxies to measure "mobilised" private finance as data and reporting improves**. Once countries adopt common definitions and calculation processes, and data improves, countries may feasibly transition to methodologies that report mobilised finance, and at the individual level. At this point, countries can review the *Analytics* options outlined in this report to establish causality, assign mobilisation credit to various public actors, and consider temporal impacts. To maximise the practical feasibility of adopting these *Analytics* options, the UNFCCC

[1] Discussions on practical feasibility do not include considerations of political acceptability

may create proxies for measuring "mobilised finance," informed by how various public interventions have mobilised private finance historically.

3. **Transition contributor countries to reporting the mobilisation impacts of indirect and early-stage interventions in the long term.** Updating methodologies to consider long-term impacts of indirect interventions like policy support, research and development, and technical assistance will bolster critical early- and middle- stage market support.

**TABLE OF CONTENTS**

I. Introduction ..... 8
II. Section I: Review of Previous Results ..... 10
III. Section II: Broad Decision-Making Framework ..... 14
IV. Section III: Detailed Analytical Framework ..... 29
V. Ways Forward ..... 39
Appendix I: Methodologies ..... 41
Appendix II: Case Studies ..... 51
Appendix III: Results of Testing of Methodologies ..... 110
References ..... 117

**INTRODUCTION**

As global mean temperatures rise, public actors are seeking ways to mobilise the scale of investment required to tackle climate change and its impacts. The transition to low-carbon, climate-resilient economies will be especially challenging for developing countries. In 2008–09, experts projected that developing countries will need US$300 billion annually by 2020 and up to US$500 billion annually by 2030 for climate change mitigation *alone*.[i] More recent projections find that US$5.7 trillion in annual global investment in green infrastructure (US$0.7 trillion of which represents new, incremental investment requirements beyond business as usual) is required to limit greenhouse gas emissions to acceptable levels.[2] Much of this new infrastructure will need to be established in developing countries.[ii]

Recent international negotiations and resulting agreements through the United Nations Framework Convention on Climate Change (UNFCCC) have attempted to address the current gap in climate finance. At the annual UNFCCC Conference of Parties Copenhagen meeting in 2009, a subset of industrialised or "Annex II"[3] countries first pledged to *mobilise* "new and additional"[4] funds of $100 billion annually by 2020 to help developing countries both mitigate greenhouse gas emissions and adapt to the various impacts of climate change. In subsequent meetings in Cancun (2010) and Durban (2011), Annex II countries reaffirmed their commitments.

While the $100 billion commitment may in itself be inadequate to address climate change investment needs in developing countries, measuring and reporting how contributor countries are progressing toward, and hopefully, beyond, this goal is still critical for several reasons. First, delivery on these pledges carries significant implications for the level of trust countries place in the UNFCCC process – and in each other – to achieve fair and effective outcomes[iii]. Second, measuring and reporting mobilised finance can inform contributor and recipient governments of the most effective means through which to fill the growing investment needs of developing countries. Finally, measuring this progress will push contributors and recipients to take steps and increase ambition to fill the remaining gap, whether to or beyond, the $100 billion goal.

In 2010, the Standing Committee on Finance of the UNFCCC was established, in part to take stock on global progress toward tracking the $100 billion target and to consider ways of strengthening methodologies for reporting climate finance through biennial assessments. As highlighted by several reports, even just tracking public climate finance flows is challenging.[iv, v, & vi] As the OECD observes, there is "currently no definition of which "climate" activities, flows, or other interventions could count towards the USD 100 billion; what "mobilising" means; or even which countries are covered by this commitment."[vii]

During the "Fast-Start Finance" reporting period from 2010-2012, the vast majority of countries reported only publicly-sourced finance[5], that is, climate finance sourced from contributor

[2] Defined as those that would limit global average temperature increases to 2 degrees Celsius above pre-industrial levels
[3] The list of Annex II countries is available at https://unfccc.int/essential_background/convention/background/items/1348.php
[4] There is no international consensus on how "new and additional" funds are defined. However, a range of criteria have been put forth under various studies (http://www.wri.org/sites/default/files/mobilising_international_climate_finance.pdf, http://pubs.iied.org/pdfs/17080IIED.pdf)
[5] For simplicity in this report, we have defined public sector entities to include those with any level of public ownership.

governments and channelled through multilateral or bilateral funds, institutions, or facilities.[viii] But, particularly in light of constrained public budgets, contributor governments have increasingly embraced harnessing private sector investment to meet developing country requirements and, indeed, to reach the $100 billion annual commitment by 2020. As a result, the question of estimating and reporting "mobilised" private climate finance—that is, financial flows from private sector sources, but specifically those resulting from public sector interventions—has gained prominence.

As discussed throughout this report, and in several past reports released by the Organisation for Economic Cooperation and Development (OECD) and others such as the Overseas Development Institute (ODI) and the Stockholm Environment Institute, accurately estimating and reporting mobilised private climate finance is extremely complicated for various reasons.[ix & x] Challenges range from practical issues like securing data on private sector investments, to definitional issues such as understanding which actors constitute the private sector and what projects are climate change-friendly, to analytical issues like proving causality between public and private financial flows.

In fact, estimating mobilised private climate finance is such a challenging endeavour that it is worth evaluating how feasible it is to create robust methodologies[6] that can be applied across various institutions and incentivise effective deployment of climate finance.[7] As shown in this report, currently employed methodologies, while practically feasible, are highly simplistic and run the risk of underplaying and thereby disincentivising public interventions that truly fill climate finance gaps. But even if these methodologies were to be improved to reflect recommendations in this report, the limited data availability and complex set of variables involved in attributing public sector finance to private climate finance flows may still result in a large enough margin of error to undermine the $100 billion ambition by overestimating private climate finance flows.

With this overarching caveat, we have chosen to undertake this research and analysis with the hopes of not just uncovering the universe of challenges associated with attributing mobilised private climate finance, but also proposing pathways forward that, at the very least, improve upon the status quo. This report presents our findings and recommendations in the following sections:

- Section I: Reviews key results from the background paper to this report (further details available in the appendices) that informed our framework
- Section II: Describes a broad decision framework for countries to consider when estimating and reporting "mobilised" finance.
- Section III: Details an analytical framework, within the aforementioned decision framework, to estimate causality and attribute mobilisation credit, including over time.
- Ways Forward: Presents our preliminary recommendations in advance of contributor countries' May 1st UNFCCC submission deadline.

[6] In this paper, 'methodologies' refers to the processes, definitions, and calculations that DFIs and climate funds use to estimate the amounts of climate finance mobilised

[7] Such an exercise would be relevant for individual, not aggregate, reporting, and would in the long term increase the effectiveness of climate finance by increasing competition and collaboration between contributor countries, though not necessarily institutions within a country

## SECTION I: REVIEW OF PREVIOUS RESULTS

The background paper to this report examined existing gaps and weaknesses in current estimation and reporting methodologies (see Appendix I) particularly with respect to how these methodologies established the link between public interventions and private finance. WRI tested seven methodologies (see Appendix III) currently in use against seven "test" cases, detailed in Appendix II, that showcased varied types of public interventions—including policy support, incremental finance, and technical assistance; varied sectors—renewable energy, energy efficiency, resilient agriculture, sustainable transportation, forestry; and varied geographies/ economies—emerging markets, frontier markets, and less developed countries.

To evaluate these methodologies with respect to how public interventions mobilise private finance, we looked at three inter-related analytical factors, which form the basis of our framework presented in Sections II and III: (1) causality, (2) attribution, and (3) temporal dimensions[8].

1. **Causality:** How do you determine if a public intervention (of any kind) caused a flow of private climate finance, and to what extent and over what period? How can we measure the counter factual without the public intervention?
2. **Attribution:** How can you attribute mobilisation among public actors, and avoid double counting, especially when multiple actors are involved in a given project, program, or policy, and in developing a market over time, and through different interventions?
3. **Temporal Dimensions:** When (temporally) in a market development timeline, is mobilisation estimated and reported and how are subsequent rounds of financing addressed? How can indirect or "softer" interventions like policy and R&D support, technical assistance, and capacity building receive credit for future mobilisation impacts?

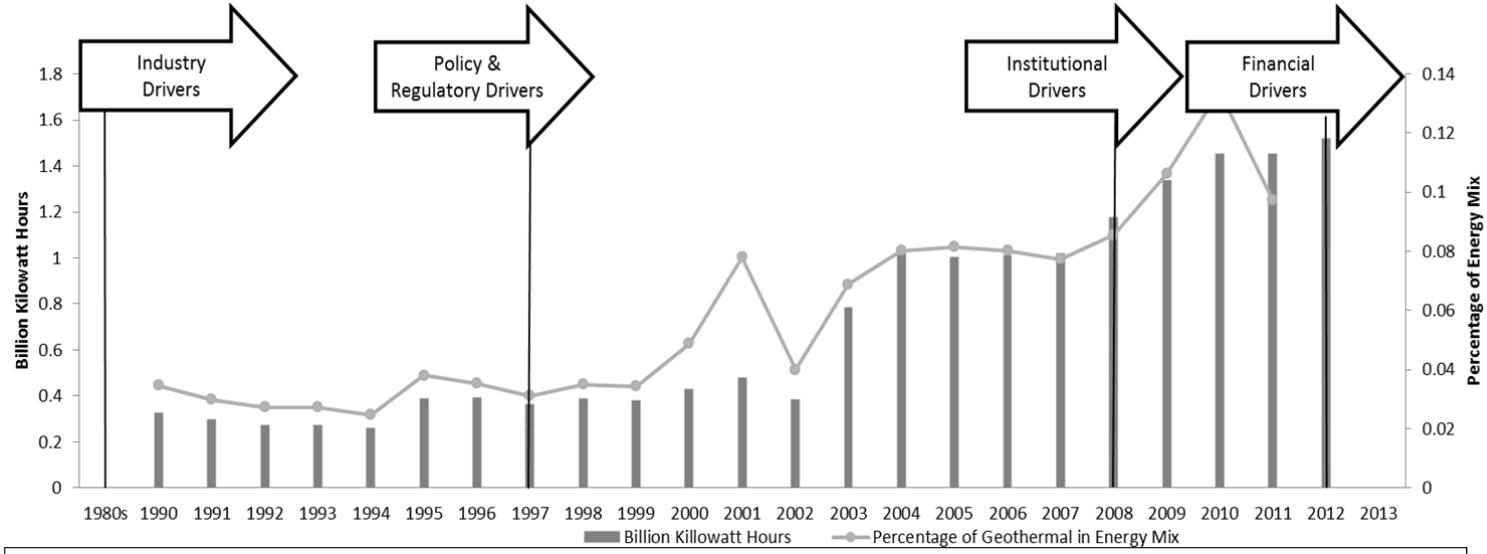
These three factors, and related questions, are relevant regardless of whether contributor countries report mobilised finance at the aggregate level or at the individual level. As shown by our previous testing, the lack of robust methodologies to consider causality, attribution, and temporal dimensions can lead to problems like multiple contributor agencies claiming credit for the same slice of private climate finance mobilised and overestimating mobilised finance in aggregate. Additionally, by independently claiming credit for the mobilisation, reporters may underestimate, and thus, undervalue, the contributions of other agencies, or indeed their own previous contributions, to broader market development. Finally, ignoring temporal elements can disincentivise early stage and non-project-specific support.

The importance of evaluating causality and attribution with a temporal lens is highlighted in Figure 2, which maps the development of Kenya's geothermal sector[9]. As shown, several policy, institutional, financial, and industry actions taken over several decades were integral to market development, and consequently private sector investment. It can thus be misleading to focus and report mobilised finance for only a particular project at a particular point in time. Rather, any particular project will have benefitted from past projects and interventions, and similarly, can also have impacts on mobilising private investment in future projects.

[8] Definitions are drawn in part from the Overseas Development Institute and Gaia's 2013 report, released as Part A under Work Stream 2 of the Research Collaborative

[9] See Appendix II for additional details

*Figure 2: Graph of Geothermal Sector Development in Kenya against Various Public Interventions*




**1980s:** The first geothermal power plant in Africa, Olkaria I, was commissioned by KenGen

**1997:** The Electric Power Act separated generation of electricity from transmission and distribution and established the Electricity Regulatory Board.

**1999:** The Olkaria III plant was commissioned. It was the first privately funded and developed geothermal project in Africa.

**2008:** Kenya Vision 2030, a development program that included a target of 5000MW of geothermal power (26% of peak demand) by 2030, was released. The government established Geothermal Development Corp to take responsibility of geothermal steam field development.

**2012:** The Nordic Development Fund supported a geothermal drilling training program under a World Bank project, which cost a total of EUR2.7 million.

**2012:** KfW, the EU, and the African Union launched a €50 million Geothermal Risk Mitigation Facility (GRMF) to support developments in Ethiopia, Kenya, Rwanda, Tanzania and Uganda.

Source: WRI

Drawing from six other similar market development timelines and indicators, our testing uncovered the following major findings. Readers can refer to the appendices and WRI's March 2014 background paper (please contact asrivastava@wri.org for a copy) for more detailed results.

(1) **Current reporting methodologies only consider how project-level financing mobilises private co-finance in a particular project.** But looking at mobilised private climate finance at the project level and at a specific point in time not only hides market realities but also favours certain types of public interventions, namely project co-finance in established markets. Unsurprisingly, WRI's ongoing interviews with relevant stakeholders and experts indicatively confirm that, in most cases, preceding projects and broader policy and market interventions—whether domestically or internationally financed—have an even more influential role than co-financing in a specific project at a late stage of markets. In other words, there is a need for including a temporal dimension to the methodologies to estimate impacts over time. They also point to the need for expanding the scope of these methodologies beyond project-level financing to also consider broader market-level interventions that directly or indirectly influence the feasibility of these projects, thus creating appropriate incentives to promote more effective interventions. For example, interviews with relevant stakeholders in the commercial building energy efficiency space in Thailand highlight that the 1992 Energy Conservation Promotion Act (ECPA), which led to decade-long energy audits, was instrumental in building capacity. Without this capacity, private sector investment would have certainly been lower, if not absent altogether. Recent projects, such as the $15.9 million GEF-UNDP Energy Efficiency project that was approved in 2010, partially owe their ability to mobilise private investment to the role played by the ECPA.

(2) **Even at the project level, reporting practices are not harmonised across institutions or even across instruments within the same institution.** This can lead to a double counting or under-estimation of private flows mobilised. For example, the Olkaria III geothermal power plant in Kenya was financed through a mix of commercial equity from the private sector and long term senior debt from a range of bilateral development banks and financing institutions, and the equity investments were partially covered by a guarantee. Had the loans and guarantee coverage both been provided by the same institution, such as the Asian Development Bank (ADB), the amount of finance reported as mobilised could have been significantly underreported. This is because ADB's methodology for reporting equity co-financing from its loan disbursements only includes those investments made by private actors in funds where the ADB acts as a general partner, implying that none of the equity in this case would have been counted as mobilised, while for partial risk guarantees, only the portion of the covered instrument that is not guaranteed is considered as co-financing.

(3) **Reporters are not transparent or consistent in applying methodologies, making it particularly challenging to aggregate and compare reporting**. For example, certain institutions may estimate mobilised amounts subjectively, and/or on a pro-rata basis, while others may choose to consider only private money originating from commercial banks based in their country as having been mobilised. If such institutions are involved in the same project or programme, their diverse methodologies would lead to different ways of counting the amounts mobilised, which may be significantly more or less than the actual amounts of co-financing. Comparability thus becomes an

important criterion to accurately assess progress towards the $100 billion commitment and also to accurately estimate effectiveness of the financing.

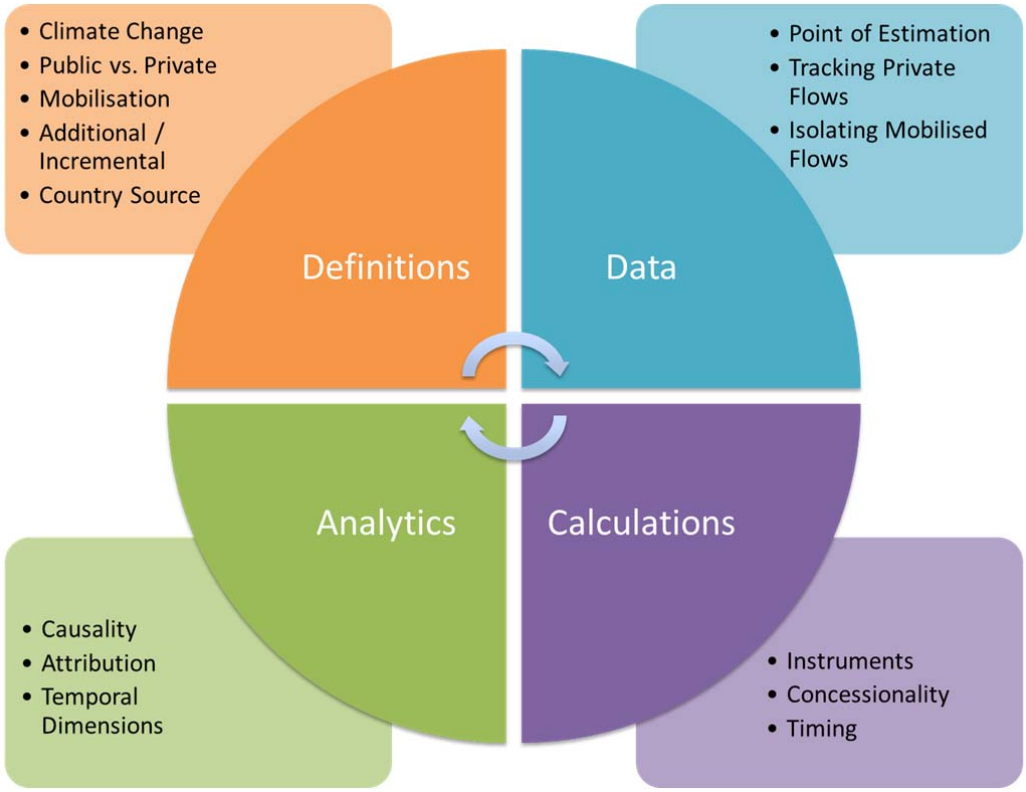
Drawing from these aforementioned gaps and weaknesses in current reporting practices, Sections II and III outline a broad framework to help countries progress toward more robust estimation and reporting methodologies.

**SECTION II: BROAD DECISION-MAKING FRAMEWORK**

Reporters must contend with several decision points when estimating and reporting public and mobilised private finance. These decision points can be classified under four overarching categories as summarised in Figure 3: ***Definitions***, ***Analytics***, ***Calculations***, and ***Data.***

These categories are closely interconnected and there are several instances where decision points within a category may be dependent on or closely linked to decision points within another category. For example, the practical feasibility of applying methodologies will depend on what data is available. Conversely, how methodologies choose to account for these instruments will determine what types of data are required. How the incrementality of finance is defined is closely related to how causality is estimated. Thus, a robust methodology for reporting on climate finance mobilised should look at these decision points in aggregate and not in isolation.

*Figure 3: Overarching Mobilisation Estimation Framework*

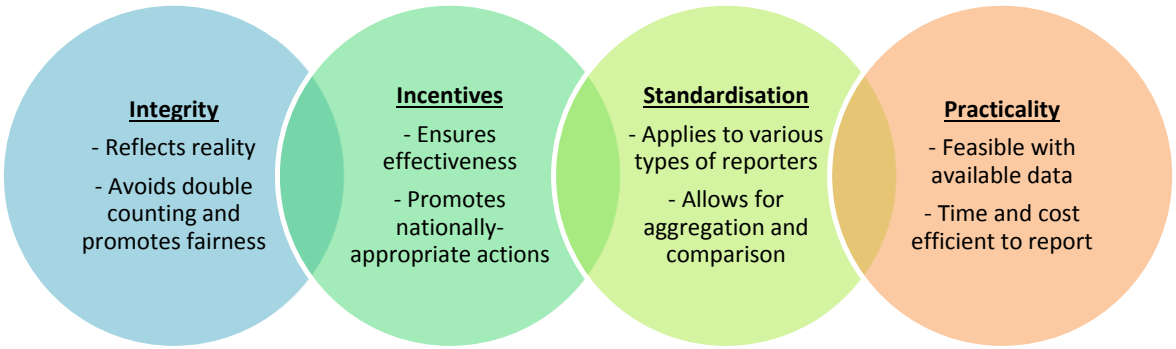



Source: WRI

This section and the subsequent section outline a decision framework with several options that are evaluated against their integrity, incentives, standardisation, and practicality (See Figure 4). For simplicity and to avoid presupposing outcomes, we do not consider the political feasibility of these options, though this is no doubt an important factor, This section, after providing a broad overview of decision points, focuses on the decision points relating to *Definitions* and *Calculations* since these decision points are highly related to *Analytics*—the focus of this paper. Section III dives more deeply on the decision points relating to *Analytics*.

*This report does not address the decision points relating to Data* since these are being separately considered under Work Stream 1 of the RC. However, some of the options for narrowing the *Definitions*, *Analytics*, and *Calculations* decision points do assume the availability of ideal data and information; the 'Practicality' evaluation factor considers this.

*Figure 4: Evaluation Factors Relevant to Evaluate Methods to Report Mobilised Climate Finance*




Source: WRI
Note: Political feasibility is not currently considered in our evaluation factors but is certainly a relevant consideration.

Of note, many of the options and decision points are more readily addressed if the reporting takes place at an aggregate level, rather than by individual countries. Specifically, decision points relating to *Analytics* (such as attribution and assigning credit with the group of contributors) would be less relevant since there would be less of a need to attribute credit and assign causality between various public institutions, at least at the project level. However, reporting at an aggregate level would not take away from the need to establish common definitions and calculation practices in the short run, and the need to estimate mobilisation in the medium to long run. Reporting processes will likely need to adopt a mix of the two approaches—that is, financing might be reported at the individual level and then aggregated up assuming methodological harmonisation. While this is desirable, keeping in mind both the intention of ambition and the practicality of reporting on climate finance mobilised against the $100 billion commitment, there is a risk that aggregate estimates may not fully show the extent to which specific public actors and interventions actually helped to mobilise finance and which of these actors/interventions have been more effective than others. Thus, to promote greater effectiveness by individual contributors, concurrent disaggregated reporting may be more desirable in the medium to long run as long as this reporting is standardised across countries and can be aggregated.

The framework outlined in this report (refer to Figure 3) proposes options based on the underlying assumption that all countries report on an individual basis since this is current practice; but it does not presuppose that individual reporting is the ideal option for countries going forward. In fact, at least in the interim, aggregate reporting may make more sense to measure progress toward the $100 billion as discussed in Section IV.

**Definitions**

The first overarching decision point for reporters is determining what flows to include or exclude from the $100 billion target. This decision point entails defining terms—a topic that is not the focus of this report (but discussed at greater length in ODI/Gaia's contribution to the RC's Work Stream 2, Part A), but merits an overview given its importance in estimating mobilised private climate finance, the current variations in terminology across reporting methodologies, and the lack of consensus on basic questions that could influence mobilised amounts reported by significant margins. Some of the definitional issues arise out of the text of the Copenhagen Accord of 2009.

> "*The collective commitment **by developed countries** is to provide **new and additional** resources, including forestry and investments through international institutions, approaching $30 billion for the period 2010–12 **with balanced allocation between adaptation and mitigation**.... In the context of meaningful mitigation actions and transparency on implementation, developed countries commit to a goal of **mobilising jointly** $100 billion a year by 2020 to address the needs of **developing countries**. This funding will come from a wide variety of sources, **public and private**, bilateral and multilateral, including **alternative sources** of finance.*[xi]"

Based on this text and current variations in reporting methodologies, relevant definition points and related options to narrow the choices could include:

- *Defining a climate change mitigation or adaptation project or activity:* Most reporters use the OECD's DAC and Rio Markers system to define which projects count toward climate change commitments, but this system has some drawbacks, including the fact that current definitions and systems may overestimate the financing going towards climate-friendly purposes[xii]. However, this system is undergoing revisions currently, and future iterations may address existing concerns.

- *Defining the public and private sectors:* Most current reporting considers governments and their associated development finance institutions and funds as public sector entities, but there remain grey areas, for example with institutions like state-owned enterprises, which are profit-seeking and thus not typically making decisions based on climate change considerations. Another example: KfW—the German development bank—shareholdings consist of both German government and private sector contributions. When KfW is estimating mobilised private climate finance, should it only report a pro-rata share—based on its government ownership—of climate finance it disburses to reflect its ownership structure? Or would it more simply assign the entire amount of its climate finance disbursements as publicly sourced? Even for those institutions whose equity is completely capitalised by government donors, this equity capital is typically used to then raise additional monies, from both public and private sources, through for example capital markets issuance of bonds. Do we consider total disbursements as public money or just the amounts sourced from the public budgets? If one takes ownership arguments further up the chain, there could even be debate on how one should account for the fact that governments themselves raise money through taxes and fees from the private sector.

- *Defining new and additional finance:* There remains debate regarding how and whether countries will report both publicly and privately sourced finance as new and additional, as well as what these terms mean. WRI has previously employed the following definition for new and additional in its review of Fast-Start finance reporting.

  **New**: Climate finance that has increased over previous years' allocations and/or pledges. Potential factors to consider in determining whether to count climate finance as *new* include:

  - Does reported climate finance for a given year exceed annual climate finance in prior years, for example, prior to the Fast-Start reporting period after harmonising methodologies?
  - Does climate finance recycle or duplicate previously pledged climate finance?
  - Do projects or programs identified as climate finance include more finance than they did in prior years? For example, if funding is being counted for a project that began prior to the reporting period, has it received more funding relative to what would have been given in the absence of the commitment?

  **Additional:** climate finance as that which does not divert funding from development objectives. Potential checks to define additionality may include:

  - Has the contributor country in question achieved 0.7% GNI for ODA?
  - How does the change in climate finance from previous years compare to the change in Overseas Development Assistance (ODA) over the same time frame?

  Proving that a dataset of estimated private climate finance flows exhibits these characteristics would require extensive analysis at a disaggregated level—i.e., at the project level—and potentially at the source level as well if stakeholders decide that climate finance only counts if these requirements are met at the source. Thus, while the cleanest point of estimation for mobilised private climate finance would theoretically be at the project level, given the political direction, a robust methodology may need to merge both top down source (and intermediary) reporting with bottom up recipient reporting.

- *Defining developed and developing countries:* Most current reporting systems, and broader definitions in general, make use of the UNFCCC system under which developed countries are classified as Annex I (including Annex II developed countries that were members of the OECD in 1992 and Economies in Transition) and developing countries are classified as Non-Annex I.[10] This might be the easiest system to adopt, but may not be flexible enough to reflect shifting realities. For example, China is still classified as a Non-Annex I country but is rapidly becoming a significant provider of aid. Is there a case for using other definitions, such as those used by the multilateral development banks (MDBs)? Could other, more flexible, systems or categorisations be created, based on changing indicators like gross domestic product per capita etc.?

- *Defining sovereign ownership over finance:* Defining which country has ownership over the private sector financial flows is an important question that can have significant implications on

[10] It is worth noting however that Fast Start Finance actions included instances of support to Annex I countries such as Russia; for more information, see http://www.wri.org/sites/default/files/mobilising_international_climate_finance.pdf and http://ec.europa.eu/europeaid/how/finance/documents/el-a3_en.pdf for more information

the amounts reported as mobilised. Is the finance considered as originating in the country where the deal was signed? Alternately, does the finance belong to the country where the entity is headquartered or its ownership? For example, if Citibank (US Headquarters, global ownership) signs a deal in Germany to co-finance a project based in Kenya, which country can claim credit for its mobilisation of Citigroup-provided finance? Similar questions apply to companies, projects, and government entities with ownership from multiple countries.

These and other decision points related to *Definitions*, together with options and their implications, are captured below in Figure 5.

*Figure 5: Framework of Options to Address Definitional Issues*

| Issue | | Research Question | Options | Implications | | | |
|---|---|---|---|---|---|---|---|
| | | | | Integrity | Incentives | Standardisation | Practicality |
| **What counts as a climate change project?** | 1 | Which sectors and what types of projects count? | Option 1: Use existing definitions such as OECD DAC Definitions, MDB Definitions, Rio Markers, etc. | Does not reflect mixed adaptation/ mitigation projects | May incentivise straitjacketing of projects to fit them in pre-defined categories | Easy to standardise | Low effort |
| | | | Option 2: New stakeholder process to define a set of sectors and type of projects that are climate change-friendly | Will better reflect shifting reality | Potential for better incentives; but may also capture projects with dubious benefits | Easy to standardise | Resource intensive |
| | | | Option 3: Define on a case-by-case basis with approval from recipient and source governments; arbitrated by a neutral party like the UNFCCC, based on intent, impact, alignment with pathways, etc. | Best reflects reality | Most neutral incentives | Not easy to standardise | Most resource intensive |
| | 2 | Can certain activities and proceeds be ringfenced? If only part of a project is climate change-friendly, how should credit be allocated? | Option 1: Take a pro-rata share of the project (based on costs, or time, or net impacts, etc.) | Most realistic picture of climate finance | Incentivises internalising climate considerations in every project | Easy to standardise | Less practical; may be difficult to isolate climate impacts from other co-benefits |
| | | | Option 2: If a majority share is climate-friendly, treat entire project as such. | May lead to slight overestimation | Neutral | Easy to standardise | More practical |
| | | | Option 3: 100% credit to any project with climate-friendly components | Overestimates extent of climate finance flows | Incentivises climate-unfriendly projects; may incentivise green-washing | Easy to standardise | More practical |
| | | | Option 4: Gradation (like Rio markers) | Provides fairly accurate picture of climate finance | Incentivises internalising climate considerations in every project | Easy to standardise | May be difficult to isolate climate impacts from other co-benefits |
| | | *Additional Questions:*<br>-How can definitions promote a balance between mitigation and adaptation?<br>- How do we balance co-benefits and co-disadvantages; for example, development and other environmental impacts? | | | | | |

| Issue | | Research Question | Options | Implications: Integrity | Incentives | Standardisation | Practicality |
|---|---|---|---|---|---|---|---|
| **Which sources and recipients can be counted?** | 3 | How do we define developed (contributors) and developing countries (recipients)? | Option 1: Follow UNFCCC definitions (Annex 1, non-Annex 1, etc.) | Definitions may be dated (e.g., China) | Incentivises support to countries that may not need it | Easy to standardise | Simple; status quo |
| | | | Option 2: Use existing definitions such as OECD DAC Definitions, MDB Definitions, Rio Markers, etc. | More realistic; definitions may still be dated | Neutral | Easy to standardise | Neutral |
| | | | Option 3: Adopt evolving/flexible approach based on economic indicators such as GDP per capita. | Best picture of delineation between countries | Incentivises support to appropriate set of countries | Indicators may vary | Resource intensive |
| | 4 | How do we assign sovereign ownership over finance provided by **private** entities? More simply, what country is the private entity from and does their financing contribution count as mobilised? See Definitions, Questions 7, 8, 9 for treatment of public entities<br><br>// For example, Citigroup (US HQ; global ownership) undertakes a project in India | Option 1: Country assignment is dependent on where the finance provided by the private entity is originating or where deal is signed | If institution generates revenue from this country, option 1 provides realistic picture of flows of finance | May disincentivise on-the-ground engagements in favor of cross-border deals, to be able to report higher finance figures | Neutral | Neutral |
| | | | Option 2: Country assignment is dependent on where the private financing entity is based or headquartered | Neutral | Neutral | Neutral | Neutral |
| | | | Option 3: Country assignment is dependent on where the financing entity is primarily listed on stock exchanges, if applicable to institution; for unlisted institutions use Option 1 or 2 | Neutral | Neutral | Neutral as long as double counting is avoided | Challenging for unlisted entities |

| Issue | | Research Question | Options | Implications | | | |
|---|---|---|---|---|---|---|---|
| | | | | Integrity | Incentives | Standardisation | Practicality |
| **Which sources and recipients can be counted?** | 5 | Defining mixed ownership and multiple country ownership in projects and programs<br>// For example a Swiss company and a Vietnamese company are in a joint venture<br>// For example a company with Dutch and Danish ownership<br>// For example, multilateral development banks are owned by multiple governments | Option 1: Pro-rate based on individual equity ownership | Most accurate picture of source and destination of flows | Encourages greater participation by contributors | Easy to standardise | More resource intensive |
| | | | Option 2: Credit is taken by majority shareholder | Neutral | Encourages greater participation by contributors | Neutral | Neutral |
| | | | Option 3: Each country reports separately and without coordination or regard for other owners | Double counting | Encourages minimal participation from individual countries | Not easy to standardise | Neutral |
| | 6 | Do we count recipient (developing) country private sector contributions to a project as mobilised finance, assuming causality is established? (See 9 also)<br>// For example, Canadian money mobilises finance from Yes Bank (India) | Options: Yes, no, or partial credit; partial credit could be based on subjective determination depending on to what extent the mobilised portion was caused by developed versus developing country interventions (see Analytics section) | | | | |

| Issue | | Research Question | Options | Implications: Integrity | Incentives | Standardisation | Practicality |
|---|---|---|---|---|---|---|---|
| What counts as private sector project or flow? | 7 | How is the public versus private sector defined? | See ODI paper for options (http://www.odi.org.uk/sites/odi.org.uk/files/odi-assets/publications-opinion-files/7665.pdf) . In this framework, the broad assumption that any entity that is not 100% owned and operated by a government actor (whether sovereign, regional, state, municipal, or local) is a private sector actor. | See ODI/Gaia paper for options (http://www.odi.org.uk/sites/odi.org.uk/files/odi-assets/publications-opinion-files/7665.pdf) . | | | |
| | 8 | How should we handle the case of institutions with both public and private capitalisation? | Option 1: Define based on who is the decisionmaker and/or holds majority ownership over the institution or project: if decisionmaker is a representative of a government, or government holds majority ownership, it would count as public sector institution. E.g for a $100 MM project: If an institutions' ("A") financing contribution to the project is $10MM and 60% of A is publicly-owned, then we assume it is an entirely public actor, so the breakdown of the project would be $10MM public and $90MM private. | May overestimate actual public contribution | Creates incentives to capitalise higher amount from private sector | NA | More feasible |
| | | | Option 2: Define based on the actual ownership in the institution providing finance; so for example, if public institution had 60% equity capitalisation from the public sector, and used that to raised 40% of its overall capitalisation on capital markets, then any project to which it disburses would allocate credit as follows: | | | | |
| | | | --Option 2A: Public to total non-public. I.e. Public sector capitalisation = 60% * Institution's financing ($10MM), so public share $6MM : private share $94MM | 2A:Creates high leverage numbers | 2A:Creates incentives to capitalise higher amount from private sector | 2A:Neutral | 2A: Less feasible; more difficult to estimate capitalisation shares |
| | | | --Option 2B: Pro-rate based on ownership. I.e. If public sector share of capitalisation is 60%, then public share $6MM : private share mobilised $54MM (which is 60% of $90MM) | 2B:May underestimate true mobilisation effect | 2B: Neutral | 2B: Neutral | 2B: Less feasible; more difficult to estimate capitalisation shares |
| | | | Option 3: Define a pre-agreed upon set of actors that are considered public or private. For example, a commercial bank, individuals/households are always private, while development finance institutions, and aid agencies are always public | May not reflect reality | Neutral | Neutral | More feasible |
| | 9 | Do we split credit of public v. private ownership in institutions between developed and developing countries? //For institutions that are raising money from the capital markets (e.g., IFC) the capitalisation may be from both public and private entities and from both developed and developing countries. | Options: Yes, no, or partial credit. Partial credit could be based on proxies or actual estimations of developed versus developing country capitalisation in an institution. | | | | |

| Issue | | Research Question | Options | Implications | | | |
|---|---|---|---|---|---|---|---|
| | | | | Integrity | Incentives | Standardisation | Practicality |
| **What finance is new and additional?** | 10 | Is public money additional? | Option 1: Over 0.7% of GNI (total ODA commitment) | May discount climate impacts of finance provided under 0.7% | Incentivises significant financing | Easy to standardise | Feasible |
| | | | Option 2: Comparisons to a baseline amount or previous years (accounting for inflation) climate finance | Closest to reflecting reality | May incentivise repurposing of finance intended for other development purposes | Easy to standardise | Less feasible |
| | | | Option 3: Additional to existing levels of ODA | Would not consider previous levels of climate finance | Neutral | Easy to standardise | Feasible |
| **What finance is incremental?** | 11 | How do we determine whether finance is incremental (i.e., beyond business as usual; would private/public flows have occurred without public intervention)? | See Analytics section as incrementality is related to causality | | | | |
| **What types of interventions, and resulting finance, should be counted?** | 12 | Which public interventions do we examine? (Cross-referenced with Analytics) | See Analytics section | | | | |

Source: WRI

**Calculations**

Another important decision point to consider is that of the actual calculations relating to the finance provided and mobilised. Examples of questions (a full listing is provided in the framework table) include:

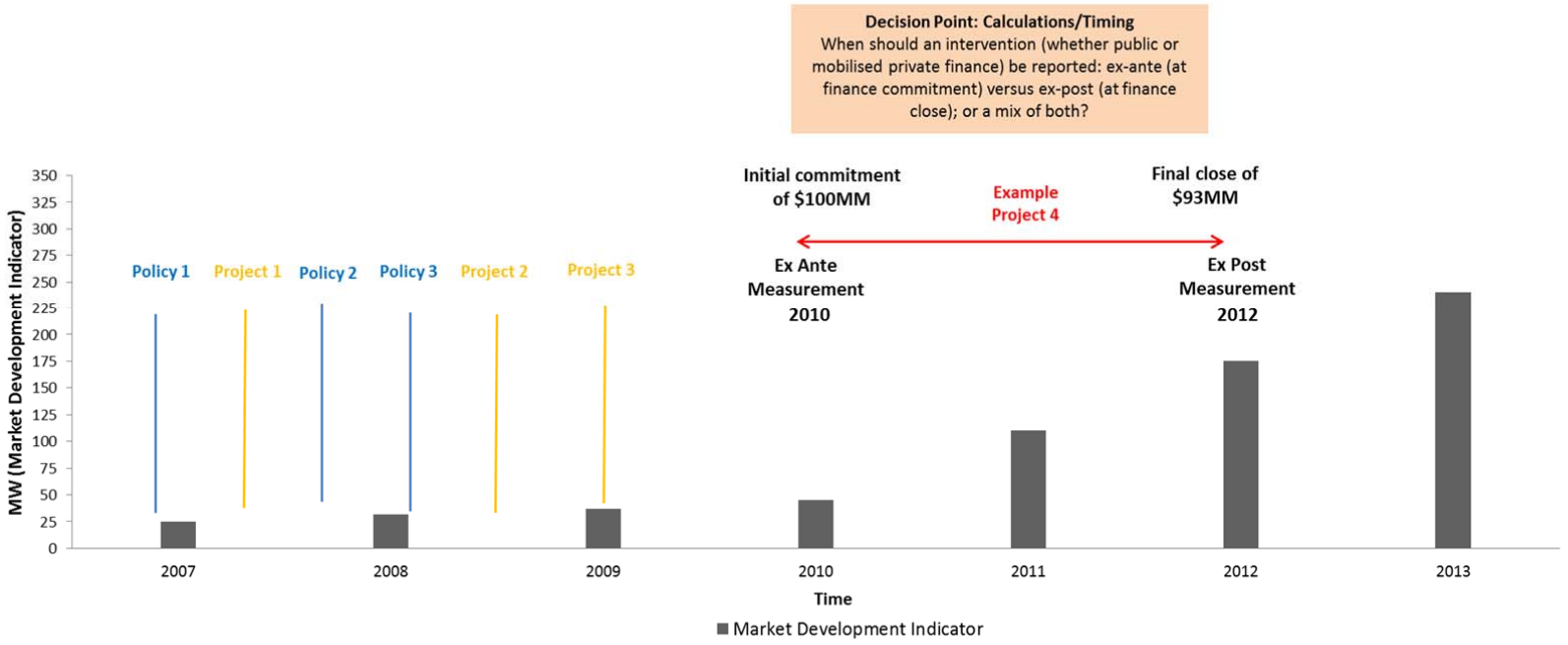
- *Which currency to use for reporting*: Different contributor countries may disburse financing in their respective currencies, or in the local currencies of the recipient countries. Should financing be reported in the currencies in which they are disbursed, which would provide a more accurate picture of the currency risks adopted? Or should they be reported in USD and/or contributor country currency, which would be easier to aggregate and compare? Complications include what exchange rate to apply to ensure consistency and allow for aggregation; at project commitment, finance disbursement, end of year, a yearly average or, if mobilisation is calculated over time, a rolling or dynamic average?

- *How to report different instruments*: Different instrument play very different roles in addressing various risks and mobilising co-finance, including from the public and private sectors. Should these instruments be reported based on their face value or should their different risk profiles be considered? Should non-concessional financing be treated separately from concessional financing? How can we distinguish between grants and instruments that expect returns (such as loans or equity) and whose principal can be re-invested, instruments that require triggers to provide payments (such as insurance), as well as performance-based or market-based instruments (such as carbon finance)?

- *Whether to report on ex-ante or ex-post basis (See Figure 6)*: Should co-financing be reported on an ex-ante or ex-post basis? Most institutions currently report on an ex-ante basis, which is a good signal of their intent and is a more feasible approach. However, it may ignore final costs, particularly if they change in the process of finalising the deal, and may create incentives to commit more financing than is actually disbursed eventually. Ex-post reporting is a more accurate approach but also more resource-intensive. An ideal approach however may include a mix of ex-ante and ex-post reporting, to capture both the institution's intent and actual execution.

These decision points are captured below in Figure 7, together with options to address them and implications of adopting these options.

*Figure 6: Ex-Ante vs. Ex-Post Measurements*




Source: WRI

*Figure 7: Framework of Options to Address Calculation Issues*

| Issue | | Research Question | Option | Implications | | | |
|---|---|---|---|---|---|---|---|
| | | | | Integrity | Incentives | Standardisation | Practicality |
| **Currency** | 1 | What reporting currency is used? | Option 1: Use USD reporting convention (per the $100 billion commitment) | Low; does not capture risk mitigation roles | Neutral | Easy to standardise | Practical |
| | | | Option 2: Use individual donor country currency | Neutral | Neutral | Neutral | More practical; already in use |
| | | | Option 3: Report by country and currency | High, reflects exchange risks being taken on | Neutral | Not easy to standardise | Neutral |
| | 2 | What exchange rates are used? | Option 1: Do exchange rate conversion at project commitment | Low, but reflects intened financing | Neutral | Easy to standardise | Practical |
| | | | Option 2: Do exchange rate conversion at project disbursement | High; captures actual extent of financing | Neutral | Easy to standardise | Neutral |
| | | | Option 3: Do exchange rate conversion at year end or annual average over the year | Neutral | Neutral | Not easy to standardise | Less practical; more resource intensive |
| | 3 | How do we calculate the value of local currency versus leading (hard) currency finance? | Option 1: Do not make any distinction | Low | Neutral | Easy to standardise | More practical |
| | | | Option 2: Use proxies to determine risk exposure for countries (possibly e.g. based on country credit ratings) | High, captures amount of risk taken on | Incentivises adoption of exchange rate risks | Easy to standardise | Less practical |

| Issue | | Research Question | Option | Implications | | | |
|---|---|---|---|---|---|---|---|
| | | | | Integrity | Incentives | Standardisation | Practicality |
| **Instruments** | 4 | How do we account for different financial instruments and their risk-return profiles?<br><br>// Grant; non-performance based<br><br>//Loan; non-performance based, non-concesional<br><br>// Equity; non-performanced based, non-concessional<br><br>// Quasi-equity, non-performanced based, non-concessional | OPTIONS ARE NOT MUTUALLY EXCLUSIVE | | | | |
| | | | Option 1: Face value; all instruments are treated the same way; at their face value | Low; different instruments play different roles | Neutral | Easy to standardise | More practical |
| | | | Option 2: Use risk-return adjusted equivalence: Treat loans, equity, quasi-equity as equals and grants seperately; not clear how to distinguish between grants and loans. See paper for discussion. | High | High | Not easy to standardise | Less practical |
| | | | Option 3: Consider knock-on impacts of finance; for example, loan wouldn't have happened without equity or vice versa | High | High | Not easy to standardise | Less practical |
| | 5 | How do we consider concessional finance versus non-concessional finance? | Option 1: Face value; no difference whether concessional or market rate finance (based on the idea that even market rate loans can be considered concessional in theory if noone else is willing to finance them | Neutral | Low | Easy to standardise | More practical |
| | | | Option 2: Economic value (calculating grant equivalence) of concessional loans; complication is calculating this equivalence; some examples exist (e.g., OECD calculator) | High | High | Not easy to standardise | Less practical |

| Issue | | Research Question | Option | Implications | | | |
|---|---|---|---|---|---|---|---|
| | | | | Integrity | Incentives | Standardisation | Practicality |
| Instruments | 6 | How do we treat instruments that have a trigger: e.g., insurance; guarantees; derivatives; hedges since money may not be paid out but is committed | Option 1: Do not count guarantees | Low | No incentive to provide guarantees | Easy to standardise | More practical |
| | | | Option 2: Amount kept on reserve against guarantee issued (issue with different countries having different reserve requirements) | High | High | Not easy to standardise | Neutral |
| | | | Option 3: Gross exposure | Neutral; does not properly capture risk taken on and can significantly overstimate financing amounts | Neutral | Neutral | Neutral |
| | | | Option 4: Gross exposure * probability of default * Rio marker percentage | High | High | Not easy to standardise | Less practical |
| | | *Additional Questions*<br>Do we adjust for reinsurance of these instruments by third parties? | | | | | |
| | 7 | Consideration of performance-based payments and market mechanisms such as REDD finance, carbon finance (CDM) | Option 1: Do not consider carbon finance (CDM) because it is meant to meet developed country mitigation commitments. | High; reduces double counting | Neutral | Easy to standardise | More practical |
| | | | Option 2: Face value of emissions credits purchased or results-based finance; only counted if disbursed and counted the same way as a non-performanced based instrument | Neutral | Neutral | Easy to standardise | More practical |
| | | | Option 3: Discount the value of the performance based finance over time to show that it has a reduced impact over time and because the donor took on less risk in providing it (disincentive for small actors, though it can also promote effectiveness in other cases) | High | High | Not easy to standardise | Less practical |
| | | *Additional Questions*<br>-Bonds, and tradability/net subscriptions; options are face value of bond, reissuance, rollover, secondary trades, additional questions about point of estimation in the value chain and also whether we adjust for first purchaser versus later purchaser, how to deal with bonds that are associated with multiple projects, bonds that are associated with entities rather than projects? | | | | | |
| Timing | 8 | When is it reported: ex-ante, ex-post; commitment versus close of financing, especially if a project takes years to finance | Option 1: Ex ante, ideally with ex-post verifications; when the commitment is made | May ignore final costs | Promotes commitments to projects, but might result in incentive to commit more than is actually disbursed (overestimation) | Neutral | More practical |
| | | | Option 2: Ex post | Reflects reality and adjusts for changes | Neutral | Neutral | Less practical; resource intensive |
| | | | Option 3: A mix of both | Same as Option 2 | Realigns incentives by capturing both intent and actual commitment | Neutral | Less practical; most resource intensive |

Source: WRI

**SECTION III: DETAILED ANALYTICAL FRAMEWORK**

Calculating the total aggregated public and private investment (that is, total cost of projects and policies) in climate change-friendly projects and sectors would provide a useful starting point to measure a baseline, and subsequently, progress to the $100 billion goal. But ensuring that subsequent data collected represented new and additional finance mobilised, and ensuring that this measurement incentivised effective actions would require a second set of processes: proving the causality between these two data sets, attributing mobilisation credit to various actors, and considering impacts over time. Below we outline in detail the decision points *specifically associated with linking public interventions to mobilised private finance* under these three aforementioned categories. Many of these analytical decision points, and the resulting options, depend on the *Definitions* and *Calculations* approaches outlined in Section II.

- *Causality*: How do you determine if a public intervention caused a flow of private climate finance, and to what extent? How can we measure the counter factual without the intervention?

    - The choice of which public interventions to include in estimating mobilised finance is the first decision point. Contributor countries can continue with the current approach of only including project-level contributions, or broaden methodologies to focus on indirect interventions like policy support and technical assistance. The background paper that informs this report (and that was built on the cases in Appendix II) highlighted how not including indirect interventions can have the negative impact of skewing public funds toward more established markets. But it is certainly true that measuring the impacts of policies and technical support can be tricky and a somewhat subjective exercise, particularly in the absence of good data.

    - Currently, some methodologies report "mobilised" finance derived from both public and private sources. Deciding whether to report instances when public contributions in a particular project can cause other public contributions is important because this has a bearing on how credit for mobilised private finance in a project is subsequently allocated. Options range from allowing an individual reporter to claim credit for all the public co-finance in the project (a practice employed by several institutions currently, but leads to multiple instances of double counting across institutions), to partial credit based on subjective and objective factors, to claiming no credit for public co-finance.

    - The third and most complex decision point is establishing the link between public monies and mobilised finance. The options depend on whether or not indirect public interventions are included in reporting. For project-level reporting, one option—typically used in current methodologies—is simply assuming that all private finance was mobilised by public co-finance in a project. However, this underestimates the importance of recipient country activities in creating attractive investment conditions for private investment, and does not require proof that the private finance would not have occurred without the public interventions (incrementality). The other option is providing partial credit to public interventions, however, countries would need to agree on proxies to estimate such partial credit, whether in aggregate or at individual

reporting levels. For indirect interventions such as policy support, reporters will have to either report the impacts of policy over time, or reassign credit from mobilised private finance within projects to policies in the past. In either case, estimating the impacts of past policies or projecting future impacts of current policies will either require creating standardised proxies used by all countries (for example, applying the same "mobilised finance" multiplier to any Feed-in-Tariff policy) or a subjective (and thus inconsistent) determination. An important complication is how to treat changes in policies (for example, repealing a feed-in-tariff) and resulting allocations in credit.

- *Attribution*: How can you attribute mobilisation among public actors, and avoid double counting, especially when multiple actors are involved in a given project, program, or policy, and in developing a market over time, and through different interventions (See Figure 8).

    - How do we assign credit to different actors? Each actor could take full credit for the private co-financing, but this would create lead to a significant overestimation of mobilisation. An alternate approach, used by the ADB, is to assign credit for mobilisation to the lead public actor in an intervention, though this may disincentivise institutions from providing smaller, or more incremental, amounts of financing. Credit could also be pro-rated based on the economic or face value of the public contributions, possibly adjusted to reflect the sequence in which the financing was provided.

    - How do we split credit for mobilisation between different parts of the public financing mix? Even within the different public sector contributions, one instrument or institution may be trigger another piece of public finance, which then triggers private finance. Do we assume that there is no causality between the different public contributions? Or could we consider providing credit based on the sequencing of public finance?

*Figure 8: Assigning Credit to Public Interventions for Mobilising Other Public and Private Finance*

**Decision Point Analytics/Attribution: Number 7 and 8**

How do we consider assigning credit to private finance mobilisation to various actors considering two issues below?

(1) How public contributions trigger other public contributions within a project

(2) How public contributions subsequently mobilise private finance contributions

For example, if a specific public grant is responsible for another public loan, and then this loan resulted in another infusion of private finance, how should mobilisation credit be assigned to the public grant and the public loan?

**Decision Tree**

Step 1: Do we assume that public contributions cause other public contributions?

If no, then only Step 2

If yes, then Step 2 and Step 3

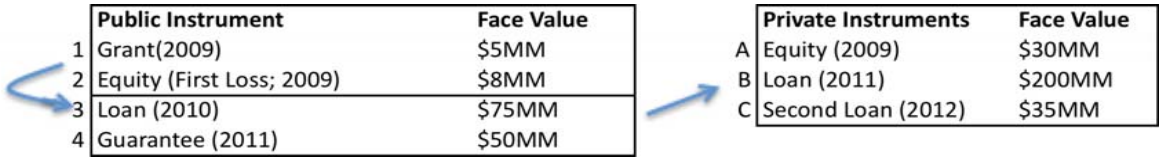
Step 2: Assign private finance mobilisation credit to public actors based on

Option 1: Each public actor gets full credit (results in double counting)

Option 2: Only the "lead" actor gets full credit (disincentivises some finance)

Option 3: Assign credit based on sequence of financing (challenging to estimate)

Step 3: Adjust credit based on public-public mobilisation, for example based on the sequence or type of financing



| | Public Instrument | Face Value |
|---|---|---|
| 1 | Grant(2009) | $5MM |
| 2 | Equity (First Loss; 2009) | $8MM |
| 3 | Loan (2010) | $75MM |
| 4 | Guarantee (2011) | $50MM |

| | Private Instruments | Face Value |
|---|---|---|
| A | Equity (2009) | $30MM |
| B | Loan (2011) | $200MM |
| C | Second Loan (2012) | $35MM |

Source: WRI

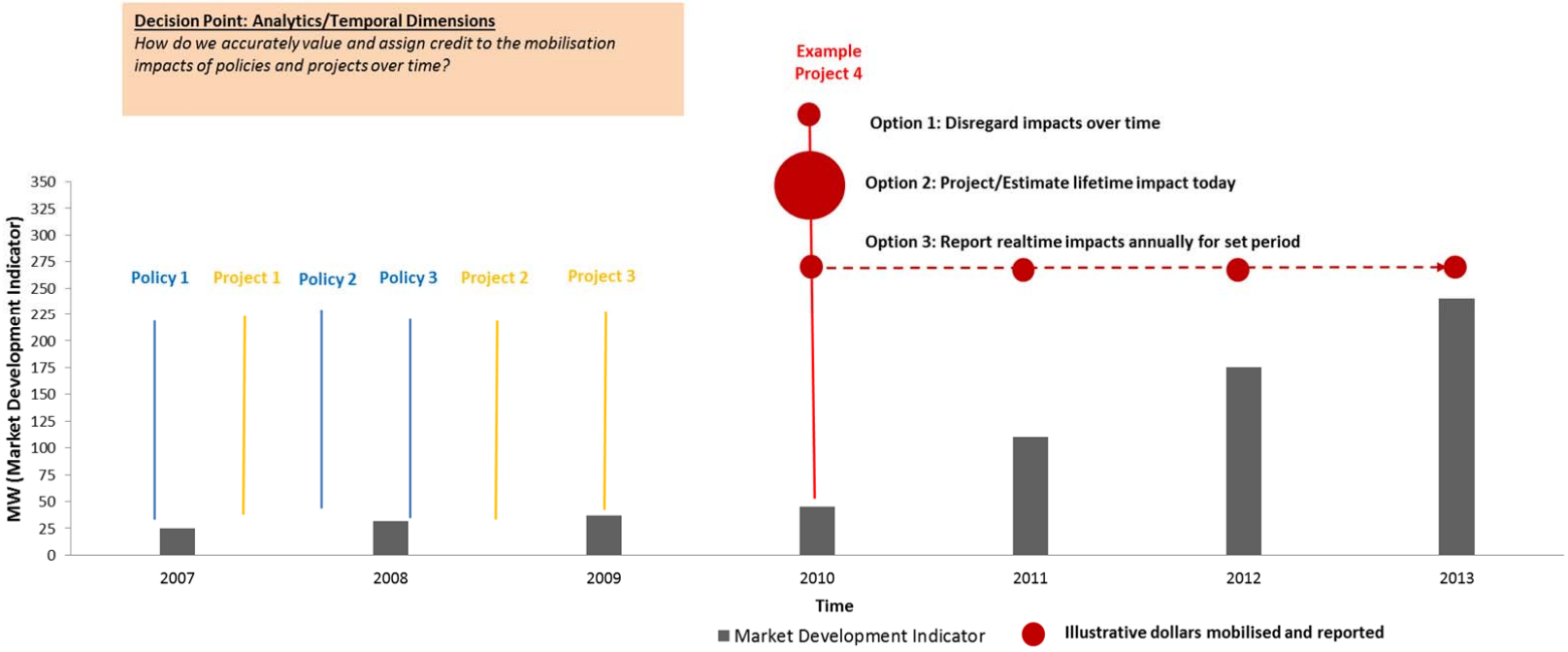
- *Temporal Dimensions:* When (temporally) in the financing chain, and in a market development timeline, is mobilisation estimated and reported? How can indirect interventions like policy support and technical assistance receive credit for future impacts?

    - How do we value and assign credit to projects and policies over time? The development of a market is shaped by various factors and interventions, and the impacts of these interventions can increase with the passage of time. For example, a policy may not induce significant investments until sufficient time has passed to create an atmosphere of policy certainty. At the same time, the impacts of these interventions may also decrease over time with the introduction of other causal factors. It is most practically feasible to discard the consideration of these impacts. However, this can reduce the incentives to grow markets more broadly. Measuring impacts over time is a more accurate, though less feasible, approach. Should these impacts be captured upfront, in an ex-ante, lifetime estimation of impacts? Or should they be reported each year based on live information? Other subsequent questions can include: what time period should be used? How do we arrive at an appropriate discount rate? Some of these issues are illustrated in Figure 9.

    - How do we address subsequent rounds of financing, particularly if the scope of the project increases, or it faces cost overruns, or gets refinanced? Should the subsequent financing be disregarded, potentially leading to underestimation of actual flows? Should we consider the gross amounts of finance every time new capital flows in? Or should we weight this subsequent finance by its tenure or volume?

These decision points, together with options for addressing them and the resulting implications, are captured in Figures 10, 11, and 12 below.

*Figure 9: Reporting Mobilisation Impacts over Time*




Source: WRI

*Figure 10: Framework of Options to Address Causality Issues*

| Issue | | Research Question | Option | Implications | | | |
|---|---|---|---|---|---|---|---|
| | | | | Integrity | Incentives | Standardisation | Practicality |
| **How do we establish causality between public interventions and private finance flows?** | 1 | Which public interventions do we examine? (Cross-referenced with Definitions) | Option 1: Only consider project-level co-finance | Does not reflect importance of indirect interventions | Biases finance to projects and established markets | Standardised as long as reporters avoid double counting | Status Quo: Practical option |
| | | | Option 2: Consider project and indirect interventions | Reflects a wider range of interventions | Incentivises indirect interventions | Standardised as long as reporters avoid double counting | Challenging to calculate |
| | 2 | Do we consider the possibility of public interventions causing other public interventions *within* a project at a given point in time? | Option 1: Each public entity can report all of the public co-finance in a project as "mobilised" | Overestimates importance of some public finance | Neutral | Neutral as long as reporters avoid double counting | Practical but hard to avoid double counting |
| | | | Option 2: Public entity takes partial credit for causing public co-finance within a project, potentially through proxies, like sequencing (that is, the "first mover" that provides finance gets some credit for subsequent co-finance | Reflects reality as long as estimations are sound | Promotes public sector taking risk and coordinating with other actors | Neutral as long as reporters avoid double counting | Resource intensive |
| | | | Option 3: Assume that no public entity can take credit for "causing" public co-finance within a project | Does not typically reflect reality | May disincentivises coordination among public actors | Neutral | Practical, especially if private data is confidential |
| | | **Note: The point of estimation and the decision of what type of interventions to consider determine the options available** | | | | | |

| Issue | | Research Question | Option | Implications | | | |
|---|---|---|---|---|---|---|---|
| | | | | Integrity | Incentives | Standardisation | Practicality |
| **How do we establish causality between public interventions and private finance flows?** | 3 | How do we link various types of public interventions to private finance mobilised either within projects, across projects, and across markets? | Assuming that only project-level co-finance is considered:<br>-- Option 1A: Assume that public interventions caused all the private finance in a specific project<br>-- Option1B: Assume that public interventions (e.g., using proxies) caused some percentage of the private co-finance | 1A: Does not reflect reality, but may be in line with public mandates<br>1B: Better reflects reality | 1A: Incentivises project-level interventions<br>1B: Neutral | Neutral | 1A: More practical<br>1B: Less practical; challenging to implement |
| | | | Assuming that project and indirect interventions are considered:<br>-- Option 2A: Use a project-level point of estimation, i.e., estimate impacts of past interventions on current projects<br>-- Option 2B: Use a policy-level point of estimation, i.e., project impacts of current interventions on future interventions | 2A&B: Both reflect reality, but may do so at different points in time | 2A: Incentivises project-level interventions only<br>2B: Incentivises project and policy interventions | Neutral | 2A&B: Less practical; both options are challenging to implement |
| | | | To make projections and estimations, use baseline leverage ratios (proxies) to estimate mobilised finance options include<br>--Simple: Proxies by intervention: policy, technical assistance, type of co-finance<br>Neutral: Matrix/gradation approach based on country, market stage, and type of intervention ( could draw data from WB Doing Business, BNEF's ClimateScope tool)<br><br>*How do we come up with the proxies?*<br>- Using benchmarks based on quantitative analysis (econometric analysis)<br>- Using benchmarks based on a case study approach | As the options get more detailed, the incentives and integrity improve but we lose the practicality; standardisation is neutral | | | |
| | | | Option 3: Subjective determination; could be based on adjusting baseline leverage ratios using qualitative factors on a case-by-case basis; similar to the GEF's approach of estimating net incremental finance. | Most integrity | Best incentives | Not standardised | Less practical; challenging to implement |
| | | **Note: The point of estimation and the decision of what type of interventions to consider determine the options available** | | | | | |
| | | *Additional Questions*<br>-What happens when public financing comes in retroactively? For example, see Mexico and Kenya case studies in WRI's background paper<br>-How do we value the causality associated with export credit loans and guarantees? | | | | | |

Source: WRI

*Figure 11: Framework of Options to Address Temporal Dimensions*

| Issue | | Research Question | Option | Implications: Integrity | Incentives | Standardisation | Practicality |
|---|---|---|---|---|---|---|---|
| **Temporal Dimensions** | 4 | How do we accurately value and assign credit to the impacts of policies and projects over time? Specifically, how do we cascade and taper both within a project, in a market, and across interventions | Option 1: Not reporting impacts over time | Does not reflect reality over time; overemphasises the now | No incentives to grow markets broadly | Neutral | More practical |
| | | | Option 2: Ex-ante project lifetime impact of cascading/tapering<br>Proxies: Use baseline leverage ratios to estimate mobilised finance; assumption is that we can prove certain types of intervention cause others<br>Simple: Intervention only; policy, technical assistance, type of co-finance<br>Neutral: Matrix/gradation approach based on country, market stage, and type of intervention ( could draw data from WB Doing Business, BNEF's ClimateScope tool) | Overestimates $100billion progress | Incentivises actions that have lasting impact | Standardised | Less practical; hard to measure lifetime impacts |
| | | | Option 3: Report project and tapering impacts every year based on live information<br>Simple: Intervention only; policy, technical assistance, type of co-finance<br>Neutral: Matrix/gradation approach based on country, market stage, and type of intervention ( could draw data from WB Doing Business, BNEF's ClimateScope tool) | Most integrity | May undermine ambition | Not standardised | Less practical; hard to measure |
| | | *Additional questions for Q4/ Options 2 and 3:*<br>*-What time period is used, how are impacts discounted over time, and how do the discount factors consider other parallel*<br>*- How do we calculate the cascading and tapering impacts?* | | As the options get more detailed, the incentives and integrity improve but we lose the practicality; standardisation is neutral | | | |

| Issue | | Research Question | Option | Implications | | | |
|---|---|---|---|---|---|---|---|
| | | | | Integrity | Incentives | Standardisation | Practicality |
| **Temporal Dimensions** | 5 | Subsequent rounds of financing (either at the project level [project gets larger, overruns, or refinance] or the fund level [expansion]) | Option 1: Disregard subsequent rounds of financing | Does not reflect reality | Creates double counting | Neutral | Feasible; least resource intensive |
| | | | Option 2: Consider subsequent rounds of financing but weight it by the tenor and volume of financing provided; one complication is that new funders might have come in only because of the existing funders | Reflects reality | Creates incentives to stay the course in a project | Neutral | Feasible; resource intensive to calculate |
| | | | Option 2A: Take credit for "mobilised finance" on par with the previous public financier, assuming finance is exiting; if finance if not existing, do not take credit<br>Option 2B: Claim credit for only future mobilised finance<br>Option 2C: Claim credit for both past and future mobilised finance<br>Option 2D: Take no credit for mobilised finance if finance comes in after project or fund close | | | | |
| | | | Option 3: Consider gross finance every time new finance comes in | Partially reflects reality but overestimates flows | Creates negative incentives to leave a project or fund if possible | Neutral | Neutral; somewhat resource intensive, but practically feasible |
| | | | Option 3A: Take credit for "mobilised finance" on par with the previous public financier, assuming finance is exiting; if finance if not existing, do not take credit<br>Option 3B: Claim credit for only future mobilised finance<br>Option 3C: Claim credit for both past and future mobilised finance<br>Option 3D: Take no credit for mobilised finance if finance comes in after project or fund close | | | | |
| | | **Note: The subsequent rounds of financing, whether public or private, would subsequently impact how much "mobilised** | | | | | |

Source: WRI

*Figure 12: Framework of Options to Address Attribution Issues*

| Issue | | Research Question | Option | Implications: Integrity | Incentives | Standardisation | Practicality |
|---|---|---|---|---|---|---|---|
| Attribution/ Double Counting /for a specific project | 6 | Assigning credit to different interventions and institutions involved in a given project based on sovereignty | Option 1: Claim credit for *all* co-financing from private sources, regardless of sovereignity | Could overestimate importance of public actor | Promotes both contributor and recipient private investment | Neutral | Neutral |
| | | | Option 2: Claim credit for private sources in a specific project, but use proxies for assignment. For example, if both public and private money come from the same country, then assume that the public portion mobilised that private portion | Could either overestimate or underestimate depending on circumstances | Could promote export credit activities | Neutral | Neutral |
| | | | Option 3: Claim credit for all *contributor country* private sources in a specific project | Reflects political goals, but not necessarily accurate | May disincentivise working with recipient private actors | Neutral | Neutral, but requires additional step |
| | 7 | How do we assign mobilisation credit to different public actors and the instruments utilised? For example, if multiple public instruments are taking credit for the same slice of mobilised private money, how is credit allocated to different instruments/interventions within a project | Option 1: Each actor/instrument gets full credit for the private portion | Does not reflect reality; promotes double counting | Negative incentives to provide small volumes of finance | Not possible to aggregate | Simple |
| | | | Option 2: Mobilisation credit is only assigned to the lead public actor (for example, by financial volume, or financing horizon); this approach is used by the ADB | Does not reflect reality | Negative incentives to provide small volumes of finance | Neutral | Simple |
| | | | Option 3: Credit is pro-rated based on the face value or economic value of the public contribution | Reflects reality | Does not incentivise early money coming into a project | Neutral | Less practical; challenging to implement |
| | | | Option 4: Option 1 or 3 but adjusted based on the sequence of financing ( so only the public instruments that came in prior to private money are assigned credit for private finance) or a projection of what percentage of funds would have achieved close with/without the intervention | Reflects reality depending on calculations | Incentivises early money coming into a project | Neutral | Less practical; challenging to implement |
| | 8 | How do we consider assigning credit to private finance mobilisation within the public sector contributions? For example, was a public loan responsible for attracting private sector equity or vice versa? | Option 1: Assume that there is no causality between public contributions in a financing | Does not reflect reality | Does not incentivise early money coming into a project | Neutral | Simple |
| | | | Option 2: Provide credit based on sequence of finance. *See Analytics, Question 7, Option 3* | More reflective of reality | Incentivises early money coming into a project | Neutral | Less practical; challenging to implement |
| | | *Additional Questions* -How should we handle export credit institutions and development finance with national content requirements, funding developed country actors to execute projects in developing countries? Export credit can have both positive and negative impacts for contributor countries | | | | | |

Source: WRI

**WAYS FORWARD**

The selection of options from the framework outlined above, and the definitions and methods that a country adopts, will implicitly involve making trade-offs and value judgments. Some of the options outlined may not even be possible given current data availability. WRI's research and analysis has uncovered a few important considerations for the UNFCCC and its parties:

1. Gaps and Weaknesses in Existing Methodologies:
    a. Current methodologies do not reflect market realities and do not set up positive incentives for effective actions, particularly with respect to promoting non-project finance support. That said, establishing causality, attributing flows, and considering temporal dimensions can be a challenging endeavour. Creating proxies can ease reporting burdens, but it remains to be seen whether there is adequate historical data to create reasonable proxies.

    b. Accurately aggregating reporting with current methodologies is not possible since reporting varies considerably in definitions and calculations, even in reporting only public contributions, let alone mobilised private finance.

2. Data Challenges:
   While it is not a focus of this report, WRI's case study process uncovered the challenge of procuring data on private finance flows. Beyond confidentiality concerns at the project level, even aggregate data on private finance flows is challenging to estimate given the lack of systems in place to track such flows in many recipient countries.

3. Trade-offs Inherent in Improving Methodologies:
   Selecting ideal methodological options will likely require balancing promoting integrity and positive incentives with standardisation and practicality: Typically – though not in all cases— the options that come closest to reflecting reality and creating positive incentives are also the hardest to standardise, aggregate, and implement. These more complex options, which are likely to promote effective public interventions in the long run, will also undoubtedly be politically challenging to implement in the short-run.

Given these considerations, we recommend that the UNFCCC and its parties:

1. Invest heavily in improving data tracking systems for private climate finance and standardising calculation processes, including providing support to recipient countries.

2. Until data improves and methodologies adopt common definitions and standardised calculation methodologies only count the public contributions toward measurement of progress toward $100 billion as a stop-gap measure until data availability and methodologies improve. Of note, during the Fast-Start finance period, countries generally only reported public contributions toward their commitment.

3. To prepare for eventual reporting of private contributions:
    a. Focus initially on improving aggregate reporting of total private climate finance investment, rather than individual countries' "mobilisation." Given current data constraints, inconsistent definitions and calculations, and methodological complexities, the margin of error associated with estimating and reporting individually "mobilised" finance could unintentionally decrease ambition, especially given the double counting issues associated with prevalent methodologies. Doing so is also the most practical and resource-efficient option, and will eventually allow better monitoring of progress towards meeting the $100 billion commitment.

    b. Transition to reporting mobilised finance from both project finance and indirect interventions. To maximise the practical feasibility of doing so, the UNFCCC may create proxies for measuring "mobilised finance," informed by how various public interventions have mobilised private finance historically.

Over time, as data improves, donor countries can improve methodological options (for example, using some of the options outlined in this report) and report on individual or aggregated "mobilisation" more accurately. In particular, updating methodologies to reflect the long-term impacts of indirect interventions will no doubt be a challenge, but doing so will ensure that we maximise the effectiveness of climate finance in meeting the diverse investment requirements of contributor countries.

## APPENDIX I: METHODOLOGIES

| Reporting Entity | Definition/Formula | Point of Reporting | Assessing Causation | Distinction b/w Public and Private | Currency | Sources |
|---|---|---|---|---|---|---|
| ***Debt Instruments*** | | | | | | |
| ADB | Apart from B loans, Direct value added (DVA) co-financing includes (i) a revised calculation for parallel loans, the debt portion of project costs financed by third parties provided that ADB's presence has been instrumental in mobilising the third-party debt evidenced by a common terms agreement, common security arrangement, or a memorandum of understanding or other framework agreement; (ii) third-party debt (net of guarantees) provided by ADB, unfunded risk participation by banks rated A and AA, and amounts reinsured with entities rated A and AA.[1] Further, if the ADB joins a non-project-specific initiative that is administered by another institution, it does not consider the co-financing provided by others as being mobilised. In general, ADB requires that its intervention was "instrumental" in mobilising external debt.[2] For ADB, instrumentality can be demonstrated by formal agreements between the ADB and co-financiers, such as memoranda of understanding (MoU)."<br><br>DVA co-financing mobilization is an indicator included in ADB's results in framework and is reported in the annual report.<br><br>The classification criteria for co-financing are: (1) Contractual co-financing which may be joint or parallel untied with full or partial administration by ADB (2) Collaborative which is parallel, tied or untied without administration by ADB (3) Discrete or non-direct value added. If ADB joins non-project specific initiatives led by others, the financing provided by others is not considered co-financing.<br><br>In addition to official co-financing flowing through partnerships with multi and bilateral development assistance agencies, public sector lending windows of ECAs for grants and loans for projects, grants for TAs, there is commercial co-financing flowing mainly through credit enhancement improvements and risk sharing agreements, where the concept of net DVA is applied. Net DVA includes DVA co-financing that does not use Ordinary Capital Resources allocation, and guidelines are provided for each modality which falls under this category.<br><br>The ADB systematically tracks this in its Annual Report and Effectiveness Report. | Ex ante (forecasts) | DVA/co-financing mobilisation | Yes, but assumes mobilisation of both sources of finance | USD, EUR, JPY, or other foreign currencies in which ADB can efficiently intermediate | 1. Asian Development Bank, *Annual report 2011*<br>2. Asian Development Bank, *Annual report 2012* |

| | | | | | | |
|---|---|---|---|---|---|---|
| CIF-CTF | Leverage refers to co-financing in CIF projects and programs from private sector and other sources, such as international and domestic commercial banks and national and municipal governments. CTF calculates its leverage by working out the ratio between the overall amount of the initiatives funded and its own contribution. The aim, therefore, is not just to assess its effectiveness in attracting private investments: the CTF implicitly considers that any joint funding has been raised thanks to its involvement, and so posts a significant leverage ratio.[1] The CIF calculates leverage using a qualitative method prior to the investments.[2] CTF includes direct leveraging as one of its core indicators to be reported for all projects. MDBs and CTF country focal points are responsible for reporting these to the CIF Administrative Unit on an annual basis. The indicator is defined as "volume of direct finance leveraged through CTF funding – disaggregated by public and private finance", though it is not clear how CIF defines 'direct'. While the CTF requires baseline and targets for each of its core indicators, it allows for these "to be established and updated as appropriate" by the MDBs and implementing agencies. To meet these requirements, the AfDB for instance has to manually go through each project-financing document and assemble a spreadsheet to provide fully disaggregated breakdown of private cofinanciers (without country of domicile) to the CIF. It is hard to know if, without the CTF investment, the clean technology projects would still go forward. 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.[3] | Ex ante (forecasts) | Assumed Total Project Cost | Yes, but assumes mobilisation of both sources of finance | USD | 1. Benoît Leguet, *Assessing the financial efficiency of the Green Climate Fund: leverage ratios - from theory to practice* (Paris: CDC Climat Research, 2012)<br>2. CDC Group, *Annual review 2011*<br>3. Jessica Brown, Barbara Buchner, Gernot Wagner and Katherine Sierra, *Improving the Effectiveness of Climate Finance: A Survey of Leveraging Methodologies* (London: Overseas Development Institute, Climate Policy Initiative, Environmental Defense Fund and Brookings Institution, 2011) |
| UK ICF | Mobilised is often also referred to as leverage. It is '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 have been the case'. This definition requires that mobilised funds are either additional funds or are existing funds diverted from another (more fossil-fuel intensive) use to this objective. Mobilised resources could be: 1) Upfront co-financing i.e. resources committed to the project from other donors, partner governments or private sector at the time of project approval; 2) Subsequent co-financing i.e. resources mobilised after the project has been operating e.g. where early success encourages others to contribute. Formula: 1. Identify HMG finance contribution; 2. Identify total public and private co-finance (i.e. other donor/partner government contributions); 3. Identify proportion of total public and private co-finance that would have been provided in the absence of DFID funding. The remainder provides an estimate of mobilised public and private finance. Count only public finance if it is truly additional or diverted to climate from other sources. Where HMG are only funding part of the project with other donors who | Not Available | Pro-rata share of funding (for private money, with some nuances in the event finance is taking a higher or lower risk than others) | Yes, but assumes mobilisation of both sources of finance, also disaggregates finance from developed and developing countries, and the theme of finance (e.g. adaption, low | GBP, USD | 1. International Climate Fund. "ICF KPI 11: Volume of public finance mobilised for climate change purposes as a result of ICF funding." International Climate Fund, Staffordshire, UK, 2013<br>2. International Climate Fund. "ICF KPI 12: Volume of private finance mobilised for climate change purposes as a result of ICF funding." International |

| | | | | | | |
|---|---|---|---|---|---|---|
| | also came on board initially then it needs to share the public sector leverage claim. It is however relevant/key to note the total sum of money that is mobilised and for this reason the total and the attributed amounts should both be reported. Projects indirectly influenced will be captured via other indicators e.g. the International Climate Fund "influence" indicator. The assessment of additionality will require the judgement of the project/programme officer. HMG will be more likely to be able to claim additionality if it designed and led the project.[1 2] | | | carbon development or forestry) | | Climate Fund, Staffordshire, UK, 2013 |
| JBIC | Taking a fairly more conservative approach, JBIC only included private sector loans from commercial banks with offices in Japan (typically comprising 40% in a B tranche of the overall Japanese loan) as well as Japanese equity co-investments in its estimation of mobilised funds. JBIC estimates mobilisation only at the first fund level. Note that JBIC and banks lend in different tranches (JBIC lending tends to be tail heavy). Japan is the only country to specify the level of 'private finance' pledged and mobilised as part of its reporting on Fast Start Finance under the UNFCCC. Its May 2011 report states that within its $15 billion pledge, $4 billion will come in the form of 'private finance', of which $3 billion has 'already been mobilised for assistance to developing countries'. The submission does not, however, define 'private finance', nor does it provide information on where the funds originated or the types of activities that have been supported. | Ex ante (forecasts) and verified at ex post | Only JPN private money | Only includes private money mobilised | JPY and USD | |
| ***Equity Investments*** | | | | | | |
| ADB | The ADB estimates mobilisation only at the first fund level. The ADB's definition of DVA co-financing as it relates to equity investments only includes investments made by private actors in funds where the ADB acts as a general partner, excluding those where the ADB acts only as a limited investment partner.[1] | Ex-ante (first fund level) | DVA/co-financing mobilisation | Yes, but assumes mobilisation of only private money | USD, EUR, JPY, or other foreign currencies in which ADB can efficiently intermediate | 1. Asian Development Bank, Annual report 2011 |
| CDC | Investments in fund closings prior to the one in which CDC participates are not counted.[1] The CDC applies a tapering factor that allows 100% of non-pre-existing funds to be counted for first round funds, but then discounts this by 25% for every subsequent round of funding. Investment by others in funds when CDC has made a legal commitment plus all capital committed at subsequent closings is counted as mobilisation once subjected to a tapering factor. | Ex-ante (forecasts) and ex post at fund closure | Pre-existing investment excluded | No, but assumes mobilisation of both sources of finance | GBP, USD, and local currencies | 1. CDC Group Plc, Annual Review 2011 |

| | | | | | | |
|---|---|---|---|---|---|---|
| CIF-CTF | Assumes that its interventions have mobilised all external capital being invested in the project. The CTF reports the definition of leverage to be "a combination of the total public and private co-financing to CTF financing". CTF calculates its leverage by working out the ratio between the overall amount of the initiatives funded and its own contribution. The aim, therefore, is not just to assess its effectiveness in attracting private investments: the CTF implicitly considers that any joint funding has been raised thanks to its involvement, and so posts a significant leverage ratio.[1] The CIF calculates leverage using a qualitative method prior to the investments.[2] CTF includes direct leveraging as one of its core indicators to be reported for all projects. MDBs and CTF country focal points are responsible for reporting these to the CIF Administrative Unit on an annual basis. The indicator is defined as "volume of direct finance leveraged through CTF funding – disaggregated by public and private finance", though it is not clear how CIF defines 'direct'. While the CTF requires baseline and targets for each of its core indicators, it allows for these "to be established and updated as appropriate" by the MDBs and implementing agencies. To meet these requirements, the AfDB for instance has to manually go through each project-financing document and assemble a spreadsheet to provide fully disaggregated breakdown of private cofinanciers (without country of domicile) to the CIF. It is hard to know if, without the CTF investment, the clean technology projects would still go forward.[1] 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.[3] | Ex ante (first fund level) | Assumed Total Project Cost | Yes, but assumes mobilisation of both sources of finance | USD | 1. Benoît Leguet, *Assessing the financial efficiency of the Green Climate Fund: leverage ratios - from theory to practice* (Paris: CDC Climat Research, 2012)<br>2. CDC Group, Annual review 2011<br>3. Jessica Brown, Barbara Buchner, Gernot Wagner and Katherine Sierra, *Improving the Effectiveness of Climate Finance: A Survey of Leveraging Methodologies* (London: Overseas Development Institute, Climate Policy Initiative, Environmental Defense Fund and Brookings Institution, 2011) |
| UK CP3 | The UK forecasts what percentage of sub-funds and direct investments would have reached financial close without intervention by the CP3. This can vary substantially according to sub-fund. For instance, DFID reported that for the CP3 Asia Fund, 60% of sub-funds and 80% of direct investments would have reached closing, and therefore that only 40% of sub-funds and 20% of direct investment were additional. For the CP3's investment in the IFC's Catalyst Fund, it was estimated that only 40% of sub-funds would have reached closing.[1 2] | Annual ex post verification; final beneficiary level | Attribution to UK on pro-rata share of public; "additional" | Yes, but assumes mobilisation of both sources of finance | GBP | 1. Stephanie Ockenden, Gail Warrander, Rosalyn Eales and Daisy Streatfeild, *UK Working Paper: A project level approach to forecast and monitor private climate finance mobilised* (Paris: CCXG Global Forum, 2012)<br>2. UK Department for International Development, *Climate Public Private Partnership Platform (CP3)* (London: UK |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | Department for International Development, 2011) https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48451/5720-business-case-for-icf-support-for-the-climate-publ.pdf |
| UK ICF | Mobilised is often also referred to as leverage. It is '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 have been the case'. This definition requires that mobilised funds are either additional funds or are existing funds diverted from another (more fossil-fuel intensive) use to this objective. Mobilised resources could be: 1) Upfront co-financing i.e. resources committed to the project from other donors or partner governments at the time of project approval; 2) Subsequent co-financing i.e. resources mobilised after the project has been operating e.g. where early success encourages others to contribute. Formula: 1. Identify HMG finance contribution; 2. Identify total public and private co-finance (i.e. other donor/partner government contributions); 3. Identify proportion of total public and private co-finance that would have been provided in the absence of DFID funding. The remainder provides an estimate of mobilised public and private finance. Count only public finance if it is truly additional or diverted to climate from other sources. Where HMG are only funding part of the project with other donors who also came on board initially then it needs to share the public sector leverage claim. It is however relevant/key to note the total sum of money that is mobilised and for this reason the total and the attributed amounts should both be reported. Projects indirectly influenced will be captured via other indicators e.g. the International Climate Fund "influence" indicator. The assessment of additionality will require the judgment of the project/programme officer. HMG will be more likely to be able to claim additionality if it designed and led the project.[1 2] | Not Available | Pro-rata share of funding (for private money, with some nuances in the event finance is taking a higher or lower risk than others) | Yes, but assumes mobilisation of both sources of finance, also disaggregates finance from developed and developing countries, and the theme of finance (e.g. adaption, low carbon development or forestry) | GBP, USD | 1. International Climate Fund. "ICF KPI 11: Volume of public finance mobilised for climate change purposes as a result of ICF funding." International Climate Fund, Staffordshire, UK, 2013<br>2. International Climate Fund. "ICF KPI 12: Volume of private finance mobilised for climate change purposes as a result of ICF funding." International Climate Fund, Staffordshire, UK, 2013 |
| GEEREF | Structured as a Fund-of-Funds, GEEREF invests in private equity funds (sub-funds) that specialise in providing equity finance to small and medium-sized project developers and enterprises (SMEs). GEEREF's analysis of the amount of financing catalysed by its activities looks at investments at both the fund level as well as the final beneficiary/project level. GEEREF uses "Leverage" for the intermediary level and "Multiplier" for the final beneficiary dimension, with "Impact" being a combination of the two. There are two multipliers to consider for GEEREF; (i) the | Annual ex post verification; sub fund and final beneficiary levels | Estimates a "leverage" and "multiplier" effect | No, but assumes mobilisation of both sources of finance | Not Available | 1. European Initiative for Clean Energy, Energy Efficiency, *Renewable Energy and Climate Change related to Development SICAV SIF, Agenda point No 6:* |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Multiplier for Equity which only considers the Equity that has been catalysed for the final beneficiaries/projects and (ii) the Multiplier for Equity and Debt which considers both the equity catalysed and the debt raised for the final beneficiaries/projects. One difficulty in this FoF model, however, is to maintain the same level of tracking for each downstream fund. For instance, it is easier for GEEREF to know the sector and domicile for all of its co-financiers in first level funds, but this may become increasingly difficult at the portfolio company and project level. Without this information, it may be difficult to avoid double counting between multiple public entities involved in a project.[1] | | | | | *Information on the multiplier effect of GEEREF* (Luxembourg: European Initiative for Clean Energy, Energy Efficiency, Renewable Energy and Climate Change related to Development SICAV SIF, 2012) |
| Swedfund | Swedfund estimates mobilisation only at the first fund level. The 15 funds in which Swedfund invests were on average comprised of 39% other public money, 57% money from private investors, and 4% Swedfund money (Swedfund, 2010). This is relevant both in assessing when and where mobilisation is estimated as well as in determining whether co-financing is public or private.[1] | Ex ante (forecasts) and verified at ex post | Not defined | Yes, but assumes mobilisation of both sources of finance | SEK, USD, GBP, local currencies[3] | |
| ***Grant Financing*** | | | | | | |
| EBRD-SEI | The EBRD estimates leverage in three different ways in order to determine the leveraging effect its TA intervention achieved in relation to its own financing. These relate to: internal project leverage (EBRD SEI funding compared to TA costs), component leverage (SEI-component funding compared to TA costs) and total leverage (total project value including non-SEI component compared to TA costs). The different estimation methods resulted in ratios ranging by up to a factor of nine for projects of the same type, providing an interesting example of the effect that different definitions have on estimating TA leverage (EBRD, 2012). This is also true for feasibility studies, pilot projects, or other technology-proving activities that are often funded by grants where the causal impact of the intervention on subsequent private investment is even more difficult to determine.[1] | Ex ante, some verified ex post | Assumed, multiple methods | No, but assumes mobilisation of both sources of finance | Not Available | |
| ***De-risking Instruments*** | | | | | | |
| ADB | DVA co-financing includes (i) co-financing for TFP transactions, including the amount of risk assumed by partner banks and risk distribution partners; (ii) third-party debt (net of guarantees) provided by ADB, unfunded risk participation by banks rated A and AA, and amounts reinsured with entities rated A and AA; (ii) parallel guarantees, third-party debt guaranteed by a co-guarantor of ADB, provided that ADB's presence has been instrumental in mobilising additional capacity by other guarantors.[1] For loans provided by third parties and not fully guaranteed by ADB, such as partial credit guarantees or partial risk guarantees, the portion of loans that is not guaranteed by ADB is considered as net DVA co-financing and reported in the year of signing the guarantee agreements; for risk | Ex ante (forecasts) | DVA/ co-financing mobilisation | Typically partial credit guarantees and partial risk guarantees cover the risk of private lender | USD, EUR, JPY, or other foreign currencies in which ADB can efficiently intermediate[3] | 1. Asian Development Bank, *Annual report 2011*<br>2. Asian Development Bank, *Annual report 2012* |

| | | | | | | |
|---|---|---|---|---|---|---|
| | transfer, which refers to the amount of ordinary capital resources allocation relief as a result of risk transfer arrangements, whereby a third party assumes risk under a guarantee or loan provided by ADB, the amount of allocation relief depends on the risk rating and nature of the counterparty.[2] | | | | | |
| OPIC | Report its intervention by subtracting the amount of the value of the guarantee from the full nominal value of the instrument (e.g. loan, equity) to which the guarantee relates.[1] | Ex post site visits for randomised sample | Assumed Total Project Cost | Yes, but assumes mobilisation of both sources of finance | USD | |

Source: WRI, using information from publicly available sources and direct consultations

Note: Apart from sources listed in the figure, information on all the methodologies listed has relied heavily on 1. Clifford Polycarp, Shally Venugopal, Tom Nagle and Andrew Catania, *Raising the Stakes: A Survey of Public and Public-Private Fund Models and Initiatives to Mobilise Private Investment* (Washington DC: World Resources Institute, 2013); 2. Randy Caruso and Jane Ellis, *Comparing Definitions and Methods to Estimate Mobilised Climate Finance* (Paris: OECD Climate Change Expert Group Paper, 2013)

*Figure 13: Strengths and Weaknesses of Methodologies*

| Instrument | Reporting Entity | Advantages | Disadvantages |
|---|---|---|---|
| Debt | ADB | 1. Disaggregates the mobilisation of public and private money.<br>2. Measures mobilisation using a concept of Direct Value-added (DVA)/Co-financing (explained in Appendix II). | 1. Assumes public money is mobilised by its interventions except in non-project specific initiatives.<br>2. Ex-ante point of reporting may not reflect the actual amount of loan disbursement. |
| | CIF-CTF | 1. Disaggregates the mobilisation of public and private money.<br>2. Includes direct leveraging as one of the core indicators to be reported for all projects. | 1. Ex-ante point of reporting may not reflect the actual amount of loan disbursement.<br>2. Calculates its leverage by working out the ratio between the overall amount of the initiatives funded and its own contribution. CTF implicitly considers that any joint funding has been raised thanks to its involvement, and so posts a significant leverage ratio.<br>3. The direct leveraging indicator is not clearly defined because the baseline and targets for each core indicator are established and updated by MDBs and implementing agencies. It is hard to know if, without the CTF investment, the clean technology projects would still go forward.<br>4. Estimating mobilisation only at first fund level may underestimate mobilisation at project level. |
| | UK ICF | 1. Estimates mobilisation on a pro-rata basis.<br>2. Reports both total and attributed amounts of money.<br>3. Takes into account the risk exposures of public money in calculating private money mobilised.<br>4. Has an indicator to estimate mobilisation among indirectly influenced projects.<br>5. Disaggregates mobilisation of public and private money, finance from developed and developing countries, and the theme of finance. | 1. Difficult to identify proportion of total public and private co-finance that would have been provided in the absence of DFID funding.<br>2. Does not specify the point of reporting.<br>3. Subjective assessment of additionality by project/programme officer. |
| | JBIC | 1. Only counts the mobilisation of private loans from any commercial bank with an office in Japan.<br>2. Improves data accuracy by verifying ex-ante measurement on ex-post basis. | 1. May underestimate the mobilisation by only counting the mobilisation of private loans from commercial banks with Japanese entities.<br>2. No definition of private finance in Fast Start Finance Reporting. |

| | | | |
|---|---|---|---|
| Equity | ADB | 1. Avoids overestimating the mobilisation effect by excluding those investments where ADB acts as a limited investment partner.<br>2. Measures mobilisation using the concept of DVA/co-financing. | 1. Estimating mobilisation only at first fund level may underestimate mobilisation at project level.<br>2. Only including investments made by private actors in funds where the ADB acts as a general partner can underestimate the amount mobilised. |
| | CDC | 1. Avoids overestimating the mobilisation effect by excluding investments made before CDC's involvement.<br>2. Applies a tapering factor to subsequent rounds of funding, thus not claiming entire credit for funding mobilised.<br>3. Improves data accuracy by verifying ex-ante measurement on ex-post basis. | 1. Does not disaggregate the mobilisation of public and private money.<br>2. Does not explain reasoning behind the 25% tapering factor for subsequent rounds of funding. |
| | CIF-CTF | 1. Disaggregates the mobilisation of public and private money.<br>2. Includes direct leveraging as one of its core indicators to be reported for all projects. | 1. Ex-ante point of reporting may not reflect the actual amount of loan disbursement.<br>2. Calculates its leverage by working out the ratio between the overall amount of the initiatives funded and its own contribution. CTF implicitly considers that any joint funding has been raised thanks to its involvement, and so posts a significant leverage ratio.<br>3. The direct leveraging indicator is not clearly defined because the baseline and targets for each core indicator are established and updated by MDBs and implementing agencies. It is hard to know if, without the CTF investment, the clean technology projects would still go forward.<br>4. Does not seem to have distinct methodology between debt and equity.<br>5. Estimating mobilisation only at first fund level may underestimate mobilisation at project level. |
| | UK CP3 | 1. Forecasts what percentage of sub-funds and direct investments would have reached financial close without intervention by the CP3.<br>2. Estimates mobilisation using pro-rata shares of public funding.<br>3. Reports interventions down to the final beneficiary level.<br>4. Disaggregates the mobilisation of public and private money. | 1. Not clear how it forecasts what percentage of sub-funds and direct investments would have reached financial close without intervention by the CP3. This can vary substantially according to sub-fund. |

| | | | |
|---|---|---|---|
| | UK ICF | 1. Estimates mobilisation on a pro-rata basis.<br>2. Reports both total and attributed amounts of money.<br>3. Takes into account risk exposures of public money in estimating private money mobilised.<br>4. Has an indicator to estimate mobilisation among indirectly influenced projects.<br>5. Disaggregates mobilisation of public and private money, finance from developed and developing countries, and the theme. | 1. Difficult to identify proportion of total public and private co-finance that would have been provided in the absence of DFID funding.<br>2. Does not specify the point of reporting.<br>3. Subjective assessment of additionality by project/programme officer.<br>4. Does not seem to have distinct methodology between debt and equity. |
| | GEEREF | 1. Estimates mobilisation at both fund level and final beneficiary/project level. GEEREF uses "Leverage" for the intermediary level and "Multiplier" for the final beneficiary dimension, with "Impact" being a combination of the two.<br>2. Applies two multipliers; (i) the Multiplier for Equity which only considers the equity that has been catalysed for final beneficiaries/projects and (ii) the Multiplier for Equity and Debt which considers equity catalysed and debt raised for final beneficiaries/projects. | 1. Difficult to maintain the same level of tracking for each downstream fund. It is easier for GEEREF to know the sector and domicile for all of its co-financiers in first level funds, but this may become increasingly difficult at the portfolio company and project level. Without this information, it may be difficult to avoid double counting between multiple public entities involved in a project.<br>2. Does not disaggregate mobilisation of public and private money. |
| | Swedfund | 1. Disaggregates the mobilisation of public and private money.<br>2. Improves data accuracy by verifying ex-ante measurement on ex-post basis. | 1. Not clear how it estimates mobilisation at first fund level.<br>2. Estimating mobilisation only at first fund level may underestimate mobilisation at project level. |
| Grant | EBRD-SEI | 1. Applies multiple methods for leverage ratio.<br>2. Improves data accuracy by verifying ex-ante measurements on ex-post basis. | 1. The multiple methods create a wide range of leverage ratios for the same money.<br>2. Does not disaggregate mobilisation of public and private money. |
| De-risking | ADB | 1. Attributes its intervention using the concept of DVA/ co-financing. | 1. Only applicable to partial loan guarantees. If the guarantee insures the full amount of the related instrument, the amount mobilised will be 0.<br>2. Does not specify the point of reporting. |
| | OPIC | 1. Improves data accuracy through randomised sample verification of ex-ante measurements on ex-post basis. | 1. Only applicable to partial loan guarantees. If the guarantee insures the full amount of the related instrument, the amount mobilised will be 0.<br>2. Attributes its intervention using total project funding. |

Source: WRI, using information compiled from OECD (2013) and websites of listed institutions

## APPENDIX II: CASE STUDIES

### 1. Energy Efficiency in Thailand

The commercial building sector is Thailand's second highest electricity consuming sector, and also the quickest growing sector[xiii]. The Thai government estimates that 2008 electricity consumption in the commercial building sector (including offices, hotels, hospitals and retail stores) was 57,777.84 GWh.[xiv] Recently, the Energy Conservation and Promotion Act of 1992 and its revision in 2009 established a building energy code for new buildings and the retrofit of existing buildings; and designated factories and buildings that consume significant energy to comply with the code.[xv] But important barriers in implementing energy efficiency (EE) measures in this sector persist, including:

(1) Lack of awareness: A lack of information on the costs and benefits of EE systems in buildings; lack of knowledge of available resources to finance building EE projects; lack of knowledge in banks about building energy conservation business opportunities; risk aversion of building owners to invest in EE technologies. [xvi]

(2) Policy barriers: A lack of guidelines on how to implement EE projects in commercial buildings; lack of enforcement of policies and energy consumption reporting requirements;[xvii] non-integration of commercial building EE in the Government Action Plan; lack of coordination to implement mandatory policy measures.[xviii]

(3) Technical challenges: Limited experience with the technical and economic aspects of EE applications; lack of technical expertise on how to operate EE building systems;[xix] lack of demonstrations on cost-effective and innovative commercial building EE concepts. [xx]

(4) Financing: Lack of an enabling financial environment for local banks, since the energy conservation market still requires supporting fiscal policy measures, including the Energy Efficiency Revolving Fund (EERF).[xxi] Although the EERF has been successful in many aspects, it has not been able to trigger investment in the commercial building sector in Thailand due to smaller investment sizes and delayed returns on investments, and because most financial institutions rely on conventional collateral financing to reduce their lending risks. [xxii]

<u>Project Overview: The Thai-GEF-UNDP Energy Efficiency Project</u>

The $15.9 million Thai-GEF-UNDP Energy Efficiency project aims to reduce the growth of GHGs from commercial buildings by facilitating EE technologies and practices. In line with Thai national targets and the 4-year National Climate Change Strategies (2008-2012),[xxiii] the project's goals include implementing a new Building Energy Code, disseminating good practice technologies, suppliers, and experts, raising awareness, creating incentives and tools for building owners and managers, and demonstrating energy efficient building technologies and conducting retrofits of 30% of commercial building stock with EE technologies and measures.[xxiv] A variety of private sector players are participating in the project.

Appendix III contains a detailed description of the project's financing plan, and the results of the application of selected reporting methodologies to understand the potential risks for double counting. The project,

which won GEF approval in 2010, is implemented by UNDP and is co-financed by a mix of actors as outlined in table 1.[xxv] In this mix, the private sector consists of hotels, hospitals, office buildings, shopping malls, financial institutions, and suppliers of EE technologies. It also includes NGOs, which provided $500,000 of the amount.[xxvi]

*Table 1: Financing Breakdown for Thai-GEF/UNDP Energy Efficiency Project*

| Instrument | Amount | Source |
|---|---|---|
| Grant | US$ 3,637,273 | GEF |
| Cash and In-Kind | US$ 6,500,000 | National Government |
| Cash and In-Kind | US$ 5,767,500 | Private Sector and NGOs |
| **Total** | **US$ 15,904,773** | |

Source: WRI, using information available from UNDP

Note: Costs of project preparation and project management are included in the total amounts

Attribution Assessments

As the GEF was the only international public actor involved in this project through its grant financing, we applied the EBRD-SEI methodology for grant reporting to the private sector component of the financing mix to understand how the flows might be reported. There was no evidence of any double counting, since only one entity was providing the grant. If another DFI or PPCFI had provided grants to the project, however, the aggregate of their financing reported would have resulted in a double counting of flows. Details are provided in Appendix III.

Market Development Timeline

Energy efficiency initiatives in Thailand benefitted from a series of interventions and investments that were either designed to deliver market development or that could be expected to contribute to such development. WRI lists and classifies these interventions under four broad categories, drawing from the definitions outlined in a previous WRI publication, 'Mobilising Climate Investment.'[xxvii]

- Policy measures: Plans and targets, laws, regulations, economic incentives
- Institutional measures: Institutional capacity building, institutional strengthening, etc.
- Industry measures: Industry capacity building, resource assessments, enabling infrastructure, etc.
- Financial measures: Financial sector development, capacity building, and strengthening

1. 1991: The government approved a national five-year demand-side management (DSM) plan to promote development of EE equipment, processes, and institutional capability within Thailand's electricity sector to deliver cost-effective energy services. The plan was supported by the World Bank, through grants from the GEF and the government of Australia, and a loan from JBIC. EGAT also provided $31.6 million of its own funds, largely from its automatic tariff mechanism. The DSM plan was designed based on similar initiatives in North America, which the government then revised to fit the local context. [xxviii]

2. 1992: The National Energy Policy Committee was formed that consisted of members from across nine government ministries. [xxix] Moreover, the Energy Conservation Promotion Act established EE requirements for industry and created an Energy Conservation Promotion Fund (ECPF), which receives revenue from a dedicated sales tax levied on petroleum products.[xxx] The Act also initiated Thailand's energy conservation program. [xxxi]

3. 1993: Training programs were conducted for DEDE, with funding from the ECPF and support from GIZ. By involving relevant private sector actors in developing training programs and marketing concepts, the programs strengthened communication between government and industry. [xxxii]

4. 1994: The Thai government established a National Sub-committee on Climate Change to develop Thailand's climate change policy. In 2006, the sub-committee was upgraded to become the National Climate Change Committee chaired by the Prime Minister. [xxxiii]

5. 2000: The DSM plan had reduced peak demand by 566 MW and achieved annual energy savings of 3,140GWh, at a lower cost than originally anticipated. A second phase of the plan, launched with funding from EGAT and from ECPF, targeted residential, commercial, and industrial sectors, as well as energy efficiency promotion for small- and medium-sized businesses and education programs. [xxxiv]

6. 2001: The World Bank (with an interest-free loan from GEF and the Montreal Protocol Fund) supported a private bank, the Industrial Finance Corporation of Thailand, in promoting energy efficient building air conditioning systems. The demonstration effect of this project sparked a greater interest in energy efficiency in the financial sector, and led to a proposal to DEDE for a simplified loan program for energy efficiency, which resulted in the establishment of a revolving fund the following year. [xxxv]

7. 2002: The government set up an Energy Efficiency Revolving Fund (EERF), using funds allocated from ECPF, to provide credit lines to banks, which would then provide concessional loans for energy efficiency projects in industry and buildings. DANIDA provided assistance and funding to help set up the fund. [xxxvi]

8. 2002: The Government of Thailand ratified the Kyoto Protocol, an international treaty on reducing greenhouse gas emissions. [xxxvii]

9. 2002: The government, through institutional restructuring, created a new Ministry of Energy, incorporating the Department of Energy Development and Promotion (formerly under the Ministry of Science, Technology and Environment), which became the DEDE. [xxxviii]

10. 2003: UNEP implemented a regional project for nine countries (including Thailand) with $1.96 million from SIDA to support energy efficiency in Asian businesses. [xxxix]

11. 2005: The government of Thailand introduced a program to offer tax incentives to businesses for energy efficiency improvements. [xl]

12. 2006: A second phase of the EERF was launched. Banks had at this stage gained sufficient familiarity with energy efficiency projects to take on more of the financing costs with fewer concessions. [xli]

13. 2007: The tenth five-year national economic and social development plan emphasized the need for increasing efficiency in energy usage and developing alternative sources to meet domestic demand for energy. [xlii]

14. 2008: To address bank unfamiliarity with ESCOs, the government established a fund to provide specialized financing (including equity) and technical assistance to ESCOs to promote energy efficiency activities. The ESCO Fund was organized into two phases (2008-2010 and 2011-2012) and is managed by government-appointed, non-profit organizations. [xliii&xliv]

15. 2008: The ADB provided technical assistance to strengthen capacity for implementing energy efficiency measures within the Provincial Electricity Authority and municipalities. [xlv & xlvi]

16. 2008: Thailand was one of six participating countries in a five-year regional UNDP-implemented project to promote energy efficiency standards and labeling, started in 2008 with $7.8 million from GEF. [xlvii&xlviii] In addition to this, various agencies in Thailand have cooperated with international organizations in the development of the Climate Change Strategy (2008-2012).[xlix]

17. 2010: By 2010, the EERF had financed 335 energy efficiency projects. The annual energy cost savings were $154 million, with an average payback of about three years. The fund has been successful in incentivising commercial banks in financing energy efficiency projects, by providing them with interest-free credit lines, and by helping them to gain a better understanding of such projects. [l]

18. 2011: UNDP and UNIDO, with GEF funding, provided support to assist energy efficiency measures in commercial buildings and industry, and to strengthen the capacity of industry and the financial sector. [li & lii]

19. 2011: Thailand completed a CTF investment plan that includes a component to increase private involvement in energy efficiency. It also includes support to scale up energy efficiency projects in the corporate, SME, commercial, residential, and municipal sectors, and to incentivise local financial institutions to provide financing for energy efficiency projects. [liii] Within the plan, the IFC approved a risk sharing facility of up to $70 million to a leasing company. This facility aims to increase funding to energy efficiency projects through the company. By sharing credit risk in the lease portfolio, the facility will reduce the risks taken by financial institutions and aid the development of the financial sector. [liv]

20. 2012: DSM activities had resulted in an estimated 2,600 MW peak demand reduction and 15,700GWh of energy savings. [lv]

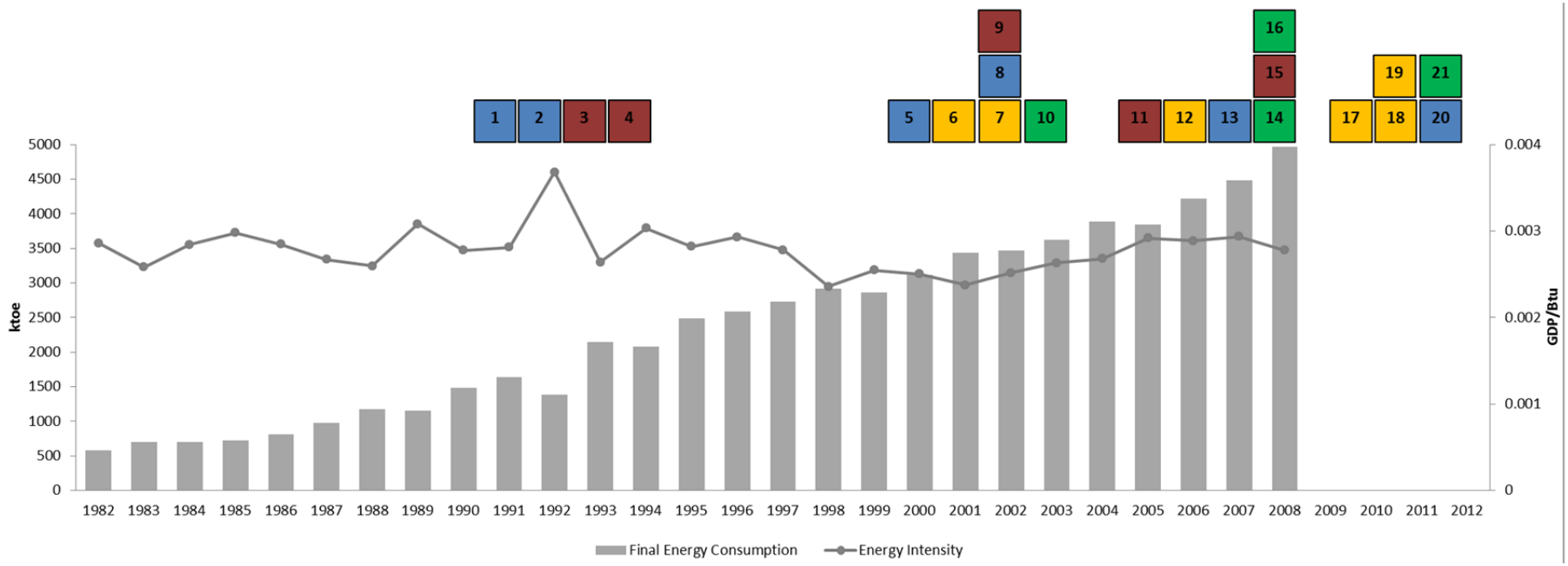
21. 2012: Registration with CDM of a project to improve the energy efficiency of street lights in a central province, with the involvement of the WBG and the Swedish government. [lvi]

Evolution of Market Development: Causality and Temporal Assessments

We map these interventions against the consumption of energy by the commercial sector (figure 14) by year, and see the public interventions that are likely to have contributed to energy savings. In order to account for energy consumption due to overall economic growth, we also show the evolution of energy intensity, measured as units of energy per unit of GDP.

Though energy consumption increased at an even rate, this may be partly due to the rapid growth of the economy, as seen from the fairly constant levels of energy intensity. It is likely that the prior interventions created awareness and comfort around such EE undertakings, and that this project owes its feasibility in part to such activities.

*Figure 14: Graph of Final Consumption by the Commercial Sector in Thailand against Various Public Interventions*




Source: WRI, using information compiled from DEDE, IMF

Some of these broad public interventions, and the international support they received, are categorized in table 2 below. Interviews conducted so far highlight that the Energy Conservation Promotion Act (ECPA), which led to decade-long energy audits, was instrumental in building capacity. Without this capacity, private sector investment would have certainly been lower, if not absent altogether. Stakeholders further state that though this energy audit program was flawed in that there was no way of operationalising the audits, it has been amended recently and is expected to spur greater investments.

*Table 2: Typology of Broader Interventions Undertaken in Thailand*

| Type of Intervention | Public Agencies Involved |
|---|---|
| Development of plans and regulations | WBG, GEF, Australia, JBIC |
| Support to financial sector to incentivise energy efficiency investments | WBG, GEF, DANIDA |
| Assisting energy efficiency measures in industry | UNEP, Sweden, UNDP, GEF, UNIDO, WBG |
| Capacity building and institutional strengthening | GIZ, ADB, UNDP, UNIDO, GEF |

Source: WRI, using information compiled from websites of listed institutions

## 2. Geothermal Power in Kenya

In recent years, Kenya has faced power rationing, largely because of reduced water levels at hydroelectric generating plants - in 2006 the national grid ran short of as much as 90MW after rains were delayed.[lvii] Further, between 2004 and 2010, demand for electricity in Kenya grew at an average annual rate of about 5%, and it is projected to grow at more than 8% per annum going forward.[lviii]

As of June 2013, 217 MW of geothermal energy had already been developed in the East African region[lix], most of it in Kenya, and most of it through public sources. But this is insignificant compared to the region's huge potential, which experts estimate at 10,000 MW in Kenya alone.[lx] Kenya is now accelerating efforts to diversify its power supplies, with plans to add 2,596MW of geothermal capacity by 2020/21.[lxi] 296 MW of the over ~1,000 MW of geothermal under development in Kenya are currently under construction.[lxii] But important barriers in employing geothermal power persist, including:

(1) Lack of Funds: The lack of funds for geothermal projects is also forcing the authorities to shift to coal-powered plants in an effort to achieve their energy generation targets.[lxiii]

(2) High costs: Consumers pay a fixed connection fee, a demand charge set to recover the capital costs of the transmission and distribution network in an area, and a variable energy cost. There are additional pass-through costs of fuel oil and foreign currency, which increase with increased emergency power production.[lxiv]

(3) High investment costs: Kenya requires $20 billion over the next 17 years to achieve its target of generating 5 GW from geothermal sources by 2030. Meeting this goal looks unlikely, particularly after the leading power generation company, Kenya Electricity Generating Company (KenGen), raised huge debts to finance the 280MW Olkaria project, leaving the company financially exposed and unable to absorb more debt. This realization has led to an increased focus on private investors. However, private investors have been largely indifferent towards the initiatives, because of the size of the investments and the time it would take to recover the costs. The apathy by private investors has been compounded by the Kenyan government's refusal to offer them sovereign guarantees, leaving them to seek private insurance or guarantees from the World Bank.[lxv]

(4) Public scrutiny: In 2013 forceful evictions of Maasai left thousands homeless in Naivasha, Kenya. The land in question has allegedly been sold to KenGen for the production of geothermal power with funding from the World Bank. According to the World Bank, however, the evictions were not in the area where KenGen is intending to build its plant, but for a project adjacent to the WBG project[lxvi]

The Olkaria III Project

Olkaria III[11], a geothermal power station operated by Orpower4, was commissioned in 1998-99 following a tender to build, own and operate a geothermal facility by the Government of Kenya. It was the first privately funded and developed geothermal project in Africa.[lxvii] The station has been operational since 2000 and is the sole geothermal Independent Power Producer (IPP) in Africa. The generated power is sold to Kenya Power and Lighting Co. Ltd (KPLC) under a 20 year-Power Purchase Agreement (PPA).[lxviii] Phase I, the early generation facility, had a 13MW capacity that was operational by July 2000. Phase II expanded the capacity to 48 MW and was completed at the end of 2008, financed initially by Orpower4 while DFI financial close was delayed. DFIs then refinanced both Phases I and II in March 2009.[lxix]

While conversations with DFIs to arrange Phase II's financing commenced in 2005, financial close only happened in March 2009. Part of the delay was due to lengthy negotiations between Orpower4 and KPLC on tariff levels and technical designs, which resulted in the signing of an amended PPA in 2007.[lxx] Despite the delays in assessing finance, Orpower4 proceeded with the expansion in 2007. The DFI involvement allowed for the refinancing of both Phases I and II, where commercial financing would have been difficult to obtain.

The refinancing allowed Ormat, OpPower4's parent company, to free up capital to finance other projects, and helped reduce its overall risk exposure. Further, it would have been difficult for Orpower4 to find commercial lenders who were willing to lend without fuller backstopping of KPLC, and also to offer the terms provided by the DFIs.[lxxi]

The total project cost was US$179.4 million (refer to table 3 for the financing breakdown for Olkaria III). Though this public funding was important, it was not perceived as crucial by the developers, because it was secured after construction had already been completed.[lxxii] MIGA also provided guarantees to Ormat for its equity investments in Orpower4, to cover against the risks of transfer restriction, expropriation, war, and breaches of contract facing the construction and operation of Olkaria III.[lxxiii]

Commercial operation of the third phase of 36MW at Olkaria III was started in 2013. It was financed with a limited-recourse debt facility provided by OPIC, totalling US$310 million. [lxxiv] A $265 million tranche of the OPIC loan, maturing over 18 years, was used to fund construction for the third phase. The remaining $45 million standby tranche is for a further expansion of 16MW, thereby increasing the generation capacity to 100MW.[lxxv&lxxvi]

[11] Olkaria I and II are the other geothermal plants located in the same area, and run by KenGen. Given the plant's location within a national park, Orpower has a Memorandum of Understanding (MoU) with the Kenya Wildlife Society that guides the company's activities in the park.

*Table 3: Financing Breakdown for Olkaria III Phase I & II* [lxxvii&lxxviii&lxxix]

| Instrument | Amount | Source |
|---|---|---|
| Long term senior loans | US$ 40,000,000[lxxx] | DEG with FMO contributing $20,000,000 to the DEG loan |
| Long term senior loans | US$ 49,700,000 | KfW, EFP[12] |
| Long term senior loans | US$ 15,000,000[lxxxi] | Proparco |
| Long term senior loans | US$ 15,000,000[lxxxii] | EAIF |
| **Public Total** | **US$ 119,700,000 (67%)** | |
| Equity | US$ 59,700,000 | Ormat (Private Firm) *MIGA provided guarantees to Ormat for equity investment |
| **Private Total** | **US$ 59,700,000 (33%)** | |
| **Total** | **US$ 179,400,000 (100%)** | |

Source: WRI, using information compiled from website of listed institutions and companies, as well as email exchanges

Attribution Assessments

We applied two sets of reporting methodologies to the private flows in this financing mix to understand two different scenarios (details are available in Appendix III). Under the first scenario, we applied the UK-ICF methodology for loans disbursed to the financing provided by the European DFIs and the MIGA methodology to the guarantee it provided[13]. While the UK-ICF methodology did not lead to a double counting of flows, since it evaluates mobilisation on a pro-rated basis for loans, the presence of a guarantee did, indicating that there is a greater need for harmonising methodologies across instruments and institutions.

Under the second scenario, we applied the ADB methodologies for both, the loans and the MIGA guarantee. Under the information available, the ADB loan methodology may not be strictly applicable to private sector equity investments at the project level, so we inferred that the amount mobilised must equal zero, though a different interpretation of the methodology would lead to double counting of flows. The guarantee methodology on the other hand considered the portion of loans[14] that is not guaranteed by ADB as net DVA co-financing, which is not applicable in case the entire amount is covered under the guarantee. The amount mobilised could thus range between double counting and underestimation of flows. This suggests that there is also a need for harmonising methodologies across instruments within the same institutions.

[12] European Finance Partners - a financing vehicle of 12 European Development Finance Institutions (EDFIs) and the European Investment Bank (EIB)
[13] Though MIGA is not one of the institutions captured under the OECD's paper, we include it in our consideration in this instance to offer a contrast with the ADB's methodology for guarantees. The MIGA methodology assesses the leverage by MIGA's guarantees as the ratio of total private FDI flows to the net public guarantee coverage issued.
[14] Its applicability to an equity coverage is therefore debatable

Market Development Timeline

WRI classifies interventions under four broad categories, drawing from the definitions outlined in a previous WRI publication, 'Mobilising Climate Investment.'[lxxxiii]

- Policy measures: Plans and targets, laws, regulations, economic incentives
- Institutional measures: Institutional capacity building, institutional strengthening, etc.
- Industry measures: Industry capacity building, resource assessments, enabling infrastructure, etc.
- Financial measures: Financial sector development, capacity building, and strengthening

1. 1980s: The first geothermal power plant in Africa, Olkaria I, was commissioned by KenGen. It had a capacity of 45MW. [lxxxiv]

2. 1997: The Electric Power Act was passed, which separated generation of electricity from transmission and distribution and established the Electricity Regulatory Board. [lxxxv]

3. 1999: The 48MW Olkaria III plant was commissioned.[lxxxvi] It was the first privately funded and developed geothermal project in Africa; and the borrower/developer was Orpower 4.[lxxxvii] The plant is comprised of two phases: the first phase of 13 MW commenced operations in 1999/2000 and the second phase of 35 MW commenced operations in 2009. The total project cost was US$179.4 million, which included equity invested by the project sponsor, and refinancing through long term loans from DEG, FMO, EFP, KfW, Proparco and the Emerging Africa Infrastructure Fund (EAIF). [15] & [lxxxviii] & [lxxxix] & [xc]

4. 2003: The 70MW Olkaria II plant (owned by KenGen) was commissioned, even though studies were completed by 1994.[xci] It received funding from KfW, with total investment costs of about $200 million.[xcii] In 2010, another generation unit of 35MW was commissioned, taking total capacity to 105MW. [xciii] This unit was financed by loans from AFD (EUR20 million), EIB ($41 million), and IDA ($27.6 million).[xciv&xcv] The Community Development Carbon Fund is purchasing emissions reductions from project activity. [xcvi&xcvii]

5. 2004: The policy framework of the energy sector was laid out in Sessional Paper n°4 of 2004 on Energy.[xcviii&xcix] The government committed to promote electricity generation from renewable sources,[c] while mapping the landscape of the Kenyan electricity sector and recognizing the challenges and barriers facing its development. It also stated the need to establish a special purpose geothermal development company, legislate a new energy act, and partially privatize KenGen, amongst other tasks. [ci]

[15] A PPP able to provide long-term debt or mezzanine finance on commercial terms to finance the construction and development of private infrastructure; EAIF was set up in 2001 as the first multi-donor PIDG facility. Funded by: PIDG Trust, Barclays Bank PLC, Standard Bank of South Africa Ltd., KfW, FMO, DEG and DBSA (Source – PIDG).

6. 2006: The Energy Act was introduced, laying out energy sector legal and institutional frameworks.[cii&ciii] It empowered the Minister responsible for energy to promote the development and use of renewable energy technologies. [civ]

7. 2008: Kenya Vision 2030, a development program that includes a target of 5000MW of geothermal power (26% of peak demand) by 2030, was released. [cv]

8. 2008: The government established two public entities to take responsibility of (1) geothermal steam field development (GDC), and (2) new high voltage transmission lines (Ketraco). [cvi]

9. 2010: The Kenya National Climate Change Response Strategy was introduced, which included proposing speedier development of geothermal resources as a cost-effective and clean source of power that is more resilient to the effects of climate change. [cvii]

10. 2010: A 20-year rolling, annually updated, least cost power development plan (LCPDP) was finalized. It is used for long term planning of the energy sector by identifying existing potential in generation, identifying possible investments in transmission, and forecasting on future demand.[cviii] The LCPDP identified geothermal electricity as a cost-effective power option.
11. 2010: Feed-in-tariffs, enacted in 2008, were modified to include geothermal power. These tariffs are valid for 20 years from the beginning of the PPA.[cix] A further new FiT policy was released in 2012. [cx]

12. 2010: Expansion of Olkaria I and IV by 140MW each for a total cost of EUR1 billion was begun; commissioning was expected in 2013.[cxi&cxii] KenGen has signed a $137 million contract for the 280MW scheme with China's Sinopec International, which will install pipelines, steam separators, and the steam field control system. The main power plant construction contract has gone to South Korea's Hyundai and Japan's ToyotaTsusho, funded by the World Bank, EIB, JICA, and AFD, as well as the Kenyan government and KenGen. India's KEC International is building transmission lines and substations. [cxiii & cxiv]

13. 2011: Drilling started for the Menengai plant, [cxv] which will generate 400MW of electricity by 2017. The project is financed by the AfDB's African Development Fund ($124 million), the CIF's SREP ($25 million), the AFD ($72 million), the EIB ($37.5 million), and the Government of Kenya ($246 million). [cxvi&cxvii] AfDB has led the development of the project, which included assisting the GDC to build a bankable financial model for the project and addressing the drilling risk that the private sector is hesitant to assume.[cxviii]

14. 2011: The Eburru Wellhead plant was commissioned[cxix] and is now generating up to 2.5 MW for KenGen. This is a milestone for KenGen, as it is their first geothermal wellhead power plant in commercial operation. The project is also unique because, for the first time, KenGen engineers carried out implementation work without the assistance of external consultants. [cxx]

15. 2012: A standardised PPA was introduced for the renewable energy sector in Kenya, to reduce processing times and improve grid interconnectivity.[cxxi&cxxii]

16. 2012: The Nordic Development Fund supported a geothermal drilling training program under a World Bank project, which cost a total of EUR2.7 million.[cxxiii]

17. 2012: GDC approached the Export-Import Bank of the United States to acquire two more rigs to drill for geothermal resources. Ormat also brought in two more rigs and KenGen considered buying another two. This could bring the number of rigs in country to 19 by 2013.[cxxiv]

18. 2012: KfW, the EU, and the African Union launched a €50 million Geothermal Risk Mitigation Facility (GRMF) to support developments in Ethiopia, Kenya, Rwanda, Tanzania and Uganda. €20 million of the total will come from KfW (which received grant funding from BMZ) and €30 million from the EU-Africa Infrastructure Trust Fund.[cxxv&cxxvi]

19. 2012: USAID and the Geothermal Energy Association (GEA) launched the US – East Africa Geothermal Partnership to bring US expertise to the local market by identifying needs and opportunities and matching them with US companies and experts.[cxxvii]

20. 2012-2013: Kenya has been working with experts like those at the United Nations University Geothermal Training Programme (UNU-GTP) in Iceland on training, capacity-building, technology transfer, and financing. [cxxviii&cxxix]

21. 2013: Commercial operation of the second plant of 36MW at Olkaria III was started. It was financed with a limited-recourse debt facility provided by OPIC,[cxxx] totaling US$310 million, and resulting from the positive demonstration effects of the first plant. A $265 million tranche of the OPIC loan, maturing over 18 years, was used to fund construction for the second plant. The remaining $45 million standby tranche is for a further expansion of 16MW, thereby increasing the generation capacity to 100MW. [cxxxi & cxxxii]

22. 2013: National Climate Change Action Plan was introduced, laying out recommendations to move Kenya to a low carbon, climate-resilient pathway. This includes the promotion of electricity generation through geothermal sources. [cxxxiii & cxxxiv]

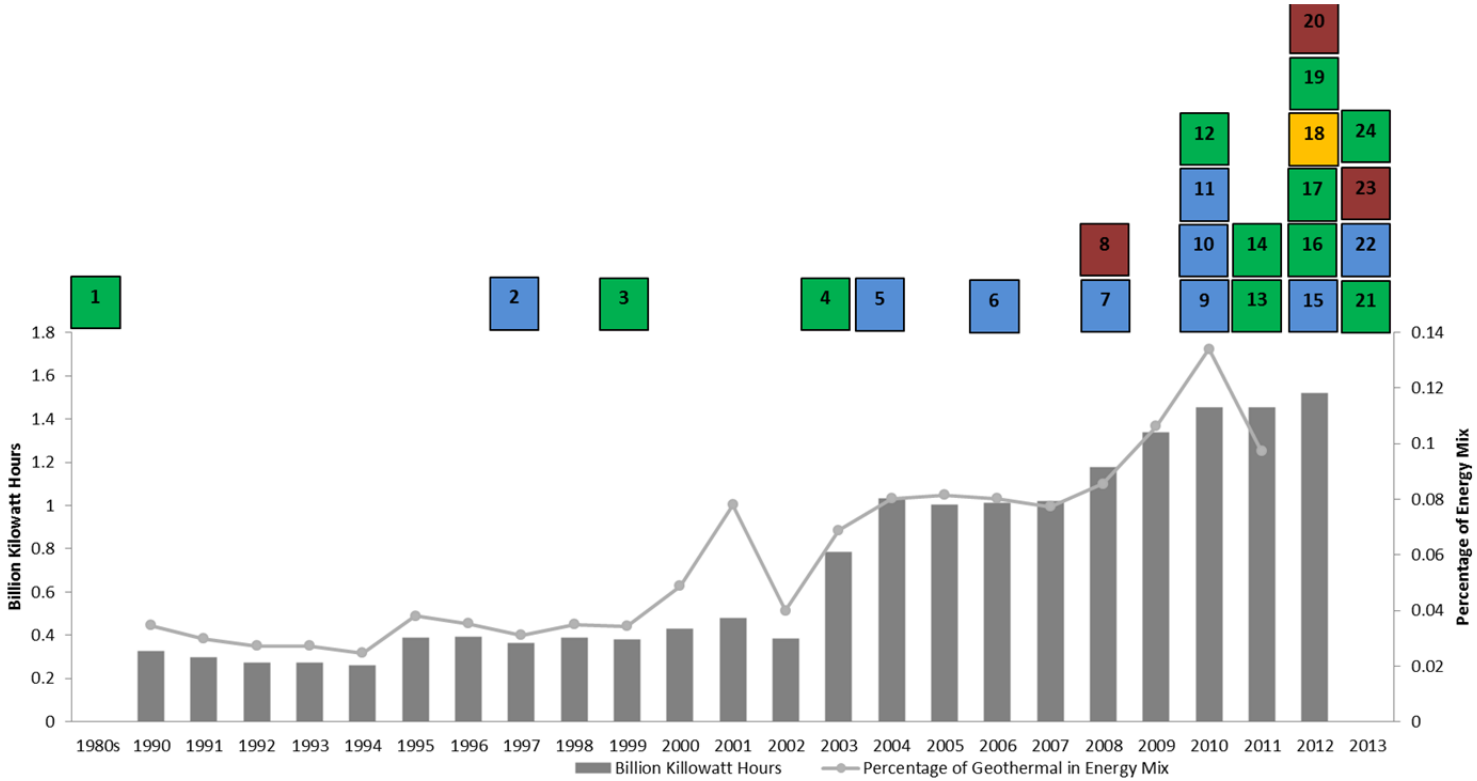
23. 2013: JICA committed a grant of $18.4 million to GDC to provide three years of assistance for capacity building, including training in exploration, engineering, negotiations, and the use of geothermal resources. JICA's assistance will help build geothermal plants in Menangai, Suswa, and other fields.[cxxxv]

24. 2013: The World Bank pledged $150 million to the Menengai geothermal project to fund and expedite drilling and exploration activities. [cxxxvi]

Evolution of Market Development: Causality and Temporal Assessments

We map these interventions against the development of geothermal energy in Kenya over time (figure 15), to depict when various types of key interventions began to be introduced, which contributed to market development. The sector witnessed significant growth starting in 2003; since that time, a number of initiatives and measures have been implemented, many of which have likely benefited this project. The increasing share of geothermal generation in Kenya's electricity mix is also shown in the same graph. Though industry drivers were introduced earlier, it is only when a number of policy drivers were also put in place that the sector started expanding rapidly, aided by institutional and financial development.

*Figure 15: Graph of Geothermal Energy Generation in Kenya against Various Public Interventions*




Source: WRI, using information from International Energy Statistics, July 2013

Some of these broader public interventions, and the international support they received, are categorized in table 4 below. Interviews confirm the role of these supporting interventions in attracting investments. Stakeholders in particular mentioned the role of the Geothermal Development Corporation, created to remove the exploration risk previously borne by developers. Other key support was provided in the form of investment allowances (such as an accelerated depreciation scheme) and exemptions from duties for the import of generation equipment. At the project level, Olkaria III was bankable largely because the government provided support by covering customary risks such as off-taker obligations, political force majeure, and buy-downs of termination payments.

*Table 4: Typology of Broader Interventions Undertaken in Kenya*

| Type of Intervention | Public Agencies Involved |
|---|---|
| Development, construction, operation of power plants and fields | KenGen, DEG, FMO, EFP, KfW, Proparco, EAIF, AFD, EIB, WBG, JICA, AfDB, CIF, OPIC |
| Development of plans, targets, regulations, laws | Government of Kenya |
| Setting up institutions | Government of Kenya |
| Developing FiTs, PPAs | Government of Kenya |
| Training, capacity building, addressing needs | Nordic Development Fund, Exim Bank, USAID, UNU, JICA |
| Risk sharing | KfW, EU, African Union Commission |

Source: WRI, using information compiled from website of listed institutions

### 3. Wind Power in Mexico

Though local and international interest in the Mexican wind market has been evident since the 1990s, dedicated efforts to develop this sector only began in the early 2000s. The Mexican wind market has consequently grown considerably between 2003 and 2011; from two small scale private projects in 2003 to more than 17 private sector wind projects under construction or already in operation by 2011, including 12 self- and 5 independent power producer (IPP) projects. Cumulatively, over 95% of wind capacity additions over the last 10 years are attributable to the private sector.[cxxxvii]

The official estimate of wind potential in Mexico is roughly 71,000 MW[cxxxviii]. Of this total, 11,000 MW is estimated to have capacity factors[16] of at least 30 percent.[cxxxix] By 2011, over 500 MW of wind projects were in operation[cxl]. By 2013, an additional 1,470 MW of wind projects were expected to come into operation[cxli] of which 1,370MW was reached by 2012.[cxlii] A further pipeline of at least 3,400MW of committed wind energy is set to come on line by 2016.[cxliii] It is estimated that up to 12,000MW of economically-feasible projects could be implemented in México by 2020.[cxliv] In spite of this, important barriers in developing the wind power market persist, including:

(1) Relations with Local Communities: The majority of land in Mexico's rural areas is controlled by local indigenous cooperatives known as Ejidos. The administration and ownership records of the Ejido lands are often incomplete and convoluted. Poor record keeping by the states, corruption, and unsettled disputes often cloud ownership. The majority of the developable wind properties in Oaxaca appear to be held by Ejidos.[cxlv] Although wind projects in Oaxaca have successfully developed the wind resource, they have received significant criticism on the grounds of unfair treatment of local landholders and a failure to share benefits with the local communities.[cxlvi] Between 2007 and 2010, more than 180 lawsuits have been filed in Oaxaca against wind energy companies, seeking to nullify contracts that are perceived as unfair.[cxlvii]

(2) High wheeling charges: Wheeling is the act of providing access to or transporting power over transmission lines. Mexico's Federal Electricity Commission (CFE) levies a very high wheeling fee on "off-site" self-supply projects (where the location of the generation is different from the site at which the self-supply power is consumed) for access to its high-tension transmission lines.[cxlviii]

<u>The La Ventosa Project</u>

The La Ventosa project was the third large-scale private sector wind project in the country[17]. It started to materialise in 2001 as an agreement between a Mexican national, Electricite de France (EDF), and the Asociados Pan Americanos (APA).

Previous to its success, the project had many hurdles to overcome. Since the CFE and municipalities are required to purchase power from the lowest cost sources, they tend to favour fossil fuel-based electricity. As such, the project entered into a power purchase agreement with Walmart, a sole off-taker that agreed to purchase power at prices higher than offered by the CFE.

[16] The ratio of a plant's actual output over a period of time, to its potential output if it were possible for it to operate at full installed capacity; wind farm capacity factors are usually in the range of 20-40% because of the natural variability of wind.
[17] The first two were the 30 MW of the 79.9MW Iberdrola project in 2009, and the first phase of the 250 MW Acciona Energy and Eurus S.A. project.

The project also had to create a complex shareholder structure between equity partners, including a small stake for Walmart in order for it to be the off-taker. The eventual ownership of the project was divided between Electrica del Valle de Mexico (EVM) (an indirect subsidiary of EDF with a 0.08% owned by Walmart, the off-taker), which owned 75%, the Mexican national (20%), and the APA (5%).[cxlix]

The properties involved in the project were controlled by two Ejidos[18] and required 60 land lease contracts. The whole process to secure development rights and secure the necessary permits and contracts to develop the project took over seven years.[cl] By 2008, the Isthmus of Tehuantepec region in the State of Oaxaca, where La Ventosa was to be located, had only developed 85 MW of its 8000W estimated potential.[cli]

As mentioned, the CFE still controlled all wheeling and transmission charges at very high rates. The project contracted with the CFE to utilize its transmission lines and included a provision stipulating that the CFE will purchase any power not consumed by the off-taker at half the price paid by the off-taker.[clii]

The total project cost was estimated at MXN2.2 billion.[cliii] In 2009, it was not easy to secure local debt financing in Mexico due to the global financial crisis. Bank deposits had fallen significantly, and with higher rates of loan defaults, credit had dried up. Project sponsors thus had to fund the project entirely through their equity contributions, which is an unusual structure. The La Ventosa project eventually secured retroactive international public financial support in 2009-10, and was funded as explained in table 5.

*Table 5: Financing Breakdown for the La Ventosa Project*

| Instrument | Amount | Source |
|---|---|---|
| Senior Loan | MXN 275,000,000 | IFC |
| Senior Loan | MXN 275,000,000 | IDB |
| Senior Loan | US$ 81,000,000 | Exim Bank |
| Subordinated concessional loan | US$ 15,000,000 | CTF |
| Hedges | NA | IFC |
| **Public Total** | **US$ 151,000,000 (approx.)** | |
| Equity | Not Available | EVM |
| **Private Total** | **?** | |
| **Total** | **Not Available** | |

Source: WRI, 2012

The involvement of the multilateral agencies may have improved project viability, particularly since there were few alternative sources of finance as a result of the financial crisis. Despite the presence of the concessional financing offered by these institutions, institutional hurdles required innovative financial instruments and complex shareholder patterns to finally start the project.

[18] Local indigenous cooperatives

Attribution Assessments

WRI applied two sets of methodologies to the financing for La Ventosa. Under the first case, the UK-ICF methodology was applied to the loans from IFC, IDB, Exim, and CTF. The UK-ICF methodology did not lead to a double counting of flows due to its pro-rata estimation of mobilisation. However, there is no means to assess the mobilising impact of mechanisms like the CDM that facilitate ex-post performance-based payments.

Under the second scenario, we applied the ADB methodology to the loans disbursed. Since we cannot conclusively state whether the ADB loan methodology claims credit for private sector equity investments at the project level, the amount reported as mobilised across the four loans could either be zero or four times the total equity infusion.

Further, since the equity investments came in years before the international public support, it is difficult to claim under either scenario that public money did at all mobilise private money.

Market Development Timeline

WRI classifies interventions under four broad categories, drawing from the definitions outlined in a previous WRI publication, 'Mobilising Climate Investment.'[cliv]

- Policy measures: Plans and targets, laws, regulations, economic incentives
- Institutional measures: Institutional capacity building, institutional strengthening, etc.
- Industry measures: Industry capacity building, resource assessments, enabling infrastructure, etc.
- Financial measures: Financial sector development, capacity building, and strengthening

1. 1992: LSPEE (1975 Law of Public Service of Electricity) was amended to allow greater private sector participation in electricity generation.[clv] Now generators themselves and municipalities could, besides CFE, purchase power from private generation. However, the off-taker generator was still required to be a shareholder in the project. [clvi]

2. 1993: The signing of the North American Free Trade Agreement (NAFTA) opened the door to the possibility for independent energy producers in Mexico and foreign investment in this sector. [clvii]

3. 1993: The CRE was formed as an advisory body to SENER.

4. 1994: The economic crisis hit Mexico. In a deal with its creditors, the government agreed to prohibit publicly-owned enterprises from taking on additional debt. This limited CFE's ability to expand its capacity to keep up with rising demand. In response, the Mexican government began to promote private sector investment in capacity expansion. [clviii]

5. 1994: CFE established the first grid-connected wind demonstration project (La Venta). [clix]

6. 1995: CRE authorised to regulate private sector energy generation; duties previously performed by CFE. [clx]

7. 1995: A Wind Resource Mapping Project, undertaken by the National Renewable Energy Laboratory (NREL), led to a deeper evaluation of the resource in 2002, in which USAID, NREL and others participated. [clxi]

8. 2001: CRE issued a model contract for the interconnection of intermittent (renewable) energy sources to the national grid. [clxii]

9. 2001: Since wind self-suppliers cannot necessarily produce the electricity when it is needed to satisfy their associated load demand, CRE established an Energy Bank in 2001 to disengage energy supply from energy demand. At the end of the year, if there is a net positive balance in the account, the self-supplier can sell a portion of this balance to CFE at a discount or carry over the balance to the next year.[clxiii]

10. 2002: SENER issued a policy directive requiring CFE to finance its own wind power generation. This allowed CFE to proceed without having to show least cost. [clxiv]

11. 2002: CFE financed an 83.3MW turnkey wind farm (La Venta II), the first large-scale wind investment in Mexico, with an emissions reduction purchase agreement with the World Bank through the CDM. [clxv]

12. 2003: Government launched initiative to expand transmission infrastructure to facilitate the connection of wind parks to the national grid. [clxvi]

13. 2003: A UNDP project, with funding from GEF, established a training center for wind farm technology, and was the first project to receive a permit to operate as a small power producer in Mexico. Its impact was limited, however, because it did not make information freely available to the industry. [clxvii]

14. 2004: CRE introduced a simplified wheeling fee for the wind industry that provides more predictable and lower (by 40-50%) fees that can also be estimated in a shorter timeframe (thus reducing transaction costs) than under the previous scheme. [clxviii]

15. 2004: Accelerated depreciation:[clxix] Companies investing in machinery and equipment for power generation using renewable sources could deduct up to 100% of the total investment in a single year. The only fiscal incentive that Mexico provides for RE, this incentive is offered both to self-supply projects and IPPs. [clxx]

16. 2005: The Inter-secretarial Commission on Climate Change (CICC) was set up, designed to coordinate and develop strategies and policies on climate action. [clxxi]

17. 2006: The World Bank and GEF supported a project for large-scale RE development (including the 101MW La Venta III wind farm) to reduce policy and financial barriers to private sector investment in wind energy. The project included technical advice and capacity building for SENER and CFE, support for developing a pricing mechanism for renewables (A "green fund" was established, through which CFE could pay each IPP an additional incentive of up to 1.1¢ per kWh delivered (a feed-in tariff) for the first five years of generation. This level of subsidy would lower the cost incurred by CFE for a 100 MW wind farm to that of marginal generation sources in the system, satisfying the least cost purchase requirement. CFE has now established a successful bidding program for IPPs that is not dependent upon a feed-in tariff[clxxii]), and support for policy development. [clxxiii & clxxiv]

18. 2006: To facilitate the connection of wind parks to the national grid, CRE and SENER introduced the "Open Season" project. A period of time is determined during which electricity companies can indicate their intention to build new plants and their need for transmission capacity. At the end of this time, the CFE uses the results to justify its investment in constructing new lines. The project consists of an agreement between CFE and private developers to distribute the costs of transmission infrastructure in the state of Oaxaca among themselves. [clxxv]

19. 2007: Mexico approved and implemented the Project for Large Scale Development of Renewable Energy (PERGE) in 2007, which provided economic incentives for renewable energy projects over 100 MW.[clxxvi] It received financial support from the GEF and World Bank, and was part of their 2006 project for large-scale RE development. [clxxvii]

20. 2007: A National Climate Change Strategy (ENACC) was developed by CICC, which among other goals proposed the installation of 7000MW of RE capacity by 2014 and suggested prioritizing RE promotion when devising energy policies. [clxxviii & clxxix]

21. 2008: The Law for Renewable Energy Use and Financing of Energy Transition (LAERFTE) on targets and pricing issues surrounding renewable energy generation was enacted under an Energy Reform package. It enlarged private sector role in RE generation and shifted power from CFE to SENER and CRE. The enactment of the Law was influenced by GEF-financed work on regulatory reform,[clxxx] and main elements of the strategy include creating a special program for renewable energy; creating a green fund; providing access to the grid; and providing support for industrial development and R&D. [clxxxi]

22. 2009: Introduction of the Special Climate Change Program (PECC), which builds on and operationalises the ENACC. It aims to induce a reduction in carbon intensity and establishes 294 quantitative mitigation and adaptation goals as a framework for the period 2009-2012 without compromising development. [clxxxii]

23. 2009: As the financial crisis hit, GDP contracted at an annual of 6.2% [clxxxiii]; as a result, deposits fell and defaults increased and credit supply consequently dried up. [clxxxiv]

24. 2009: The first privately owned wind power plant for self-supply purposes, the 79MW Parques Ecologicos led by Iberdola, was commissioned. [clxxxv]

25. 2010: The $536mn, 250MW Eurus wind farm project was approved, financed by IFC, IDB, CAF, Proparco, and DEG, plus other national and private financiers.[clxxxvi] The credit deals totaled $375mn, the biggest amount in Latin America for renewable energy at that time.[clxxxvii] It was mainly owned by Acciona, with a 6% ownership by CEMEX (for self-supply reasons, under a 20-year PPA). [clxxxviii]

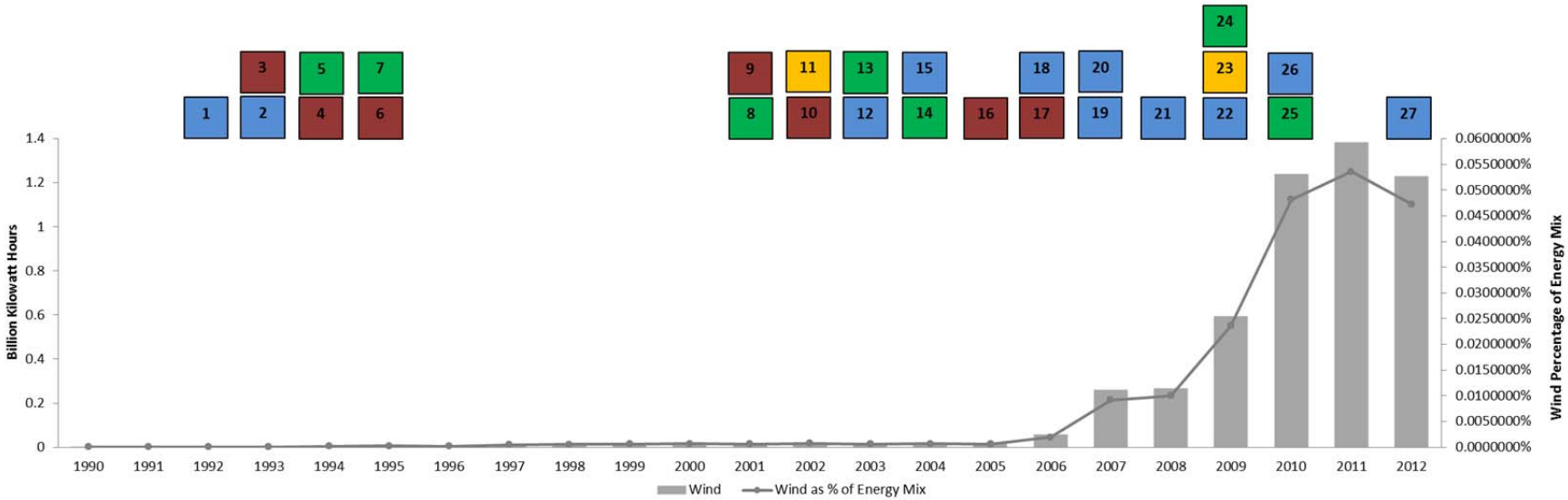
26. 2010: CRE issued new regulations to strengthen the regulatory framework for RE projects in self-supply modality, including reductions in transmission charges for private developers and a standardised methodology to calculate transmission costs, thereby reducing price uncertainty. [clxxxix & cxc]

27. 2012: A General Law on Climate Change (GLCC) was passed, requiring Mexico to generate 35% of its electricity from clean sources by 2024.[cxci] The new law also commits Mexico to cut its emissions by 50% by 2050 against 2000 levels with international support and make renewables economically competitive before 2020, and includes the creation of the National Institute of Ecology and Climate Change. [cxcii]

Evolution of Market Development: Causality and Temporal Assessments

We map these interventions against the wind development in Mexico implemented over the years (figure 16). These measures appear to have begun to bear fruit starting in 2007. The share of wind energy in Mexico's energy mix is also shown in the graph; as can be seen, wind energy contributed a growing share to the energy mix and thus grew much faster than the energy sector overall. The mix of government commitment and international support has contributed to the development of the sector.

*Figure 16: Graph of Wind Energy Generation in Mexico against Various Public Interventions*




Source: WRI, using information compiled from Federal Electricity Commission, 2007, IEA Wind 2012 Annual Report, and International Energy Statistics

Some of these broader public interventions, and the international support they received, are categorized in table 6 below.

*Table 6: Typology of Broader Interventions Undertaken in Mexico*

| Type of Intervention | Public Agencies Involved |
|---|---|
| Demonstration projects | CFE, WBG, UNDP, GEF, IDB, Proparco, DEG |
| Wheeling fees | CRE |
| Grid connectivity and transmission infrastructure | CRE, SENER |
| Renewable energy targets | Government of Mexico, GEF |
| Resource mapping | USAID |
| Training and assistance | UNDP, GEF, WBG |
| Fiscal and economic incentives | WBG, GEF |
| Regulatory framework | CRE |

Source: WRI, using information compiled from website of listed institutions

## 4. Forestry in Cambodia

The Cambodian Forestry Administration estimates that, as of 2006, forests covered 59% of Cambodia's total land area.[cxciii] The country's 2003 Millennium Development Goal aims to maintain a similar forest cover percentage in 2015.[cxciv] A significant amount of deforestation has occurred in Cambodia though, driven by agricultural and timber sectors, suboptimal land use and management, forest fires, chemical damage during war, and illegal logging. [cxcv] While the country's deforestation rates have slowed slightly in recent years, several barriers remain to maintaining forest cover, such as the lack of consistent and coherent land use and management policies, limited government capacity, and the lack of formal, stakeholder-driven efforts to manage resources. Some of these important barriers are:

(1) Carbon Market Risks and Challenges: The variability of REDD projects rests largely on the carbon market, which is not reliable, thereby creating the risk that OPIC-supported REDD projects will fail to provide the revenue stream needed to deliver promised benefits to implementing partners and local communities, and high returns to investor. [cxcvi] Moreover, the Cambodian government missed the deadline to sign the deal for the project to sell carbon credits; potential buyers of carbon credits may stay away from Cambodia because of this. [cxcvii]

(2) Forest Management: Despite sustainable forest management being a priority for the Cambodian government, it has been managed in a fragmented way; responsibilities for the management and conservation of forests in declared protected areas lie with the Ministry of Environment and responsibilities for unprotected forests lie with the Forestry Administration, the Ministry of Agriculture, and the Ministry of Agriculture, Forestry and Fisheries, causing for limited coordination and collaboration. [cxcviii]

(3) Limited funding: Over the last three years, the availability of donor funding to support REDD projects has been limited. Therefore, projects were forced to consider forms of private finance as a way to cover the negative cash flow. [cxcix]

<u>The Oddar Meanchey Project</u>

The Oddar Meanchey project was Cambodia's first REDD project.[cc] It started in 2008 with the support of the Cambodian Forest Administration, Terra Global Capital, Pact Cambodia, and Community Forestry International (CFI), in collaboration with NGOs and community forestry groups comprised of 58 villages. The project protects 56,050 hectares of community forests; it aims to sequester 8.2 million metric tons of $CO_2$ over 30 years and reduce poverty among nearly 10,000 participating households through shared revenues amounting to an estimated US$50 million worth of carbon credits.[cci]

The project had many challenges in the development stage, ranging from a limited government capacity to implementation risks. The Forestry Administration had to dedicate time and resources to become familiar with the Verified Carbon Standard (VCS) and Climate, Community & Biodiversity Alliance validation requirements. The long-term viability of the project depended on three major implementation elements: (1) the Forest Administration's ability to provide 50% of revenues to community groups for sustainably managing the land, (2) the Technical Working Group on Forestry and Environment's ensuring that project revenues flow in a transparent and accountable manner, and (3) community forestry groups' consistency in reporting cases of deforestation to local authorities.

For Terra Global, one of the central challenges in the project concerned the REDD carbon credits, which are currently traded in voluntary emissions reductions markets. As international and national REDD frameworks evolve as a result of ongoing international negotiations, projects may be nested within state- or national-level REDD accounting systems that change the way REDD targets are measured, potentially preventing projects from earning carbon credits. The potential for diminishing returns on investment as a result of policy changes currently heightens the risk for investors in REDD projects. Despite Terra Global's grandfathering clause in its contract with the Cambodian government, as its investment in the project grew, the company felt compelled to insure their investment against political risk. Terra Global took a year and a half to secure political risk insurance from a public financial institution, and ultimately received it from OPIC in June 2011. OPIC provided US$900,000 worth of expropriation and political violence insurance to protect Terra Global's investment. OPIC tailored its insurance coverage to meet Terra Global's specific requirements. [ccii & cciii]

Multiple donors have provided funding to support the carbon development and implementation activities of this project, including Danida, DFID, NZAID, the William J. Clinton Foundation–Clinton Climate Change Initiative, the John D. and Catherine T. MacArthur Foundation, Pact, the US Department of State, JICA, and UNDP. The total project cost is estimated to be over US$21.3 million, of which 85% is implementation-related (to support community sustainable forest management activities) and 15% is carbon-related (for carbon data and validation and registration fees).

As of March 2013, Terra Global had invested US$1.38 million worth of equity in the project, and further details are provided in table 7.

*Table 7: Financing Breakdown for the Oddar Meanchey Project*

| Instrument | Amount | Source |
|---|---|---|
| Subordinated concessional loan | Unknown.<br>(The total project cost is estimated to be over US$21.3 million) | Danida, DFID, NZAID, the US Department of State, JICA, UNDP, the Clinton Foundation, the MacArthur Foundation, and Pact |
| Insurance (20-year coverage period) | US$ 900,000 | OPIC |
| **Public Total** | **Not available** | |
| Equity | US$1.38 million | Terra Global Investment Management |
| **Private Total** | **US$1.38 million** | |
| **Total** | **Not available** | |

Source: WRI, using information compiled from website of listed institutions

Attribution Assessments

WRI applied the methodology OPIC uses to its insurance provided, but was not able to apply the selected loan methodologies due to insufficient information on the loans provided (results are provided in Appendix III). Application of only the OPIC methodology, without being able to account for the mobilisation effects of the remaining public finance, led to an estimation of mobilisation that was lower than the total equity provided by Terra Global. Underestimation of mobilisation can disincentivise certain types of interventions and finance from institutions unable to claim success for their contributions.

Market Development Timeline

WRI classifies interventions under four broad categories, drawing from the definitions outlined in a previous WRI publication, 'Mobilising Climate Investment.'[cciv]

- Policy measures: Plans and targets, laws, regulations, economic incentives
- Institutional measures: Institutional capacity building, institutional strengthening, etc.
- Industry measures: Industry capacity building, resource assessments, enabling infrastructure, etc.
- Financial measures: Financial sector development, capacity building, and strengthening

1. 1998: The Cambodian government initiates a forestry reform process through a national committee[ccv], with support from the Development Partners (DPs) including AFD, DANIDA, DFID, JICA, FAO, UNDP, USAID and World Bank. [ccvi]

2. 1999: The ADB launched a Sustainable Forest Management Project concentrating on strengthening and intensifying activities relating to a forest concession review, forest law and regulation, and community forestry guidelines. [ccvii]

3. 2002: The secretariat of the national committee in collaboration with the GIZ-funded Cambodia-German forestry project formulated a National Forest Policy Statement which states the commitment of the Government to sustainable forest management of forest resources. [ccviii]

4. 2002: The National Forest Policy Statement was announced which promotes reforestation activities for the development of forest resources and reduction timber supply from natural forests through encouraging private investment and public participation. [ccix]

5. 2002: Cambodia's Law on Forestry incorporates a framework for sustainable forest management which state that the sustainable forest management will be conducted in a manner consistent with the National Forest Sector Policy and this law. [ccx]

6. 2003: The Millennium Development Goals of Cambodia aim to increase forest cover to 60% of total land from 2005 to 2015 and to reduce inhabitants dependent on fuel wood as primary energy source from 92% to 52% by 2015. [ccxi]

7. 2003: Forestry Administration is created, replacing previous Department of Forestry and Wildlife; it is tasked with managing the country's forests. [ccxii]

8. 2003: Independent Forest Sector Review was released by Joint Coordinating Committee of Government and donors which include the World Bank, ADB, FAO, UNDP and IMF, providing critical background information to develop a National Forest Programme and pursue towards achieving sustainability in the management of the forest resources. [ccxiii]

9. 2004: Royal Government of Cambodia announces initial Rectangular Strategy for Growth, Employment, Equity and Efficiency[ccxiv], and establishes a Technical Working Group on Forestry and Environment (TWG-F&E) to provide a mechanism for coordination between the government development partners, and other stakeholders. [ccxv]

10. 2006: National Strategic Development Plan (NSDP) was launched by the Cambodia government and the target of ensuring environment sustainability includes REDD activities. [ccxvi]

11. 2006: A Capacity Building for Sustainable Forest and Land Management Project was funded by Japan's Social Development Fund, with the World Bank to build the Capacity of the Forestry Administration and local NGOs to implement community forestry. [ccxvii]

12. 2007: Community Forestry Carbon Offset Project is implemented by the Forestry Administration and Oddar Meanchey Provincial Government, with support from PACT, Clinton Climate Initiative (CCI), MacArthur Foundation and Terra Global Capital. It seeks to retain CO2 in Oddar Menachey areas with an emphasis on environmental services. [ccxviii]

13. 2008: Government of Cambodia updates Rectangular Strategy for Growth, Employment, Equity and Efficiency, which includes forestry reform. This policy also encourages the private sector to establish commercial forest plantations in degraded forest land. [ccxix]

14. 2008: Launch of the Oddar Meanchey project—Cambodia's first REDD[19] project-- in northwestern Cambodia, near Thailand, which was being deforested at an average annual rate of 2% in recent years[ccxx] . The Forestry Administration of the Cambodian government, Terra Global Capital, Pact Cambodia, and Community Forestry International (CFI) developed the REDD project in collaboration with NGOs and 13 community forestry groups comprised of 58 villages. The project protects a 56,050 hectare area within a total of 64,318 hectares of community forests and will sequester roughly 8.2 million metric tons of $CO_2$ over 30 years and reduce poverty among nearly 10,000 participating households through shared revenues from an estimated US$50 million worth of carbon credits. [ccxxi]

15. 2008: The Seima Protection Forest REDD pilot project was launched. The protected area covers 187,983 hectares of the Seima Biodiversity Conservation Area. The total budget for this project is US$550,000 from UNDP-TRAC and UN-REDD (grants) and it is being implemented by the FA and Wildlife Conservation Society in Mondulkiri and Kratie provinces. [ccxxii]

[19] Reduced Emissions from Deforestation and Degradation (REDD) is an international mechanism that uses market and financial incentives to promote sustainable forest management; the mechanism gives a financial value to the carbon stored in forests' trees, and developed countries then pay developing countries carbon offsets for their standing forests. REDD is a critical piece of international climate change mitigation and adaptation efforts, whose urgency was underscored by the Fourth Assessment Report of the United Nations' Intergovernmental Panel on Climate Change, which indicated that deforestation and forest degradation contribute globally to approximately 17% of all greenhouse gas emissions—third only to the global energy (26%) and industrial (19%) sectors.

16. 2009: The Cambodian government launched the National Strategic Development Plan and implemented a law on forestry and regulations along with good collaboration between all concerned institutions, forest resources are now more strictly managed. [ccxxiii]

17. 2009: A Northern Plains REDD project was planned by WCS, together with FA and MoE, funded in part by UNDP and the total budget is $5,179,250. The goal is to help conserve the Northern Plains landscape which covers an area of 400,000 hectares of mosaic forest. A feasibility study had been completed reviewing the potential for implementing a REDD+ project. [ccxxiv]

18. 2009: Cambodia joined the World Bank Forest Carbon Partnership Facility (FCPF) and the Cambodia Readiness Plan Proposal was approved by the World Bank FCPF in 2011.

19. 2010: The UN-REDD programme approved US$15.2 million in funding for national programmes in Cambodia and other countries and the policy Board approved US $3 million for Cambodia in order to support Cambodia to be ready for REDD+ implementation. [ccxxv]

20. 2010: A REDD+ project was initiated in the Southern Cardamoms Mountain. It aims to implement the components like forest protection and monitoring, reforestation, zoning and demarcation and Alternative livelihoods. The partners involved in the project included ONF International, Institut Gaspard Monge, Ministry of Agriculture, Forestry and Fisheries, Forestry Administration, Provincial Government of Koh Kong and Technical Working Group on Forestry & Environment. [ccxxvi]

21. 2011: A Sustainable Forest Management and Rural Livelihood Enhancement project was launched, funded by the European Commission. Oxfam Great Britain and Forestry Administration were key partners. It aimed to scale up the reach and impact of community forestry in Cambodia. [ccxxvii]

22. 2011: The National Forest Program was released in 2011 which covered a total of 10.094 million hectares of forest, funded by UN-REDD for a US$ 3 million. Its mission is to advance the sustainable management and development of our forests for their contribution to poverty alleviation, enhanced livelihoods, economic growth and environmental protection, including conservation of biological diversity and our cultural heritage. [ccxxviii]

23. 2011: UNDP and GEF launched a Sustainable Forest Management project in Cambodia, funded by grants of US$2.3 million from the GEF and US $1.5 million from UNDP. [ccxxix]

24. 2011: OPIC announced US $900,000 political risk insurance for Terra Global Capital in order to reduce the risks, such as breach of government contracts, political violence cause an expropriation of the forest project. [ccxxx]

25. 2011: OPIC invested $40 million in Terra Bella, a private equity fund managed by Terra Global Capital, it sells verified emissions reductions from multiple-benefit community REDD project in Cambodia. [ccxxxi]

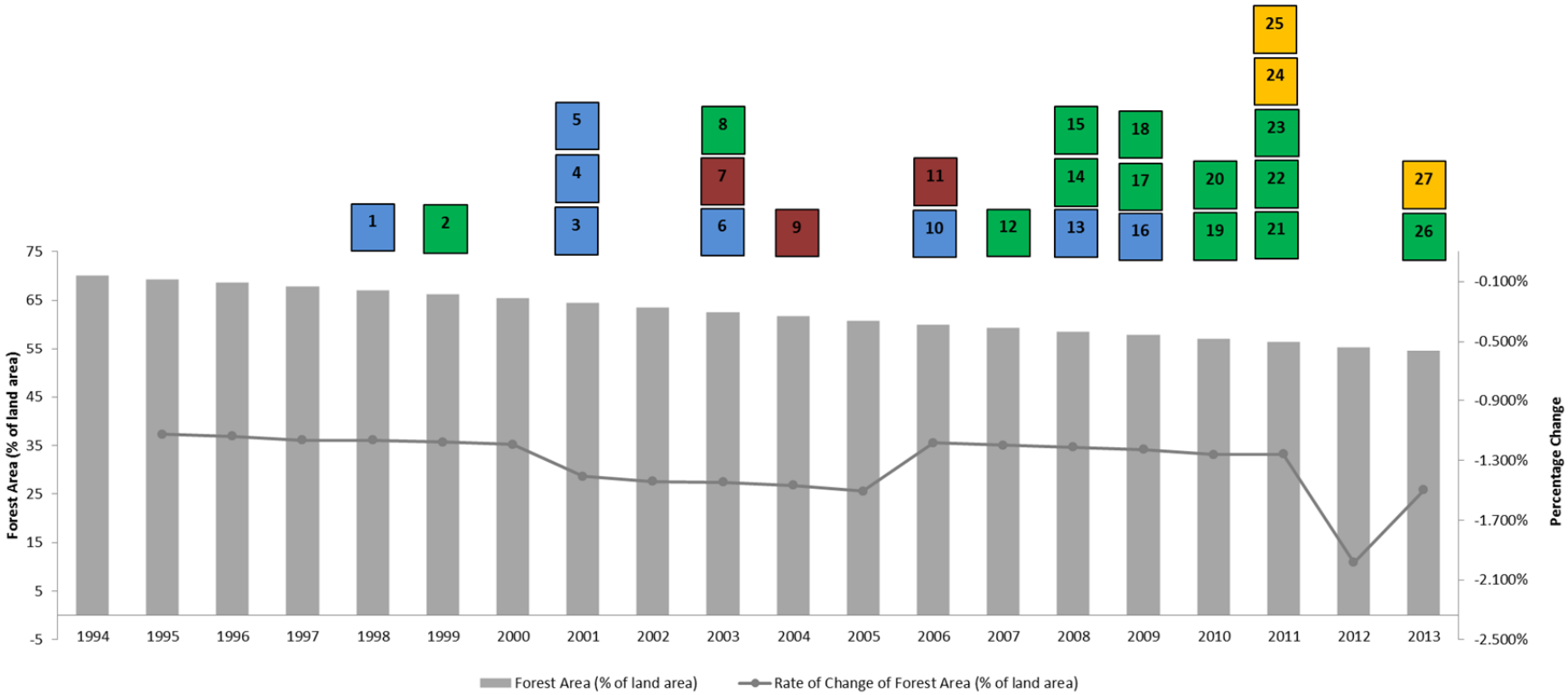
26. 2013: Dentons, a Chicago law firm, provided legal counsel for Cambodia's fist REDD project to move forward after years of development and also included advising on the terms of an Emission Reduction Purchase Agreement and regulatory and policy issues relating to REDD projects. [ccxxxii]

27. 2013: Microsoft is investing in the Oddar Meanchey forest protection project in Cambodia. [ccxxxiii]

Evolution of Market Development: Causality and Temporal Assessments

We map these interventions against Cambodia's forest area as a percentage of land area (figure 17) to highlight how public interventions are likely to have contributed to the Cambodian government's commitment to reduce deforestation. It appears unlikely that the project would have taken place in their absence. Further, though forest area as a percentage of total land area is decreasing, the rate of this decrease is declining – suggesting that though avoided deforestation efforts will require considerable additional assistance, the current efforts are starting to have a modest impact.

*Figure 17: Graph of Forest Area as a percentage of Land Area in Cambodia against Various Public Interventions*




Source: WRI, using data from the World Bank Group (1998~2011), http://data.worldbank.org/indicator/AG.LND.FRST.ZS. The forest area of 2012 and 2013 were estimated by WRI.

Some of these broader public interventions, and the international support they received, are categorized in table 8 below. Interviews with stakeholders underlined the importance of the political risk insurance at the project level, and previous interventions such as the community forestry law and the creation of the Forestry Administration at the market level, in improving the attractiveness of REDD activities in the country.

*Table 8: Typology of Broader Interventions Undertaken in Cambodia*

| Type of Interventions | Public Agencies Involved |
|---|---|
| Demonstration Projects | ADB, AusAID, DANIDA, DFID, EC, FAO, GIZ, GEF, JICA, NZAID, OPIC, PACT, UNDP, USAID, WCS and WBG |
| Training and Technical Assistance | ADB, JICA, UNDP, USAID, WCS, WBG |
| Capacity building | JSDF, WBG |
| Fiscal & economic incentives | ADB, GEF, UNDP, UN-REDD, WBG |
| Setting up institutions | Government of Cambodia |
| Regulatory framework | Government of Cambodia |

Source: WRI, using information compiled from website of listed institutions

## 5. Urban Transport in Brazil

Public transportation is especially critical in urban areas, which is where 84% of Brazil's population resides.[ccxxxiv] By the 1970s Sao Paulo's state government had started to invest in metropolitan subways through public-private partnerships. Starting in the 1990s the Brazilian government took steps to de-centralise its transportation systems, devolving responsibilities to state governments and private companies; in 1995, Brazil began its National Privatisation Programme, and in 1997, many of these state companies were split and converted into private companies. [ccxxxv]

The railway industry has been supported by many development banks and institutions such as Brazil's BNDES, the IADB, the World Bank Group, and the US Export-Import Bank. Despite the progress, there are still a number of barriers that restrict the development of a well-established urban transport sector, and some of these are:

(1) Lack of Financing and Capacity: Funding requirements go beyond those provided by non-reimbursable federal funding and loans from national development banks like BNDES. [ccxxxvi] There is a need for further involvement of other DFIs, as well as private investment banks.

(2) Evolving PPP Model: The PPP model in Brazil is yet to be widely adopted; the private sector is risk averse, while the public sector lacks capacity and credibility. Lessons and experiences of PPPs can be used to enhance investment in climate-relevant projects. [ccxxxvii]

(3) Lack of Coordination: There is a lack of coordination and integration between different modes of public transport. For example, a lack of agreement between bus companies and governments limits the use of smart cards across modes of transport. Unless the interests of stakeholders are aligned, the urban transport market will not reap the full benefits of innovative, cost-effective technologies.[ccxxxviii]

(4) Unfavourable Investment Conditions: Political interference, lengthy environmental licensing processes, expropriation of property, and the bidding process for a PPP project hamper widespread private sup ort for public works.[ccxxxix]

(5) No National Transportation Standards: No national standard on the criteria for metro regions has been established by the states concerning facilities to access federal funds. [ccxl]

The Sao Paolo Metro Line 4 Project

The Metro Line 4 (concessioned to ViaQuatro[20]) is a link between the suburban railway and the Metro network. This is Brazil's first PPP project with the State of São Paulo and first rail transit concession, signed in 2006.[ccxli] Moreover, it is the first PPP in Brazil to be financed in the international markets with the structure of the loan built around a two-phase framework. This means that the terms of the concession contract outlined that ViaQuatro must have two investment programmes. Phase I would receive funding at the start of the concession while Phase II funding could begin after the second year of commercial operations, depending on demand levels and projection forecasts. [ccxlii] The public sector is responsible for constructing Metro Line 4 in Sao Paulo, while the private sector is responsible for operation and maintenance, and the supply of trains and signalling & control systems.[ccxliii]

The participation of the private sector was required because the State of São Paulo could only borrow from multilaterals with a guarantee from the National Government of Brazil.[ccxliv] The project was not eligible for support from BNDES because the trains were manufactured outside Brazil. The federal government authorised the State of São Paulo to borrow US$ 418 million of the US$ 934 million required to build Phase 1. Thereafter, the federal government authorised an additional US$ 190 million in guarantees due to currency devaluation. The remaining amount had to come from the State's budget or the private sector.

The Brazilian government and international institutions played a significant role in convincing the private sector to invest in Metro Line 4 due to inherent risks. [ccxlv]

- The revenue model was very sensitive to demand risk. As such, there was a minimum and maximum mechanism for the level of demand to ensure there was shared demand risk between the State Government and the private sector. For example, if real demand lies between 80% and 90% of the projected demand, the government would give a protection of 60%; thus, revenue would be complemented by 60% of what lacks for 90% of the projected demand.[ccxlvi]
- The private sector was also exposed to currency risk. If the Brazilian Real were to depreciate, this would affect their capacity to pay foreign debt incurred from imported equipment. To reduce this risk, the Brazilian government applied price index controls[21] to the revenue adjustment formula for fare payment in order to reduce the likelihood of foreign exchange risk. This effectively limited foreign exchange losses to 50% of the foreign exchange impact. [ccxlvii]

Metro Line 4 was primarily financed through turnkey [ccxlviii] and concession contracts in order to protect the city from escalating costs and operating subsidies. The consortium, ViaQuatro, was composed of the firms from Brazil (68% stake), Portugal (30% stake), France (1% stake), and Argentina (1% stake).[ccxlix] The total financing costs were approximately US$ 2339 million, as detailed in table 9.

[20] ViaQuatro, an unlisted private company controlled by Brazil's CCR, was awarded a 30-year concession to operate and maintain São Paulo metro line 4. CCR (Companhia de Concessões Rodoviárias) is one of the biggest private infrastructure conglomerates of Latin America with interests in private interstate highway concessions in Brazil

[21] The Brazilian government controlled foreign exchange losses using the IGP-M (Market General Price Index). It is composed of three indexes: Wholesale Prices Index (IPA), Consumer Price Index (IPC) and Construction Cost National Index (INCC) that represent 60%, 30% and 10% respectively of the IGP-M; Source: Araújo, Carlos Hamilton Vasconcelos, et al., "Price Indices in Brazil," Investor Relations and Special Studies Department, Central Bank of Brazil, March 2013. Available online at http://www4.bcb.gov.br/pec/gci/ingl/focus/faq2-price%20indices.pdf

*Table 9: Financing Breakdown for Metro Line 4*

| Instrument | Amount | Source |
|---|---|---|
| Loan[22] | US$ 434,000,000[ccl, ccli & cclii] | IBRD |
| Loan | US$ 434,000,000[ccliii] | JBIC |
| Equity | US$ 922,000,000 | *São Paulo* |
| A/B Loan | US$ 30,000,000[ccliv & cclv] | IDB to ViaQuatro, for its equity investments[cclvi] |
| **Public Total** | **US$ 2,099, 000,000 (89.7%)** | |
| Equity[23] | US$ 309,000,000[cclvii] | ViaQuatro from IDB |
| Loan | US$ 240,000,000 | Private Banks |
| **Private Total** | **US$ 240,000,000 (10.3%)** | |
| **Grand Total** | **US$ 2,339,000,000 (100%)** | |

Source: WRI, using information compiled from website of listed institutions

The project's viability was aided by complementary transportation policy and targets established by the Brazilian government as the 2014 Football World Cup and 2016 Olympic Games approach.

Attribution Assessments

WRI applied the UK-ICF and the ADB methodologies, under two scenarios, to the loans provided by the IBRD, IDB, and JBIC (see Appendix III). The UK-ICF methodology, due to its pro-rata approach, estimated combined private finance mobilised as equalling the total private finance provided. The ADB methodology, on the other hand, led to a triple-counting of the total private sector loans disbursed.

Market Development Timeline

WRI classifies interventions under four broad categories, drawing from the definitions outlined in a previous WRI publication, 'Mobilising Climate Investment.'[cclviii]

- Policy measures: Plans and targets, laws, regulations, economic incentives
- Institutional measures: Institutional capacity building, institutional strengthening, etc.
- Industry measures: Industry capacity building, resource assessments, enabling infrastructure, etc.
- Financial measures: Financial sector development, capacity building, and strengthening

[22] The WB's loan was increased by US$ 95 million from US$ 209.00 million in 2002 to US$ 304.00 million in 2008 due to currency devaluation in the past decade. Over US$ 15 million of this loan was for technical assistance for the management, oversight of the project, and financial and costs studies.

[23] ViaQuatro: US$ 450 million for purchasing trains and signalling, communications and control systems. Moreover, during the 30 years that the operational contract will be in effect, ViaQuatro will invest on the order of US$500 million in maintaining the equipment and US$1.3 billion in operating costs. By the end of the concession period, ViaQuatro will have invested over US$2 billion in the line. Inter-American Development Bank signed a US$ 69 million loan agreement with ViaQuatro, the concessionaire of São Paulo metro line 4.

1. 1946: British-owned São Paolo Railways concession expired, Brazil began nationalizing its railways. [cclix]

2. 1957: The Rede Ferroviária Federal (RFFSA) was created to manage 42 nationalized railway lines.[cclx]

3. 1968: Companhia do Metropolitano de São Paulo (Metro) was founded. Some months later, the company started installing the São Paulo Metro. At the end of 1968, they began working on the North-South Line, now called Line 1-Blue. [cclxi]

4. 1970s: State governments began investing in metropolitan subways to reduce traffic congestion.[cclxii] São Paulo completed 11 km of tunnels with 16 stations. The route installed 31 of the 35 km Line 1-Blue. São Paulo also began the interconnection between Line 1-Blue and the future Line 2-Green. [cclxiii]

5. 1973: Specific State Management Institutions (were created after 1973). The Deliberative Council was appointed by the state governor. Its functions included: (i) promoting the integrated development plan of the metro-region, (ii) programming of common services, (iii) coordinating the implementation of programs and projects. [cclxiv]

6. 1973 to 1974: Brazilian Metropolitan Regions were formerly established by complementary Federal Laws No. 14 in 1973 and No. 20 in 1974. Facilities were created to access federal resources and financing. There was a new link between the strategy of creating metro-regions and the second National Development Plan (Federal Law 6. 151/1974).[cclxv]

7. 1974: The first two subway trains manufactured by domestic industry were fitted with imported components. This marks one of the many examples that show the importance of the São Paulo subway to the development of transport technology in Brazil. By November 1974, about 300,000 were using the São Paulo subway. [cclxvi]

8. 1976: Advanced work on Line 3-Red continued. The work focused primarily on developing the eastern end of the path to integrate with the North-South metro and tunnels in the city center. About 1300 properties were expropriated and destroyed, causing the redevelopment and modernization of São Paulo. [cclxvii]

9. 1977: The São Paulo metro system became increasingly integrated with other modes of transport. Brazilian experts created the design of Line 3-Red Metro cars. During construction of the new line, São Paulo strived to nationalize the industry, with the collaboration of major research institutions such as the University of São Paulo (USP) and the State University of Campinas (Unicamp). [cclxviii]

10. 1983: Oil crisis caused Brazil's current account deficit to become unmanageable, triggering a debt crisis. Over the next two decades, Brazil focused on controlling hyperinflation and balancing its public accounts.

11. 1990: Brazilian government transferred urban rail systems from federal level to the states and municipalities.[cclxix] This decentralisation was important because the Federal government could not concession out systems to the private sector. As such, giving states and municipalities control over the urban rail systems was a prerequisite for "concession". [cclxx] Moreover, since the Federal government

struggled to restructure a profitable railway system and wanted to ensure better connectivity to state and municipality-owned public transport systems such as the bus.[cclxxi]

12. 1993: The urban transport systems undertook decentralisation with the objectives consistent with the World Bank's 1993 Country Assistance Strategy (CAS), which put emphasis on resource allocation, increased efficiency in the public sector and, the appropriate targeting and delivery of support systems to the poor.[cclxxii]

13. 1995: Concessions Law (No. 8.987/1995) legalizing the use of private concessions to supplement interest in privatization.[cclxxiii] This law allows the Brazilian Federal Government to concession out systems to the private sector without having to transfer control to the states or municipalities. The interest to privatize was due to the fact the government wanted to improve the quality of public services[cclxxiv] and because the government could save money without compromising political power.[cclxxv] The 1995 Concessions Law opened the doors to foreign capital as it reached 53% of the total received from privatizations held in Brazil by 2002.[cclxxvi]

14. 1996 – 1999: the World Bank Group supported privatization of the federal railways through technical support underpinned by a Bank loan that financed staff retrenchment. The entire railway network, comprising of more than 28,000 km of rail line, was concessioned to the private sector.[cclxxvii] The World Bank's involvement was primarily to act as the "honest broker" between the parties and financed some of the projects.[cclxxviii]

15. 1997: The Rio de Janeiro metro system was concessioned in December 1997 to a consortium (Consórcio Opportrans).[cclxxix]

16. 1997 – 2005: Investments made by concessionaires in the track and rolling stock during the privatization of federal railways totaled about $2.3 billion.[cclxxx]

17. 2001: A Federal Law (Estatuto da Cidade – Law 10.257/2001) requested for cities and metropolitan regions with more than 500,000 inhabitants to have developed integrated urban mobility master plans.[cclxxxi]

18. 2002: After signing an agreement with the CPTM, the São Paulo Metro Company became responsible for the operation and maintenance of 8.4 km long Line 5-Lilac. Moreover, the São Paulo Metro Company signed an agreement with World Bank for a loan of $209 million for the construction of Line 4-Yellow. [cclxxxii]

19. 2003: The Ministry of Cities, a federal ministry was formed to oversee urban development. The Ministry of Transport announced a rail revitalization plan intended to stimulate increased private investment by modifications to regulatory framework, and by restructuring concessions to permit government expenditure alongside private investment in order to stimulate expansions. This is because they recognized that the concessionaires were not in a position to invest in line expansions. One such project was expected to be a rail cargo bypass line ("rail beltway") around the city of São Paulo with participation of the Federal Government, state of São Paulo and private sector concessionaires (MRS Logística and Ferroban).[cclxxxiii]

20. 2004: Public-Private Partnership Law (No. 11.079/2004)[24] allows for two kinds of concessions: (i) sponsored concession: a public services or public works concession under which the private concessionaire is entitled to both a tariff to be paid by end users and financial contribution from the government or government entity; and (ii) administrative concession: the private entity provides services to the public entity or partner and the government entity makes a payment on basis of the services received from the private partner. [cclxxxiv] This PPP law also created the PPP Guarantee Fund (FGP) to provide credit guarantees for liabilities assumed by public entities engaged in PPPs. This fund reduces the risk of government insolvency.[cclxxxv] PPP projects need to be modeled, procured, executed, and supervised under a stable and fair regulatory framework in order to attract investors. This PPP law gives PPP projects predictability and security in legal frameworks. This legal framework for PPPs has been successfully tested in the case of São Paulo's Metro Line 4.[cclxxxvi] The Metro Line 4 project decided that the most adequate type of concession is the "sponsored concession mode (PPP) because it better reflects the monetary payment by the State Government, the need of guarantees from the State government to the private partner and vice-versa, as well as the necessary sharing of the risks to make the concession possible.[cclxxxvii] [Began work on Line 4-Yellow] [cclxxxviii]

21. 2005: BNDES played an increasing role in concession arrangements by announcing its equity participation in restructuring Brasil Ferrovias Group. Brasil Ferrovias, in previous restructurings came to administer three railways services (Ferronorte, Ferroban and Novoeste) and two new projects (Nova Brasil Ferrovias and Novoeste Brasil).[cclxxxix]

22. 2007-2010: Growth Acceleration Plan (PAC 1) devoted about R$500 billion over four years to growth investment projects, including US$ 34 billion in transport with a 50% match from the Brazilian National Development Bank, BNDES.[25] Specifically, PAC 1 will provide US$ 6.6 billion of federal financing for urban mobility in host cities for the World Cup and Olympics, followed by a second round of US$12 billion for 24 Brazilian cities with a population of over 700,000. On a multi-sector base, the combination of the National Plan on Climate Change (PNMC), the National Logistics and Transport Plan (PNLT) and PAC 1 have drawn up low carbon scenarios in the Brazilian as a whole.[ccxc]
23. 2010: The Brazilian Federal Government hired Estruturadora Brasileira de Projetos (EBP) to undertake feasibility studies around the country for how to structure PPPs. EBP was formed by BNDES and eight other banks.[ccxci]

24. 2010: BNDES investment in the railway sector totalled 24% of disbursements of logistics and transport segment (R$ 1 billion). There were significant investments in the concessionaires' railway system and rolling stock in the system granted to the private sector (the loan to acquire locomotives is mentioned, representing the return to manufacturing of these goods in national industry). BNDES also supported investments related to the expansion of capacity in the railway system in the state of São Paulo.[ccxcii]

25. 2011: The U.S. Export-Import Bank provided a US$1 billion line of credit for infrastructure projects for the state of Rio de Janeiro with particular focus on public-works projects tied to the 2014 World Cup and 2016 Summer Olympics.[ccxciii]

[24] Note: Though it does not explicitly state that international support from entities like the World Bank and Inter-American Development Bank were provided to Brazil in the establishment of the 2004 PPP Law, Brazil called on many professionals from these institutions to discuss Brazil's PPP opportunities; refer to http://www.ip3.org/ip3_site/spotlight-on-brazil-brazil-launches-new-ppp-projects.html?print=1&tmpl=component

[25] A full list of PAC 1 projects is available at http://www.transportes.gov.br/public/arquivo/arq1318615138.pdf.

26. 2011-2014: Growth Acceleration Plan (PAC 2) devoted a second round of funding to development projects; estimated to be R$ 104.5 billion for transport through 2014.[26]

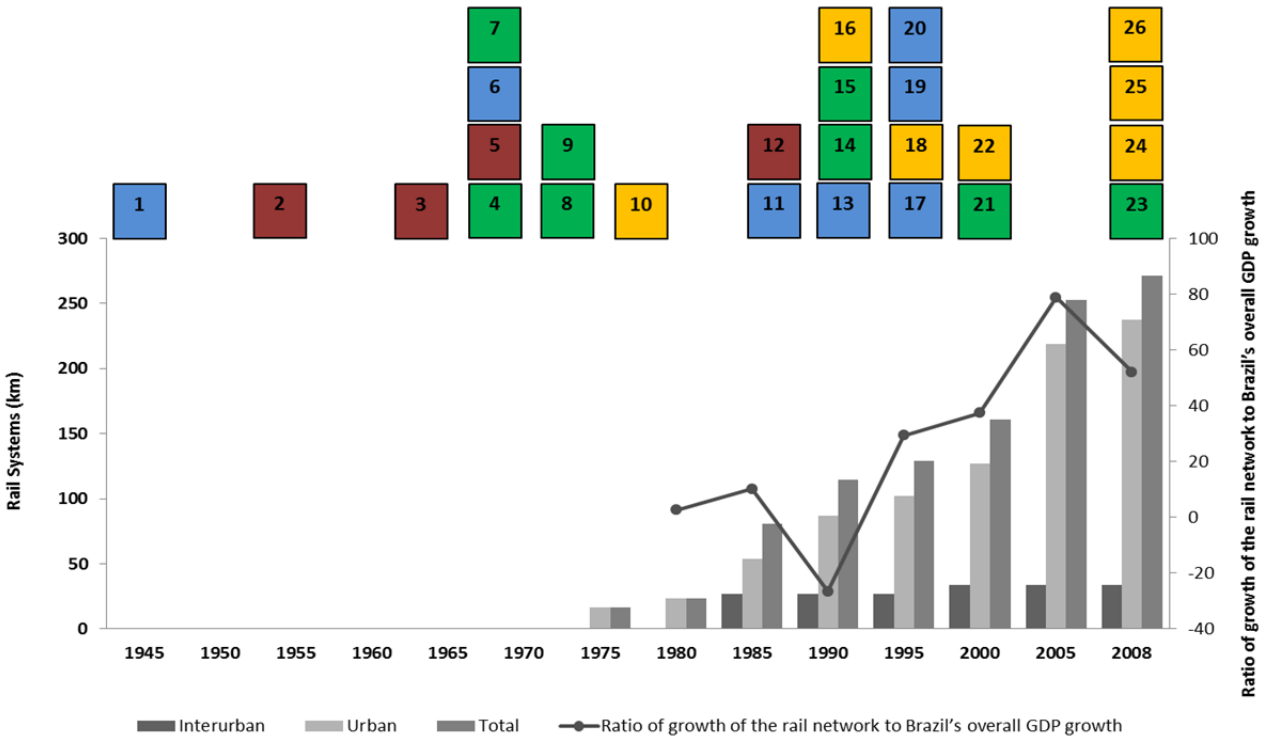
27. 2012: Logistics Investment Program (PIL) earmarked over $58 billion in the next 25 years to concessions for 7,500 km of roads, 10,000 km of rail, two airports and multiple ports.[27]

Evolution of Market Development: Causality and Temporal Assessments

We map these interventions against the growth of the Brazilian rail systems network over time (figure 18), and see the public interventions that are likely to have contributed to this growth. In order to gauge the impact of broader economic growth on the development of rail infrastructure, the ratio of growth of the rail network to Brazil's overall GDP growth is also mapped. As can be seen, the rail network has grown steadily, driven by the growth in urban passenger networks, and has grown faster than overall GDP. The project has contributed to this overall trend – but, by the same token, has likely benefited from these interventions for its own feasibility.

[26] A full list of PAC 2 projects is available at http://www.pac.gov.br/.
[27] A full list of PAC 1 projects is available at http://www.transportes.gov.br/public/arquivo/arq1318615138.pdf.

*Figure 18: Rail Systems Network in Brazil against Various Public Interventions*




Source: WRI, using information compiled from KfW, 2011, World Bank Database

Some of these broader public interventions, and the international support they received, are categorized in table 10 below.

*Table 10: Typology of Broader Interventions Undertaken in Brazil*

| Type of Intervention | Public Agencies Involved |
|---|---|
| Demonstration Projects | BNDES, WBG, JBIC, CAF |
| Training and Assistance | WBG, CAF, BNDES, CAF |
| Fiscal and economic incentives | Government of Brazil, WBG, IDB, BNDES, EXIM, JBIC |
| Regulatory Framework | Government of Brazil |
| Public/Urban Transportation Targets | Government of Brazil |
| Institutional Strengthening | Government of Brazil, Valec, CBTU, CPTM |
| Capacity Building | Government of Brazil, UITP, BNDES, ANTP, NTU |

Source: WRI, using information compiled from website of listed institutions

## 6. Solar Power in India

With an estimated 5,000 trillion kWh of solar energy incident over its geography, India has one of the world's highest solar energy generation potentials.[ccxciv] The grid-connected solar energy sector in India began developing as early as 2002-03. The initial period between 2003 and 2010 was instrumental in creating a supportive policy, regulatory, and legal environment that allowed private sector developers and financiers to enter the market, particularly after 2009 with the launch of the Jawaharlal Nehru National Solar Mission (JNNSM) and state policies.

The grid-interactive solar power installed as of December 2010 was merely 10 MW.[ccxcv] As of June 2013, total grid interactive solar PV installations stood at over 2GW, accounting for 7% of total renewable generation.[ccxcvi] In 2013, generation from renewable sources in turn accounted for 14% of total power generation in India. [ccxcvii] Despite this achievement, the actual power generation from renewable sources falls considerably short of the potential that exists for the technologies in the country. [ccxcviii] The potential for solar energy in India is not constrained by any physical fuel source. Despite this, there are still a number of barriers that restrict the development of a well-established solar market, some of which are listed below.

(1) Permitting Difficulties: Reports have indicated some difficulty in attaining permits and land for solar projects in India.[ccxcix] The current structure of some PPAs reduces bankability for lenders. Other PPA issues include tariff changes and non-inflation adjustment, which affects the cost and revenue structure of the PPA.[ccc]

(2) Financing Capacity: A key barrier to short-term growth of the sector is the unfamiliarity of Indian banks with financing solar projects. [ccci] There is a lack of appropriate financial instruments, as well as a high cost of finance due to limited tenors, limited access to non-recourse debt, and sub-scale project investment size.[cccii] Fulfilling India's National Solar Mission will require an estimated US$ 19 billion. The Indian government has committed to funding the US$ 900 million first phase, but is counting on UNFCCC funds to cover the next two phases. This creates uncertainties on longer-term market growth.[ccciii]

(3) Lack of experience with solar technology: There is limited experience with the technology and market growth is dependent on future developments to make solar technology cost competitive for grid interactive power generation.[ccciv & cccv]

The Azure Power Project

Azure Power, a US-owned private sector solar power developer based in India, was established in 2008 before the launch of the JNNSM.[cccvi] Since its inception, this independent power producer has installed several solar power plants throughout the country. The company won its first solar power plant contract in early 2009 in the northern state of Punjab. This 2MW plant was also India's first privately owned grid connected MW scale solar power plant.[cccvii]

The Indian government and international institutions played a significant role in convincing the private sector to invest in Azure Power. From its initial 2MW investment in a facility in Punjab to a total portfolio of 50 MW at present, Azure Power has availed of a mix of equity, debt and mezzanine facilities to finance itself. A brief description of the growth of the company's solar generation portfolio and funding rounds is listed below.

i. Initial Success: Obtaining Risk capital
The growth of the company's portfolio was challenging because project funding for commercially untested ventures like solar power plants was difficult to arrange, and Azure Power did not have a parent balance sheet to rely on.[cccviii] It received initial support from OPIC of US$ 6.2 million for the 2MW facility in Punjab.[cccix&cccx] In addition, it also enjoyed policy support from the Government of India's renewable energy purchase subsidy programme as well as implementation assistance from the Punjab Energy Development Agency (PEDA).[cccxi]

ii. Attaining scale: Policy/regulatory support & innovative financing
After this initial support, Azure Power expanded its Punjab facility by 3MW, using an additional US$ 7.7 million loan from OPIC. The company also received quasi-equity loans worth US$10 million from the IFC for the Punjab project, as well as for a new 10MW facility in Gujarat. The innovative quasi-equity stake offered a first-loss position in the investment and was valuable for the company to create leverage for attracting other sources of borrowing. In addition, OPIC also provided US$ 26.8million in debt financing for the Gujarat facility.

iii. Mature operations: Commercial investors
In 2011, Azure Power started a new project under the Rajasthan Solar Policy, with financing from multiple lenders. One of these was the US Ex-Im Bank, which contributed US$ 15.8 million in direct lending for a 5MW project. The company also obtained mezzanine financing from DEG worth US$ 13 million for a 35 MW project in Rajasthan, which was also co-financed by the Ex-Im Bank and a consortium of local banks. The involvement of local banks indicated the emergence of the solar sector as a commercially attractive investment opportunity.

However, as with any emerging sector, commercial project financing for solar projects in India still requires technical and financial support. Blending public finance to support markets from early-stage to commercialization is critical to mobilising private investment over time. This is seen from the mix of financing provided to Azure Power, as detailed in table 11.

*Table 11: Financing Breakdown for Azure Power*

| Instrument | Amount | Source |
|---|---|---|
| Direct Loan | US$ 6,200,000 | OPIC (2009) |
| Direct Loan | US$ 79,800,000 | Ex-Im Bank (2011 and 2012) |
| Convertible Debentures | US$ 13,600,000 | DEG (2011)[i] |
| Direct Loan | US$ 4,600,000 | IFC (2012) [ii] |
| Equity | US $ 10,000,000 | IFC Asset Management Co. (2010) |
| **Public Total** | **US$ 113,600,000** | |
| Equity | Not Available | Helion Venture Partners (2008) |
| Equity | Not available | Foundation Capital (2008) |
| **Private Total** | **Not available** | |
| **Total** | **Not available** | |

Source: WRI, using information compiled from website of listed institutions

Attribution Assessments

WRI adopted two scenarios to understand the reporting practices for Azure Power financing (see Appendix III). In the first case, we adopted the UK-ICF methodologies for all the loans as well as for the equity provided by IFC AMC. In the second case, we adopted the ADB methodology for the loans and the UK CP3 methodology for the equity support.[28]

In the first scenario, the UK-ICF pro-rated its estimations across instruments, and thus did not risk any double counting of private flows across the loan and equity support. In the second scenario, since the ADB methodology does not seem to be readily applicable to private sector equity investments at the project level, the pro-rated approach for estimating mobilisation by the UK CP3 led to an under-reporting of flows mobilised. However, a different interpretation of the applicability of ADB's methodology would lead to a large extent of double counting.

Further, since the equity investments came in before the international public support, it is difficult to claim under either scenario that public money did at all mobilise private money.

[28] Due to unavailability of information on appropriate methodologies for quasi-equity instruments, we categorize the convertible debentures provided by DEG as loan financing.

Market Development Timeline

WRI classifies interventions under four broad categories, drawing from the definitions outlined in a previous WRI publication, 'Mobilising Climate Investment.'[cccxii]

- Policy measures: Plans and targets, laws, regulations, economic incentives
- Institutional measures: Institutional capacity building, institutional strengthening, etc.
- Industry measures: Industry capacity building, resource assessments, enabling infrastructure, etc.
- Financial measures: Financial sector development, capacity building, and strengthening

1. 1987: In 1987 the government established the Indian Renewable Energy Development Agency Limited (IREDA), a government-owned non-bank financial institution under the administrative control of the Ministry of New and Renewable Energy[29] to provide financial support to renewable energy and energy efficiency projects.[cccxiii]

2. 1992: The World Bank Group set up a US$115 million line of credit, and a US$26 co-financing from the GEF for commercialization of renewable energy technologies by creating marketing and financing mechanisms, setting institutional frameworks for encouraging entry of private investments in small scale generation and promote environmentally sound investments to prevent depletion of limited forest resources.[cccxiv]

3. 1994: Special Area Demonstration Project (SADP) Program was launched by the MNRE to promote solar and other renewable energy projects in special areas around the country including: a) World Heritage Sites, b) Tourist and religious spots, c) National Parks, Zoos, Government Science Museums etc. The Energy Park Scheme was part of the SADP to create demonstration projects at state and district levels to introduce and popularize renewable energy for students, teachers and the general public. As of 2013, the SADP supports 41 sites around the country and has established 30 state and 484 district level Energy Parks.[30]

4. 1998: The World Bank Group's International Bank for Reconstruction and Development (IBRD) and International Development Association (IDA), along with the Global Environment Facility (GEF) extended the second line of credit to Indian Renewable Energy Development Agency (IREDA), which had three main objectives: a) develop 200MW of environmentally sustainable small hydro power projects, b) Finance investments in energy efficiency/demand side management (DSM) by supporting energy services company (ESCO) models and utility led schemes like DSM, c) Technical and institutional capacity building support to IREDA including pre-investment activities to build a project pipeline.[cccxv]

**Part I: 2003-2010. Setting the stage for solar energy**

5. 2003 – 2013: The Renewable Energy Certificates (REC) and Renewable Purchase Obligation (RPO) Mechanism were originally mandated under the Electricity Act of 2003. As of 2013, 21 of the 28 states (and seven union territories) have specified these targets, ranging between 2% to 14%. The RECs are aimed at resolving the mismatch between a state's RPO targets and its renewable energy potential.

[29] Formerly named the Ministry of Non-Conventional Energy Sources.
[30] See Special Area Demonstration Project website at MNRE: http://www.mnre.gov.in/related-links/support-programmes/special-area-demonstration-project-programme/

Launched in 2010, RECs facilitate faster growth of renewable energy generation in resource-rich states while allowing resource poor states to meet their RPO cost-effectively. RECs are traded on a national electronic exchange between a floor and ceiling price specified and revised periodically by CERC. In terms of denomination, 1 REC equals 1 MWh of renewable generation. As on December 4, 2013, there are 905 accredited REC generators representing 4300MW of renewable capacity. Of this, 145 solar PV projects represent 308.7MW of installed generation capacity, and 1 solar thermal project of 3MW[cccxvi].

6. 2003: The Electricity Act of 2003 (EA 2003) is designed to reduce regulatory intervention and introduce competition within distribution, transmission and generation businesses. The EA 2003 also has specific provisions to encourage renewable energy by ensuring grid connectivity (Section 86), and promoting the sale of renewable energy by fixing a minimum renewable purchase obligation (RPO) (Section 61, 86). [cccxvii]

7. 2005: The National Electricity Policy 2005 (NEP 2005) promotes private participation in renewable energy generation through price and quantity incentives. NEP 2005 mandates state electricity regulatory commissions (SERCs) to specify appropriate tariff levels to promote various types of renewable energy sources within their state. [cccxviii]
8. 2005: JICA committed official development assistance (ODA) loan support for capacity building to IREDA for medium and long term funds for new & renewable energy projects. JICA's funds would be received by IREDA and on-lent to qualified projects, with IREDA's risk of default borne by a sovereign guarantee by the Government of India. JICA would also extend technical support to IREDA for strengthening its capacity to appraise loans for solar power generation projects and holding seminars with Indian and Japanese enterprises in this sector.[31 & cccxix]

9. 2006: The National Tariff Policy 2006 (NTP 2006) formalized the competitive bidding process for renewable energy projects by mandating that the distribution licensees (distribution companies) purchase renewable energy to meet their RPO through competitive bidding, encouraging private sector innovation for cost-reduction. The RPO target was finalized at the start of the Indian Fiscal Year on April 1, 2006. [cccxx]

10. 2006: India's eleventh five-year plan (2007-12) - The Planning Commission had set up an expert group to recommend integrated energy policy. Its report submitted in 2006 dealt with various sources and forms of energy (electricity, coal, oil, gas, nuclear, hydro energy, and renewables including wind energy, solar energy, biofuels, and wood plantations), the country's projected requirement and availability of resources, energy security, energy efficiency as well as R&D priorities. [cccxxi] The report emphasized on making the energy sector efficient and competitive. It proposed relative prices and taxes to reflect the true social cost of different fuels and forms of energy as the best way to encourage right mix of fuels. Moreover, it proposed competitive markets wherever possible, transparent and target subsidies when needed, policies that rely on incentives and disincentives, and policies that are implementable. [cccxxii]

**Part II: 2008 – present. Launch of India's solar energy industry**

11. 2008: The Integrated Energy Policy in 2008 (IEP 2008) suggested several important changes and additions to the existing policy/regulatory framework. This included a tax on conventional energy

[31] Ex-Ante Loan Evaluation document at http://www.jica.go.jp/english/our_work/evaluation/oda_loan/economic_cooperation/c8h0vm000001rdjt-att/india110616_05.pdf

generation, specifically on coal to create a pool of funds for subsidizing renewable energy generation. This coal tax (called CESS, levied per ton) was used to part finance the first Phase of the JNNSM. [cccxxiii] Moreover, a number of technology missions including Solar Energy Mission were created to develop near-commercial technologies and roll out in a time bound manner new technologies that emphasize nationally relevant sources of energy.[cccxxiv] India's National Action Plan on Climate Change (NAPCC) solidified this mission by aiming to promote the development and use of solar energy for power generation and other uses with the ultimate objective of making solar competitive with fossil-based energy options. The plan includes: (i) Specific goals for increasing use of solar thermal technologies in urban areas, industry, and commercial establishments; (ii) A goal of increasing production of photovoltaics to 1000 MW/year; and (iii) A goal of deploying at least 1000 MW of solar thermal power generation. Other objectives include the establishment of a solar research center, increased international collaboration on technology development, strengthening of domestic manufacturing capacity, and increased government funding and international support.[cccxxv]

12. 2008: The British High Commission (BHC) and Department of Energy and Climate Change (DECC), Government of UK provided technical assistance through the Climate and Development Fund. The fund aims to provide technical assistance to Indian policy makers and think tanks to develop analysis to improve policies and practices to address impacts of climate change and to meet energy needs for the poor. [cccxxvi]

13. 2009: The Gujarat Solar Power Policy of 2009 introduced stepped tariffs for solar projects, offering higher prices per kWh for the first 13 years and drastically lower tariffs for the remaining 12 years. Although on a levelized basis, this was similar to the benchmark tariff of the JNNSM, the structured was more aligned with the higher upfront costs associated with solar projects. Apart from individual projects, Gujarat also launched the Charanka Solar Park in 2010. The park, situated on 5384 acres of barren land in the state of Patan, was the first of its kind to provide centralised services like transmission, water connections, roads, land leveling and maintenance[cccxxvii]. As on March 31, 2013, the total installed solar capacity in the state was 852.31MW[cccxxviii].

14. 2010: Jawaharlal Nehru National Solar Mission of 2010 (JNNSM), India's flagship program, develops solar PV and thermal power for grid-connected and off-grid decentralised generation, The JNNSM is defined in three separate phases: (a) Phase 1 from 2010 to 2013 for policy framework to attract and scale-up the sector with a grid target of 1,100MW and an off-grid target of 200MW, (b) Phase 2 from 2013 to 2017 to develop a market based on FiTs and mandatory solar RPO with a grid target of 10,000MW and an off-grid target of 1000MW, and (c) Phase 3 from 2017 to 2022 to make grid competitive solar power with a grid target of 20,000MW and an off-grid target of 2000MW.[cccxxix]

    As of July 31, 2013, a total of 279.3 MW had been commissioned under this policy[cccxxx]. The following are some of the key features of the JNNSM which were implemented for the first time in the Indian market.[cccxxxi & cccxxxii]

    i. Tariff based reverse bidding – A benchmark tariff for solar PV and solar thermal projects was established and project developers were invited to bid for available capacity (MW) offering discounts on the benchmark tariff. The lowest price developers won the power purchase agreement.
    ii. Pre-defined solar PV and solar thermal targets – The Mission declared the total amount of capacity available for bidding in each phase, and also provided technology targets to ensure a balanced growth in the solar sector, without neglecting any technology.

iii. Domestic content requirements – Project developers were also mandated to source a certain percentage of their solar panels and other associated capital equipment from Indian sources. This clause was introduced to kick start the domestic solar manufacturing industry and reduce costs through indigenization

15. 2010: The British High Commission (BHC) and Department of Energy and Climate Change (DECC), Government of UK supported the India Solar Capital Markets Climate Initiative (CMCI) through financial policy instruments and market development of the REC-RPO regime in India. This project worked closely with number of stakeholders including the Indian Ministry of Power, MNRE, Power Finance Corporation, project developers and capital market financiers to design and develop a framework to improve the REC mechanism. [cccxxxiii & cccxxxiv]

16. 2011: Rajasthan launched its solar policy after witnessing the successes of the JNNSM and the Gujarat Solar Policy. The state has similar physical characteristics as Gujarat, and is one of the best suited in the country for hosting solar projects. At present, the state hosts 81% of the JNNSM projects[cccxxxv]. The Rajasthan Solar Policy aims to support the JNNSM by offering incentives like exemption from Electricity Duty and other incentives available under the Rajasthan Investment Promotion Scheme 2010[cccxxxvi]. The Policy also laid out the details for the Bhadla Solar Park, structured along the lines of its counterpart in Gujarat. As on June 28, 2013, the total installed capacity in the state was 608.5MW[cccxxxvii].

17. 2011: The Asian Development Bank created an India Solar Power Generation Guarantee Facility, partial risk guarantee facility to offer 50% coverage of default risk to commercial lenders of solar power projects under the JNNSM or state programs. The total size of the Guarantee Facility is US$150 million and is applicable for projects with at least 50% private ownership. The facility is designed to allow private projects to secure competitive rates of financing and develop commercial lending facilities for solar projects. [cccxxxviii]

18. 2012: The French Development Agency (AFD) provided a 70M€- credit line to IREDA (Indian Renewable Energy Development Agency) to finance the production of renewable energies in five sectors (cogeneration, wind, solar, biomass and small hydroelectricity). AFD mobilised a technical assistance line (international and local) for an amount of 300,000€. For instance, a French expert was mobilised for capacity building at IREDA and its counterparts on the photovoltaic solar sector.[cccxxxix]

19. 2012: Commercialization of Solar Energy in Urban and Industrial Areas (ComSolar) is a project implemented in close coordination between the GIZ and the MNRE. The project aims to promote solar energy applications in various urban and industrial regions in India by supporting pilot projects, demonstrating new and innovative solar PV and thermal technologies in existing commercial and industrial applications, monitoring installations and developing sustainable business models based on the pilot projects. [cccxl]

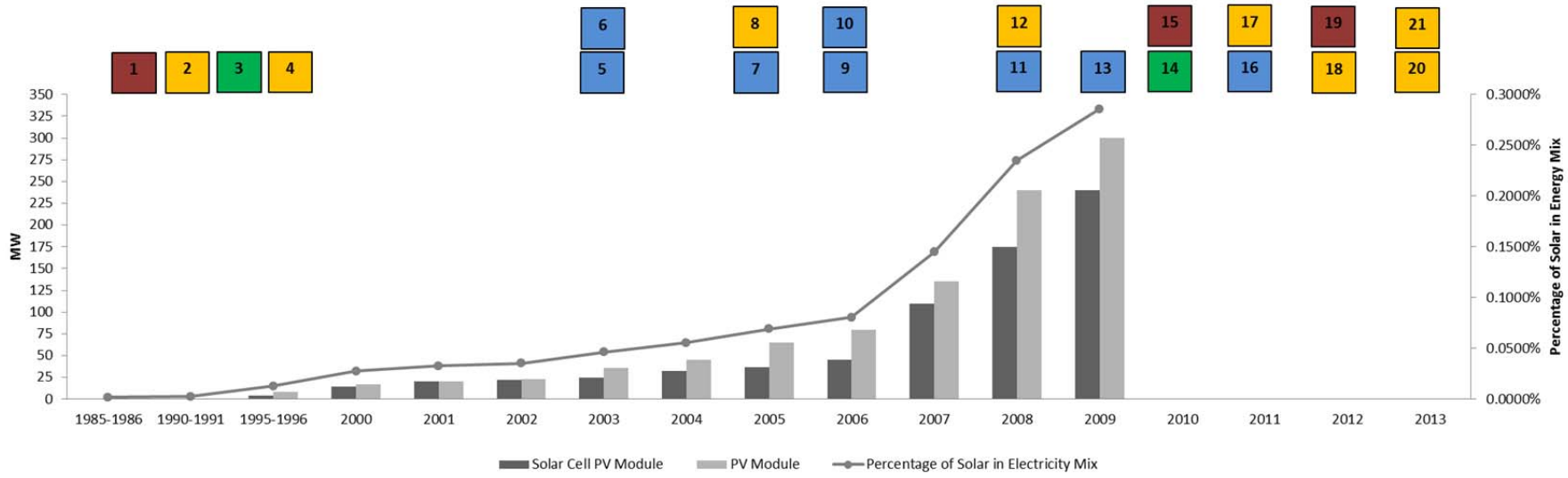
20. 2013: The Asian Development Bank provided concessional loan financing to the Rajasthan Solar Power Park for building and upgrading Rajasthan's transmission network to evacuate power from the Bhadla Solar Park in the district of Jodpur. ADB will provide $500 million to build a power transmission system needed to deliver clean electricity from wind and solar power projects in Rajasthan to the state and national grids. The loan consists of a $498 million multi-tranche financing facility, including funds from the concessional Clean Technology Fund, and $2 million in a technical assistance grant. [cccxli & cccxlii]

21. 2013: USAID's $100 million investment in India's clean energy sector benefited solar power producers. This $100 million investment by USAID is through a partnership with US investment firm Northern Lights Capital Group, aimed at promoting sustainable energy capacity on the sub-continent. The body will provide a 40% credit guarantee for investors in Nereus capital's India Alternative Energy Fund, which is managed by Northern Lights. The fund will invest in independent power producers developing, building and operating alternative energy projects in India, including solar. USAID will be able to dramatically leverage large-scale funding to help India's transition to a low carbon economy and open up new development opportunities for enhanced energy access. This investment may create up to 400MW of sustainable energy capacity. The Indian government has set a target of 30,000MW of renewable energy generation capacity in the next five years. [cccxliii]

Evolution of Market Development: Causality and Temporal Assessments

We map these interventions against the growth of the solar PV sector (figure 19), and see the public interventions that are likely to have contributed to the growth of this sector. Solar PV in India moved into a phase of strong growth after 2006, and this was aided by various measures in place to support it. These measures provided Azure Power with the regulatory certainty and investment attractiveness needed for it to enter the market. The share of solar in India's energy mix, also shown on the graph, shows an increasing trend, suggesting that the various interventions have been successful in promoting broader market development.

*Figure 19: PV Installations in India against Various Public Interventions*




Source: WRI, using information compiled from http://www.solarplaza.com/article/india-on-roll-to-be-a-solar-energy-super-power, International Energy Statistics

Some of these broader public interventions, and the international support they received, are categorized in table 12 below. Interviewees indicated that the support of the MNRE was instrumental at the project level in improving feasibility. International financing support was made possible only because the MNRE played an active role in making the power purchase agreement (PPA) acceptable to the parties. The government's bundling policy, where more expensive solar power is bundled with power from cheaper sources and sold in aggregate, as well as the renewables purchase obligation, provided added comfort to the financiers. Stakeholders further say that if the policies hadn't been well-aligned and enforced, most projects would have been unattractive.

*Table 12: Typology of Broader Interventions Undertaken in India*

| Type of Intervention | Public Agencies Involved |
|---|---|
| Demonstration Projects | ADB, WBG, KfW/GIZ, JICA, BHC/DFID, AFD, USAID, GoI, IREDA, SECI, IDBI |
| Training and Assistance | ADB, WBG, KfW/GIZ, AFD, MoP, CEA |
| Fiscal and economic incentives | GoI, USAID, BHC/DFID, JICA, ADB, WBG |
| Regulatory Framework | GoI, MoP, CEA, SREDA, SECI, CERC, SERCs |
| Solar/Renewable Energy Targets | GoI |
| Institutional Strengthening | GoI, MNRE |
| Capacity Building | ADB, WBG, KfW/GIZ, JICA, BHC/DFID, AFD, USAID |

Source: WRI, using information compiled from website of listed institutions

## 7. Weather-Indexed Insurance Globally

*Mobilising private sector investment into sectors that contribute to adaptation is a critical goal for contributor governments. However, there are few adaptation projects which have successfully mobilised private investment, and even fewer sectors that have exhibited the type of market development that would allow us to undertake the methodological testing done in the test cases. To conduct testing on an adaptation case, WRI revised its approach to think about market development to a global rather than geographic-specific lens. This test case tracks the evolution of weather-indexed risk insurance for farmers. Some argue that such financial products might incentivise business as usual practices in the long run, but just protect recipients from short term risk. WRI has used the example below as a test case, not with the intention of confirming this project as adaptation-friendly, but rather simply as an example to test reporting methodologies.*

Agriculture and associated industries throughout the food and beverage supply chains are highly exposed to climate variations due to the associated impacts of climate on commodity yields and prices.[cccxliv] Numerous weather-indexed risk insurance pilot projects have been developed since the late 1990s. Successful projects were attributed to the following:

(1) The identification of the weather exposure of crops and farmers;

(2) A quantifiable financial impact of adverse weather conditions on farmers' revenues and their input and production costs; and

(3) The development of an insurance contract structure that pays out when adverse weather conditions occur and can be reinsured in international markets.[cccxlv]

In addition to this, taking into account past and current weather-indexed risk insurance projects, it is evident that significant time needs to be committed by the insurer and other entities involved in the project. Such commitment includes capacity-building in both the private and public sectors in order to help the private sector actors realize the incentives to develop innovative products. It is also important that farmers, banks, regulatory authorities, and public agencies share technical knowledge under the leadership of the insurer. In short, the pilot projects illustrate the importance of the early working partnership between insurers, weather institutes, agricultural universities, banks, and reinsurance markets.

Governments, multilateral institutions, non-government organisations, and private entities, have promoted initiatives for the scaling up of weather-indexed risk insurance through various public and private partnership projects. These joint ventures have contributed to the transformation of this global market. Key drivers of the sustainability and scalability of this market includes: [cccxlvi]

- Offering insurance as part of a wider package of services
- Building the capacity of implementation stakeholders
- Increasing client awareness of weather index risk insurance products
- Embedding onto existing, efficient delivery channels
- Engaging the private sector from the beginning

- Accessing international risk-transfer markets
- Improving the infrastructure and quality of weather data
- Promoting enabling legal and regulatory frameworks

To warrant the adoption of weather-indexed risk insurance, it is important to recognize the nature of households that buy weather-indexed risk insurance, the factors preventing the remaining households from participating, and whether or not the purchase of index insurance results in more efficient risk taking. Important barriers in implementing weather-indexed risk insurance for farmers persist, and are listed below.

(1) Household Credit Constraints: Credit constraints prevent households from purchasing insurance, causing a lack of economies of scale, and therefore, a relatively low pay-out ratio.[cccxlvii]

(2) High Transaction Costs: The lack of economies of scale of weather insurance can be problematic to an insurer from a risk-management perspective. If rainfall insurance were written at a large scale, underwriters could limit their risk exposure by selling part of their rainfall risk to a reinsurer or by holding a significant capital buffer against potential losses. Despite feasibility, both of these options are likely to be costly because of transaction costs, informational frictions, and tax concerns.[cccxlviii]

(3) Basis Risk: A significant challenge of weather index insurance is basis risk, the variability in the relationship between the value of losses as measured by the index and the value of losses experienced on the farm. Basis risk is a consequence of limited, poor-quality, or missing data due to the spatial variability in weather variables (i.e. micro-climates), and differences in management practices, soil quality, as well as crop varieties.[cccxlix]

(4) Limited Understanding of the Product: Farmers do not fully understand the value of insurance when accessing credit, perhaps because of the lack of collateral and the lender's inability to bundle all agricultural loans with insurance.[cccl]

(5) Limited Trust in the Insurance Provider: With insurance being a foreign concept in developing regions, farmers may continue to be reluctant to sign onto an insurance policy due to a lack of trust in entities that help propel such initiatives.[cccli]

(6) Limited Repeat Uptake of Weather Insurance: In the event that farmers do not receive a payout in the first year of purchasing the weather insurance, only a small percentage of them will purchase insurance for the next year as the perceived value deteriorates.[ccclii]

The R4 Rural Resilience Initiative in Ethiopia

R4 Rural Resilience Initiative (R4) is a five-year programme starting in 2011 that provides weather-indexed micro-insurance for crops in Ethiopia and will be expanded to Senegal and other two countries.[ccliii] R4 was developed by Oxfam America and the World Food Programme (WFP) funded by Swiss Re and U.S. Agency for International Development (USAID) respectively.[ccliv] R4 employed an innovative business model offering farmers employment opportunities in public work projects to pay for weather-based insurance contract and increased their resilience towards the drought season.

R4 was developed on a pilot project, Ethiopia Horn of Africa Risk Transfer for Adaptation (HARITA) initiated in 2007 by Oxfam America; the Relief Society of Tigray; the International Research Institute for Climate and Society; the Dedebit Credit and Savings Institution– an Ethiopian micro-bank; and an Ethiopian insurance company.[ccclv] HARITA has been funded by Swiss Re the Rockefeller Foundation, and Oxfam America's internal funding.[ccclvi]

*Insurance premiums and pay outs*

Farmers get compensated in the event of drought via insurance pay-outs, when the rainfall drops below a predetermined threshold, which increases their financial resilience to extreme weather. This model was linked to microcredit using micro-insurance as collateral in the event of a drought[ccclvii]. Adjusted for landholding, all participating farmers have paid an average of around US$ 12 in premiums per year.[ccclviii] The pay-outs received by each farmer vary based on the risk exposure of the crops, the value of the crops, the insurance options purchased, and the degree to which the actual rainfall is below the trigger. Pay-outs were successfully made to 1,810 farmers in 2011, totalling around US$ 17,392[ccclix]. In 2012, drought conditions in parts of the project region led to a second insurance pay-out to more than 12,200 farmers in 45 villages, totalling US$ 322,772. [ccclx] This is the first time that a weather index insurance programme in Ethiopia has delivered pay-outs at such a large scale directly to small farmers.

*Impact, sustainability and replicability*

The impact of R4 was significant in one out of the five villages where farmers gained 57 percent higher yields compared to those who did not buy the insurance. Farmers that were signed up for the insurance tended to purchase more seeds, more high-yielding-variety seeds and more compost in all villages. Second time insurance buyers reported that they expected to plant different crops, use more fertilizer, and obtain loans[ccclxi]. So far, the R4 initiative has enrolled nearly 19,000 insurance clients across 76 villages in Ethiopia during 2012.[ccclxii] R4's potential as a broader model for agricultural micro-insurance has been assessed positively by Swiss Re, WFP, and USAID – based on performance to date. All have committed resources to its continuing expansion, alongside of Oxfam America.

*Financing*

R4 was able to raise $ 9.25 million out of the total $ 29.5 million it aims to raise for the five years. Of the $ 9.25 million raised in the first nine months of the project,[ccclxiii] Swiss Re has committed $ 1.25 million to the project for five years in Ethiopia and three other countries.[ccclxiv] USAID devoted $ 8 million to expand the project in Senegal and other two countries.[ccclxv] This financing mix is laid out in table 13.

*Table 13: Financing Breakdown for R4* [cccLxvi]

| Instrument | Amount | Source |
|---|---|---|
| Technical Assistance | US$ 8,000,000 | USAID |
| **Public Total** | **US$ 8,000,000 (86.5%)** | |
| Technical Assistance | US$ 1,250,000 | Swiss Re |
| **Private Total** | **US$ 1,250,000 (13.5%)** | |
| **Total** | **US$ 9,250,000 (100%)** | |

Source: WRI, using information from World Bank

Attribution Assessments

WRI applied the EBRD-SEI methodology for grant reporting to the technical assistance offered by USAID, and since it was the sole international public sector financier, there was no double counting of private flows mobilised.

Market Development Timeline

WRI classifies interventions under four broad categories, drawing from the definitions outlined in a previous WRI publication, 'Mobilising Climate Investment.'[cccLxvii]

- Policy measures: Plans and targets, laws, regulations, economic incentives
- Institutional measures: Institutional capacity building, institutional strengthening, etc.
- Industry measures: Industry capacity building, resource assessments, enabling infrastructure, etc.
- Financial measures: Financial sector development, capacity building, and strengthening

1. 2001: In a project to evaluate the possibility of introducing weather index insurance in Morocco, the World Bank provided technical assistance with the support of a local agricultural insurance company that had a significant rural presence, with the Italian government as a contributor.[cccLxviii]

2. 2002: The World Bank's Commodity Risk Management Group (CRMG) was allocated trust funds from the Swiss and Dutch governments to pilot weather insurance for farmers to complement its price risk management work in commodity markets. [cccLxix]

3. 2002: Mexico's first small-scale weather index insurance pilot insured 75,000 hectares of grains against drought and excess moisture through a government-owned entity responsible for the commercialization of the product and transferring the risk to the international reinsurance market. [cccLxx]

4. 2003: In India, a local microfinance institution and insurance company, with assistance from World Bank's CRMG and the IFC, launched the first pilot program for index-based weather insurance. This pilot sold policies protecting against low rainfall to 200 farmers. The local microfinance institution scaled up its program by incorporating improved risk management features for farmers, and standardised its structure, which led to it selling 7,600 policies across six states in 2005.[ccclxxi] Since 2003, four companies have provided weather insurance to farmers and have been reinsured in international markets.[ccclxxii]

5. 2003: Mexico's second pilot incorporated lessons learned from the first pilot. In 2003, the product was registered with the national insurance commission to verify the efficiency of the product and the strength of the triggers established in the contract. In this pilot, a state government contracted insurance for approximately 107,600 hectares of corn and sorghum, and distributed to over six weather stations in the region. The total sum insured was US$3.5 million[ccclxxiii]

6. 2003-2005: An index insurance pilot in Ukraine aimed to address the disparity between the traditional insurance coverage offered and the production risks faced by farmers, thus providing an innovative instrument to mitigate weather risks such as drought. The pilot was initiated by the IFC Agribusiness Development project, and jointly implemented by a local insurance firm and the World Bank's CRMG. Despite its achievements, client awareness hindered the product's success. Further, farmers mistakenly believed it to be an initiative of the IFC and the World Bank, which they were reluctant to trust.[ccclxxiv]

7. 2005: World Bank's CRMG launched a pilot program for groundnut in Malawi in which weather index insurance was used as a means to manage the risks of providing credit to farmers. World Bank's CRMG was central to building capacity, raising awareness, and stimulating the interest of potential partners. It also played an important coordinating role in working with local stakeholders to design and roll out the product. Because these contracts could mitigate the weather risk associated with lending to farmers, a local commercial microfinance bank and a microfinance institution owned by the Government of Malawi agreed to lend farmers the funds necessary to purchase higher-yielding seed if the farmers bought weather insurance as part of the loan package.[ccclxxv]

8. 2006: Ethiopia's first index insurance pilot was implemented through a partnership between the World Food Program (WFP) and the Ethiopian government.[ccclxxvi]

9. 2007: Malawi's 2005 pilot led to the creation of a weather-indexed product for tobacco. Less than 15% of the nation's tobacco-growing farmers had access to formal credit, which was needed to buy key inputs for tobacco production. As weather-related risks are the main impediments to local bank lending, the CRMG joined with local banks, insurance companies, and contract farming companies to provide index insurance that covered the value of the input loan, not the crop. By buying the insurance, farmers could access credit, obtain modern inputs and receive production advice, and thus increase their production and incomes. [ccclxxvii]

10. 2007: A tobacco merchant and a local commercial microfinance bank in Malawi introduced a weather-indexed product for tobacco at the portfolio-level to insure part of their tobacco loan portfolio against deficient and excess rainfall. This product leveraged its supply chain to offer index insurance to

its farmers. In order to participate, farmers had to open bank accounts with the microfinance bank.[ccclxxviii]

11. 2007 to 2009: In Ethiopia, a local insurance firm worked with farmer unions to provide 60,000 clients with weather insurance. The local insurer needed initial support to sensitize the market and cover its start-up costs. The unions provided farmers with inputs and paid the farmers' premiums up front. The union could then sell the produce, deduct the premium and input costs from the revenue, and then pay farmers the balance. Similar index insurances were used in Kenya, where an international sustainable agriculture foundation supported index-based insurance to promote the use of high-yield seed. [ccclxxix & ccclxxx]

12. 2007: In Nicaragua, a local insurance company began selling index-based insurance contracts with support from CRMG. The initiative was part of a pilot program to insure groundnut farmers against drought risk. The pilot showed that an external development agency could have a catalytic effect on establishing the necessary public-private partnerships, particularly in providing technical assistance to coordinate public agencies in the early stages, when confidence-building is very important.[ccclxxxi]
13. 2007: In Ethiopia, an index insurance pilot for grain farmers was developed by Oxfam America and Swiss Re, in collaboration with other partners including a university partner and non-government organizations. Swiss Re's role was to review and adapt weather index insurance contracts for commercial viability and conformity to market standards, while Oxfam's role was to convene the various stakeholders at the local and global levels and facilitate a holistic risk management model.

14. 2008: In China, a Weather Risk Management Facility (WRMF), a joint initiative by the International Fund for Agricultural Development (IFAD) and WFP, was launched to support the development of weather risk management instruments in developing countries.[ccclxxxii&ccclxxxiii] The weather-indexed insurance product was issued by a local agricultural insurance company. [ccclxxxiv]

15. 2008: In India, PepsiCo worked with a local insurance provider and the Weather Risk Management Services (WRMS), a private Indian consulting firm that pioneered weather derivative contracts, to develop a risk-management product as part of its package of services for out-grower farmers. The insurance sold through the local insurer and an international insurer, and was managed by the WRMS. The success of the program was largely due to its contract farming arrangement with farmers. [ccclxxxv]

16. 2008: In Malawi, as part of the risk management component of its agricultural development program, the Government, with support from the World Bank and the UK's DFID, initiated a pilot that transferred the financial risk of severe national drought to the international risk markets. This involved the purchase of a weather derivative contract from the World Bank Treasury, which simultaneously entered into a contract with a leading reinsurance company.[ccclxxxvi]

17. 2009: In Kenya, a social enterprise launched by an international sustainable agriculture foundation, with the support of IFC's Global Index Insurance Facility (GIIF), began by providing insurance against adverse weather to farmers. This agricultural insurance program was the first worldwide to reach farmers using mobile technologies. IFC provided the project with $2.4 million to pilot an index insurance market in Kenya. An added benefit of index insurance is access to financing, including credit and loans, and over 30,000 farmers in Kenya were able to access $5.5 million in

financing because they had insurance. Following its success, this insurance expanded into Rwanda, insuring nearly 40,000 farmers.[cccIxxxvii]

18. 2010: In Rwanda, IFC's GIIF entered into an agreement with MicroEnsure, a specialist provider of insurance to the low and middle-income market, providing a grant to incentivise MicroEnsure to: (1) Design new and affordable index-based insurance products; (2) Develop an effective distribution network that expands outreach to low income farmers; and (3) Scale-up agricultural index insurance into a commercially viable and sustainable product.[cccIxxxviii]

19. 2011: In Tanzania, the IFC supported MicroEnsure's weather index insurance pilot project to demonstrate the viability of scaling up weather index insurance for poor farmers where the right data is available. Along with the IFC, MicroEnsure worked with a British foundation and a local underwriter, with reinsurance support from Swiss Re, to provide weather index insurance to cotton farmers.[cccIxxxix]

20. 2011: Climate insurance projects in the Caribbean began in Jamaica, Saint Lucia, and Grenada, to address climate change, adaptation and vulnerability by promoting weather-index based insurance as a risk management instrument in the Caribbean. The project has developed two parametric weather-index based risk insurance products aimed at low-income individuals and lending institutions exposed to climate stressors. This project was led by the German reinsurance firm Munich Re's climate insurance initiative. Funding for the project has been provided by the German government under its International Climate Initiative.[cccxc]

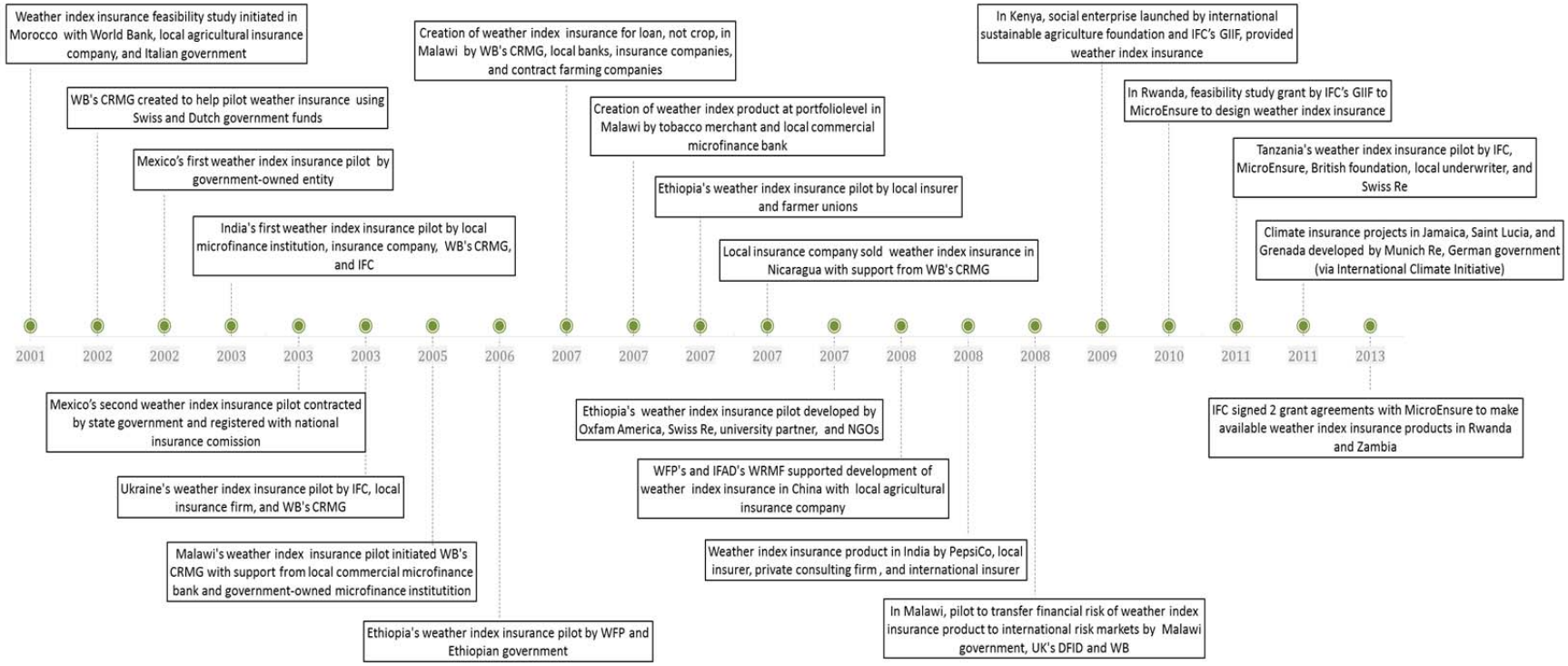
21. 2013: The IFC signed 2 grant agreements with MicroEnsure to make more index-based weather insurance available to small-scale farmers in Rwanda and Zambia. The grants, valued together at about $650,000, aim to help mitigate the adverse effects of climate change and strengthen food security. IFC's grants are expected to help MicroEnsure offer index-based insurance to an extra 90,000 small-scale farmers in Rwanda within 2 years and 15,000 small-scale farmers in Zambia within one year. [cccxci]

Evolution of Market Development: Causality and Temporal Assessments

Many interventions have international demonstration effects, highlighted in the timeline below (figure 20). Examples include the following:

- A weather-indexed insurance pilot was launched in Thailand in 2005 when the World Bank, which had worked on a pilot scheme in India, interacted with key Thai stakeholders while exploring the applicability of indexed insurance to Southeast Asia. These stakeholders requested assistance from the World Bank, resulting in the pilot. [cccxcii]
- Moreover, a Japanese insurer established a joint venture with an Indian fertiliser cooperative to gain access to local farmers. After success in India, in 2009/2010, the insurer, together with JBIC, and Thailand's Bank for Agriculture and Agricultural Cooperatives offered farmers in Northeast Thailand similar weather index insurance to protect against rainfall variations.[cccxciii]
- Additionally, Kenya's 2009 Kilimo Salama weather index insurance program expanded to Rwanda in 2011, in partnership with a Kenyan financial services company. As of 2012, the Kenyan financial services company collected KSh 19 million in premium payments, and premium revenue has nearly doubled to KSh 33 million in just the first six months of 2012. These volumes are approaching levels that can make index insurance economically sustainable in the long term.[cccxciv]

*Figure 20: Global Promotion of Weather Risk Insurance*




Source: WRI, using information from publicly available source

## APPENDIX III: RESULTS OF TESTING OF METHODOLOGIES

This appendix highlights the preliminary results obtained when WRI applied the methodologies, to each of the cases covered. Note that due to limited availability of adequate information, WRI had to exercise its interpretations on how these methodologies may be best applied to the projects (further explained in the background paper). The results of this testing exercise may not therefore be fully reflective of actual reporting practices. However, even this limited exercise suggests the existence of several gaps in current reporting practices. It further highlights the need for better coordination in reporting amongst DFIs, as well as the need for greater transparency in these practices. All amounts are in millions.

WRI will aim to improve upon this exercise as further information is made available.

### *1. Energy Efficiency in Thailand*

*Table 14: Financing Breakdown for Thai-GEF/UNDP Energy Efficiency Project* [cccxcv]

| Entity | Category | Amount | Currency | Instrument |
|---|---|---|---|---|
| GEF | Multilateral | 3.3 | USD | Grant |
| National Government | Government | 5.7 | USD | Cash and In-Kind |
| Private sector and NGOs | Private | 5.58 | USD | Cash and In-Kind |
| **Total** | | **14.58** | **USD** | |

Source: WRI, using information from UNDP

*Table 15: Testing, Using EBRD-SEI Methodology for Grant Reporting*

| Entity | Reference Methodology | Entity Contribution | Total Project Cost | Private Sector Amount | Financial Instrument | Leverage/ Mobilisation Ratio | Amount Mobilised |
|---|---|---|---|---|---|---|---|
| GEF | EBRD-SEI | 3.3 | 14.58 | 5.58 | Grant | 1.69 | 5.58 |
| Total Amount Considered Mobilised | | | | | | | 5.58 |
| Total Amount Actually Mobilised | | | | | | | 5.58 |
| **Double Counting** | | | | | | | **0** |

Source: WRI, using information from publicly available sources

* Since we are only considering the mobilisation of private money, in this case we use total private sector contribution instead of total project costs to get the leverage ratio

* If there were another grant provider in this case, total reporting based on the EBRD-SEI methodology would result in double counting

### 2. *Geothermal Power in Kenya*

*Table 16: Financing Breakdown for Olkaria III Phase I & II* [cccxcvi cccxcvii cccxcviii]

| Entity | Category | Amount | Currency | Instrument |
|---|---|---|---|---|
| DEG (w 20m from FMO) | Bilateral | 40 [cccxcix] | USD | Senior loan |
| Proparco | Bilateral | 15 [cd] | USD | Senior loan |
| EAIF | PPCFI | 15 [cdi] | USD | Senior loan |
| kfW, EFP | Bilateral and multilateral | 49.7 | USD | Senior loan |
| Ormat | Private | 59.7 | USD | Commercial equity |
| MIGA | Multilateral | g (amount not clear) | NA | Guarantee |
| **Total** | | **179.4** | **USD** | |

Source: WRI, using information compiled from website of listed institutions and companies

*Table 17: Testing, Using UK ICF Methodology for Debt Reporting, and MIGA Methodology for Guarantee Reporting*

| Entity | Reference Methodology | Entity Contribution | Total Project Cost | Private Sector Amount | Financial Instrument | Leverage/ Mobilisation Ratio | Amount Mobilised |
|---|---|---|---|---|---|---|---|
| DEG (w 20m from FMO) | UK ICF | 40 | 179.4 | 59.7 | Loan | 2.01 | 19.9 |
| Proparco | | 15 | 179.4 | 59.7 | Loan | 2.01 | 7.5 |
| EAIF | | 15 | 179.4 | 59.7 | Loan | 2.01 | 7.5 |
| kfW, EFP | | 49.7 | 179.4 | 59.7 | Loan | 2.01 | 24.8 |
| MIGA | MIGA | g | 179.4 | 59.7 | Guarantee | 59.7/g | 59.7 |
| Total Amount Considered Mobilised | | | | | | | 119.4 |
| Total Amount Actually Mobilised | | | | | | | 59.7 |
| **Double Counting** | | | | | | | **59.7** |

Source: WRI, using information from publicly available sources

*Table 18: Testing, Using ADB Methodology for Both Debt and Guarantee Reporting*

| Entity | Reference Methodology | Entity Contribution | Total Project Cost | Private Sector Amount | Financial Instrument | Leverage/ Mobilisation Ratio | Amount Mobilised |
|---|---|---|---|---|---|---|---|
| DEG (w 20m from FMO) | ADB | 40 | 179.4 | 59.7 | Loan | NA | 0 |
| Proparco | | 15 | 179.4 | 59.7 | Loan | NA | 0 |
| EAIF | | 15 | 179.4 | 59.7 | Loan | NA | 0 |
| kfW, EFP | | 49.7 | 179.4 | 59.7 | Loan | NA | 0 |
| MIGA | ADB | g | 179.4 | 59.7 | Guarantee | NA | 59.7-g |
| Total Amount Considered Mobilised | | | | | | | 59.7-g |
| Total Amount Actually Mobilised | | | | | | | 59.7 |
| **Double Counting** | | | | | | | **-g** |

Source: WRI, using information from publicly available sources

* We include MIGA in the testing scenarios to compare the differences with ADB, though MIGA is not in the list of institutions covered in the OECD study

* We apply ADB methodologies for both debt and guarantees in scenario 2, to test how a single organisation reports on financing across instruments

* The ADB methodology is only applicable to partial loan guarantees. If the guarantee were to insure the full amount of the related instrument, the amount mobilised under this methodology (59.7-g) would not be valid

* Amount mobilised by debt instruments applying ADB methodology is 0 because ADB's definition of DVA co-financing as it relates to equity investments only includes investments made by private actors in funds where the ADB acts as a general partner

### 3. *Wind Power in Mexico*

*Table 19: Financing Breakdown for the La Ventosa Project* [cdii]

| Entity | Category | Amount | Currency | Instrument |
|---|---|---|---|---|
| IFC | Multilateral | 275 | MXN | Senior loan |
| IDB | Multilateral | 275 | MXN | Senior loan |
| US EXIM | ECA | 81 | USD | Senior loan |
| CTF | PPCFI | 15 | USD | Subordinated loan |
| IFC | Multilateral | NA | MXN | Hedges |
| EVM | Private | Amount unknown | MXN | Equity |
| CDM | Private | 0.25 | NA | Carbon credits |
| **Total** | | **154+x** | **USD** | |

Source: WRI, 2012

*Table 20: Testing, Using UK ICF Methodology for Debt Reporting*

| Entity | Reference Methodology | Entity Contribution | Total Project Cost | Private Sector Amount | Financial Instrument | Leverage/ Mobilisation Ratio | Amount Mobilised |
|---|---|---|---|---|---|---|---|
| IFC | UK ICF | 29 | 154+x | x | Loan | 154/x | x*29/154 |
| IDB | | 29 | 154+x | x | Loan | 154/x | x*29/154 |
| US EXIM | | 81 | 154+x | x | Loan | 154/x | x*81/154 |
| CTF | | 15 | 154+x | x | Loan | 154/x | x*15/154 |
| Total Amount Considered Mobilised | | | | | | | x |
| Total Amount Actually Mobilised | | | | | | | x |
| **Double Counting** | | | | | | | **0** |

Source: WRI, using information from publicly available sources

*Table 21: Testing, Using ADB Methodology for Debt Reporting*

| Entity | Reference Methodology | Entity Contribution | Total Project Cost | Private Sector Amount | Financial Instrument | Leverage/ Mobilisation Ratio | Amount Mobilised |
|---|---|---|---|---|---|---|---|
| IFC | ADB | 29 | 154+x | x | Loan | NA | 0 |
| IDB | | 29 | 154+x | x | Loan | NA | 0 |
| US EXIM | | 81 | 154+x | x | Loan | NA | 0 |
| CTF | | 15 | 154+x | x | Loan | NA | 0 |
| Total Amount Considered Mobilised | | | | | | | x |
| Total Amount Actually Mobilised | | | | | | | 0 |
| **Double Counting** | | | | | | | **-x** |

Source: WRI, using information from publicly available sources

* In this case the EVM private equity came before other public funding. We are not sure of whether public money mobilised private money or not. If not the amount mobilised should be zero based on both ADB and ICF methodology.

* Amount mobilised by debt instruments applying ADB methodology is 0 because ADB's definition of DVA co-financing as it relates to equity investments only includes investments made by private actors in funds where the ADB acts as a general partner.

### *4. Forestry in Cambodia*

*Table 22: Financing Breakdown for the Oddar Meanchey Project* [cdiii]

| Entity | Category | Amount | Currency | Instrument |
|---|---|---|---|---|
| UNDP | Multilateral | NA | NA | NA |
| Danida | Bilateral | NA | NA | NA |
| DFID | Bilateral | NA | NA | NA |
| NZAid | Bilateral | NA | NA | NA |
| JICA | Bilateral | NA | NA | NA |
| US DoS | Government | NA | NA | NA |
| Foundations | Private | NA | NA | NA |
| Terra Global | Private | 1.38 | USD | Equity |
| OPIC | Bilateral | 0.9 | USD | Insurance |
| **Total** | | **21.3** | **USD** | |

Source: WRI, using information compiled from website of listed institutions

*Table 23: Testing, Using OPIC Methodology for Insurance Reporting*

| Entity | Reference Methodology | Entity Contribution | Total Project Cost | Private Sector Amount | Financial Instrument | Leverage/ Mobilisation Ratio | Amount Mobilised |
|---|---|---|---|---|---|---|---|
| OPIC | OPIC | 0.9 | 21.3 | 1.38 | Insurance | NA | 0.48 |
| Total Amount Considered Mobilised | | | | | | | 0.48 |
| Total Amount Actually Mobilised | | | | | | | 1.38 |
| **Double Counting** | | | | | | | **-0.9** |

Source: WRI, using information from publicly available sources

* Double counting is negative because the mobilisation effect from other public finance has not been considered

### *5. Transportation in Brazil*

*Table 24: Financing Breakdown for Metro Line 4* [cdiv]

| Entity | Category | Amount | Currency | Instrument |
|---|---|---|---|---|
| IBRD | Multilateral | 434 | USD | Loan |
| JBIC | Bilateral | 434 | USD | Loan |
| IDB | Multilateral | 309 | USD | A/B loan |
| *São Paulo* | Government | 922 | USD | Equity |
| Banks | Private | 240 | USD | Loan |
| **Total** | | **2,339** | **USD** | |

Source: WRI, using information compiled from website of listed institutions

*Table 25: Testing, Using UK ICF Methodology for Debt Reporting*

| Entity | Reference Methodology | Entity Contribution | Total Project Cost | Private Sector Amount | Financial Instrument | Leverage/ Mobilisation Ratio | Amount Mobilised |
|---|---|---|---|---|---|---|---|
| IBRD | UK ICF | 434 | 2,339 | 240 | Loan | 4.9 | 88 |
| JBIC | | 434 | 2,339 | 240 | Loan | 4.9 | 88 |
| IDB | | 309 | 2,339 | 240 | Loan | 4.9 | 63 |
| Total Amount Considered Mobilised | | | | | | | 240 |
| Total Amount Actually Mobilised | | | | | | | 240 |
| **Double Counting** | | | | | | | **0** |

Source: WRI, using information from publicly available sources

*Table 26: Testing, Using ADB Methodology for Debt Reporting*

| Entity | Reference Methodology | Entity Contribution | Total Project Cost | Private Sector Amount | Financial Instrument | Leverage/ Mobilisation Ratio | Amount Mobilised |
|---|---|---|---|---|---|---|---|
| IBRD | ADB | 434 | 2,339 | 240 | Loan | NA | 240 |
| JBIC | | 434 | 2,339 | 240 | Loan | NA | 240 |
| IDB | | 309 | 2,339 | 240 | Loan | NA | 240 |
| Total Amount Considered Mobilised | | | | | | | 720 |
| Total Amount Actually Mobilised | | | | | | | 240 |
| **Double Counting** | | | | | | | **480** |

Source: WRI, using information from publicly available sources

* If the JBIC methodology is applied, there is a risk of underestimating mobilisation because the methodology only accounts for private loans mobilised from the host country of the institution

### *6. Solar Power in India*

*Table 27: Financing Breakdown for Azure Power* [cdv]

| Entity | Category | Amount | Year | Currency | Instrument |
|---|---|---|---|---|---|
| OPIC | Bilateral | 6.2 | 2009 | USD | Loan |
| US EXIM | ECA | 15.8 | 2011 | USD | Loan |
| US EXIM | ECA | 64 | 2012 | USD | Loan |
| IFC | Multilateral | 4.6 | 2012 | USD | Loan |
| DEG | Bilateral | 13 | 2011 | USD | Convertible debentures |
| IFC AMC | Multilateral | 10 | 2010 | USD | Series B equity |
| Helion Venture | Private | Amount unknown | 2008 | NA | Equity |
| Foundation Capital | Private | Amount unknown | 2008 | NA | Equity |
| **Total** | | **113.6+z** | | **USD** | |

Source: WRI, using information compiled from website of listed institutions

*Table 28: Testing, Using UK ICF Methodology for Both Debt and Equity Reporting*

| Entity | Reference Methodology | Entity Contribution | Total Project Cost | Private Sector Amount | Financial Instrument | Leverage/ Mobilisation Ratio | Amount Mobilised |
|---|---|---|---|---|---|---|---|
| OPIC | UK ICF | 6.2 | 113.6+z | z | Loan | 113.6/z | z*6.2/113.6 |
| US EXIM | | 79.8 | 113.6+z | z | Loan | 113.6/z | z*79.8/113.6 |
| IFC | | 4.6 | 113.6+z | z | Loan | 113.6/z | z*4.6/113.6 |
| DEG | | 13 | 113.6+z | z | Quasi equity | 113.6/z | z*13/113.6 |
| IFC AMC | UK ICF | 10 | 113.6+z | z | Equity | 113.6/z | z*10/113.6 |
| Total Amount Considered Mobilised | | | | | | | z |
| Total Amount Actually Mobilised | | | | | | | z |
| **Double Counting** | | | | | | | **0** |

Source: WRI, using information from publicly available sources

*Table 29: Testing, Using ADB Methodology for Debt Reporting, and UK CP3 Methodology for Equity Reporting*

| Entity | Reference Methodology | Entity Contribution | Total Project Cost | Private Sector Amount | Financial Instrument | Leverage/ Mobilisation Ratio | Amount Mobilised |
|---|---|---|---|---|---|---|---|
| OPIC | ADB | 6.2 | 113.6+z | z | Loan | NA | 0 |
| US EXIM | | 79.8 | 113.6+z | z | Loan | NA | 0 |
| IFC | | 4.6 | 113.6+z | z | Loan | NA | 0 |
| DEG | | 13 | 113.6+z | z | Quasi equity | NA | 0 |
| IFC AMC | UK CP3 | 10 | 113.6+z | z | Equity | 113.6/z | z*10/113.6 |
| Total Amount Considered Mobilised | | | | | | | z/11.36 |
| Total Amount Actually Mobilised | | | | | | | z |
| **Double Counting** | | | | | | | **z/11.36-z** |

Source: WRI, using information from publicly available sources

* The major difference between debt and equity methodologies is the tapering factor applied in subsequent round of funding in a fund structure, which does not apply for the convertible debentures here so I use the same methodology for convertible debentures as other loans.
* Private equity financing came before public funding; this increases the complexities of estimating private finance mobilised
* Amount mobilised by debt instruments applying ADB methodology is 0 because ADB's definition of DVA co-financing as it relates to equity investments only includes investments made by private actors in funds where the ADB acts as a general partner.
* Amount mobilised by IFC AMC using UK CP3's methodology would be 0 if private equity would have reached financial closure without IFC AMC's intervention.

### *7. Weather-Indexed Risk Insurance in Ethiopia*

*Table 30: Financing Breakdown for R4* [cdvi]

| Entity | Category | Amount | Currency | Instrument |
|---|---|---|---|---|
| USAID | Bilateral | 8 | USD | Grant |
| Swiss Re | Private | 1.25 | USD | Grant |
| **Total** | | **9.25** | **USD** | |

Source: WRI, using information from World Bank

*Table 31: Testing, Using EBRD-SEI Methodology for Grant Reporting*

| Entity | Reference Methodology | Entity Contribution | Total Project Cost | Private Sector Amount | Financial Instrument | Leverage/ Mobilisation Ratio | Amount Mobilised |
|---|---|---|---|---|---|---|---|
| USAID | EBRD-SEI | 8 | 9.25 | 1.25 | Grant | 0.16 | 1.25 |
| Total Amount Considered Mobilised | | | | | | | 1.25 |
| Total Amount Actually Mobilised | | | | | | | 1.25 |
| **Double Counting** | | | | | | | **0** |

Source: WRI, using information from publicly available sources

* If there is another grant provider in this case, using the EBRD-SEI methodology would result in double counting.

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