



# DESIGNING AND TESTING A METHODOLOGY TO ESTIMATE PRIVATE CLIMATE FINANCE MOBILIZATION FROM POLICY AND OTHER CAUSAL FACTORS

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## 1. EXECUTIVE SUMMARY

### Highlights

- Tracking private climate finance, in addition to tracking flows of public finance, is important for monitoring progress on global climate action.
- In this report, we propose a methodology to provide a credible way to estimate mobilized private finance for climate finance tracking. Although we note its limitations, we conclude that this proposed methodology provides an improved way to track and estimate mobilized private climate finance. It provides a solid foundation to be expanded upon and applied in future case studies.
- For three country case studies examined—Brazil (sustainable urban transport), Kenya (geothermal energy), and Uruguay (wind energy)—our preliminary analysis indicates that policy is an important factor in the mobilization of private finance.

### Context

**Climate finance is increasingly important with the recent entry into force of the Paris Agreement.**

Countries will need significant amounts of climate finance to meet their Nationally Determined Contributions, and the largest pools of finance exist in the private sector. Consequently, understanding how to attract private sector investment is paramount in transitioning to a decarbonized economy. Public and private cofinance at the project level is one such avenue, and many methodologies exist to measure this. The effects of policy, however, are less understood.

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**Tracking private climate finance, in addition to tracking flows of public finance, is important for monitoring progress on global climate action.** In particular, there is growing interest in how best to track and estimate private climate finance flows that can plausibly be attributed to public interventions, such as policy reforms and technical assistance. However, significant data, methodological, and knowledge gaps remain. Additional efforts are required to improve the definition, measurement, estimation, and reporting of private climate finance.

## About This Report

**For the purposes of climate finance tracking, this report presents and tests a methodology to estimate how much private finance has been plausibly mobilized by policy interventions.** We focus on mobilization at the individual project level and use a survey-based approach. We do not seek to provide an academically rigorous way to attribute causality to specific policy reforms or to assess what types of policies best mobilize private finance. The methodology allows one to measure the importance of a particular policy, but it does not say whether that policy would have been more important than another policy.

**At the same time, estimating private capital mobilized by policy interventions may generate insights to help us understand better what drives private capital to developing countries for climate-related activities.** These insights, when combined with other research and methods, can help advance the debate about which policies are most likely to attract private capital and to “mobilize the trillions.”

**The proposed methodology builds upon previous work of the Organisation for Economic Co-operation and Development (OECD) Research Collaborative on Tracking Private Climate Finance.** This collaborative aims to advance discussions on climate finance tracking. Many methodologies, including ours, rely on their four-stage decision framework for estimating mobilized private finance. As noted, few methodologies exist to measure the amount of private finance mobilized as a result of policy and other indirect effects.

**The three case studies allow us to test the robustness of our proposed methodology.** These case studies include projects in the Brazilian sustainable urban transport, Uruguayan wind, and Kenyan geothermal sectors.

**The intention is not to have the methodology be adapted in its current form but rather to build a solid foundation that other methodologies can rely on and pull from.** This is because there are currently many limitations and barriers to fully understanding and accurately estimating mobilized finance. This report discusses these issues in detail.

**We hope this report contributes to the work of the OECD Research Collaborative as well as the research of other institutions.** This work should ideally inform these actors about interventions that can help create a more enabling investment environment for private finance.

## Research Problem

**Foremost, we endeavor to estimate mobilization resulting from a target policy, which is a type of public intervention.** A public intervention is one whose development received at least partial international support. For the purposes of this methodology the target policy is further defined as a policy, specific to a country-sector, that has a strong potential to mobilize private finance, because multiple policies in a sector may have received international support.

**We aim to examine the mobilization effects of other causal factors, which are identified ex ante as having the potential to attract private finance.** These factors include public interventions such as public cofinance directly contributed to a project. The proposed methodology also examines other factors in the broader enabling environment, such as political stability and declining technology costs. These factors are individually identified for each country.

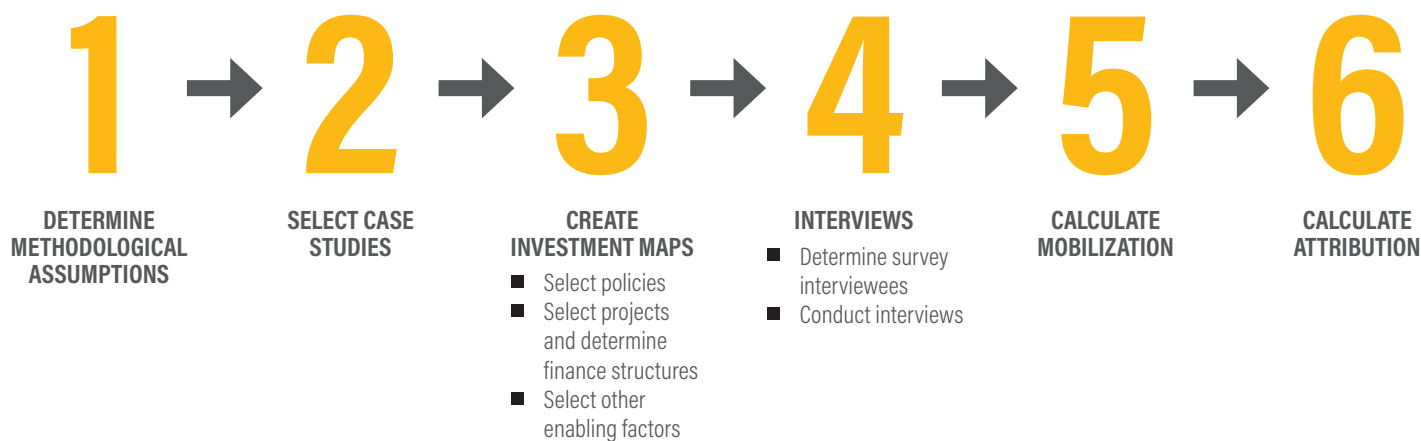
**Attribution for the target policy is also assessed.** Attribution is defined as the amount of credit given to international donors and government entities that contributed to the development of the target policy.

**Finally, we assess the robustness and usefulness of the methodology.**

## Proposed Methodology

**The proposed methodology uses a qualitative approach that relies on survey responses from the private and government sectors to estimate the effect of causal factors on mobilization.** Figure ES-1

Figure ES-1 | **Proposed Methodology**



Source: WRI.

shows the steps of our designed methodology. We create country-specific investment maps to chart stakeholder response weightings to identified causal factors and policies. The maps are inclusive of (1) public interventions, (2) other sector-relevant policies that could mobilize private finance, and (3) other causal factors in the broader enabling environment defined as “other enabling factors” (e.g., political stability, macroeconomic conditions).

### Key Findings and Discussion

**We applied the methodology to three case studies primarily to demonstrate how this methodology can work in practical terms.** Given the shortage of data, no firm conclusions should be drawn about the specific countries. We hope that future applications of this methodology will further test these findings. In general, the results do confirm expectations about the effect of causal factors on private climate finance mobilization.

**When applied, the methodology will enable users to estimate how much private finance mobilization could be attributed to the target policy, which is partially funded by international assistance.**

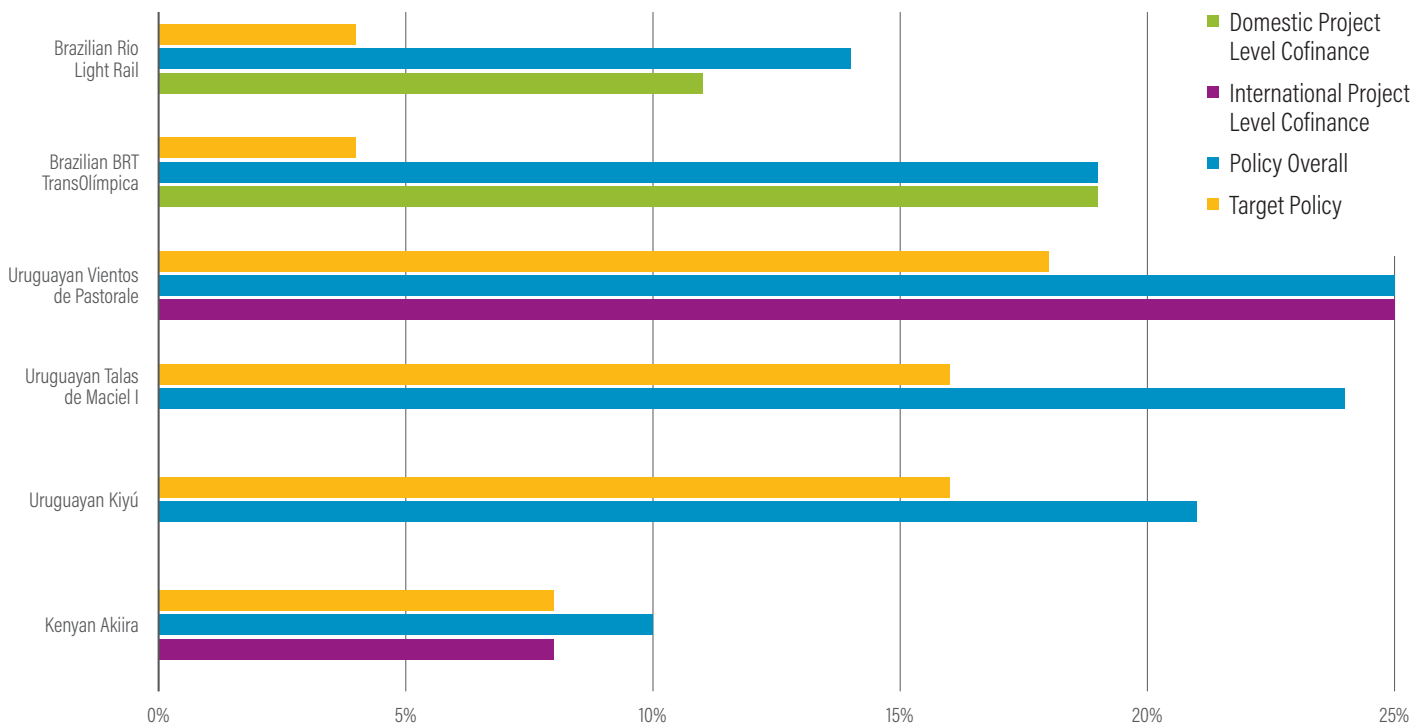
For example, Figure ES-2 shows the percentage of finance mobilized by a specific causal factor for each project. Policies that are not necessarily climate-specific can mobilize significant amounts of climate finance.

**Figure ES-3 shows attribution; it illustrates that both domestic and international actors played critical roles in developing the target policy.** This indicates that collaboration among these actors can enhance the ability to mobilize private capital.

**We conclude that this proposed methodology (see Figure ES-1) provides an improved understanding of the indirect effects on mobilizing private climate finance, but the method is not without limitations.** While we were able to estimate the effect of causal factors on mobilization as well as attribution, these estimations had significant flaws, as illustrated by the limitations outlined below. Some of these flaws result from methodological constraints, while others exist because of case study complications. Future applications and expansions of this methodology can more conclusively estimate the amount of private investment mobilization by addressing the limitations we encountered and broadly outline below.

**The greatest problem we encountered with the case studies was a low survey response rate.** As mentioned, we calculated mobilization based on survey responses. Consequently, the low survey response rate reduces our confidence in the final mobilization estimates. The reasons for the weak response rate varied. Many of these projects are in developing and less stable countries; this meant that some survey respondents we contacted worked with projects that were delayed for years or dropped on short notice.

Figure ES-2 | **Percentage of Private Finance Mobilized by Policy and Finance**



*Note:* This graphic is not inclusive of all the causal factors we analyzed; it only shows mobilization from the finance and policy interventions. “Policy Overall” includes the target policy. Additionally, this summary graphic must be taken in context. The Kiyú project had no associated project-level cofinance, while the Talas de Maciel and Vientos de Pastoreale wind farms had no domestic finance. The BRT TransOlimpica project had no finance from international actors. The Akiira geothermal project had no contributed domestic finance.

Source: WRI.

**We made many calculation assumptions, and alternative assumptions could lead to different results for the impact of policy on mobilization.**

For example, decisions on how to translate qualitative survey responses into quantitative numbers have a large impact on the mobilization calculations. Increasing the number of causal factors included in the survey increases the likelihood that any causal factor, including the target policy, will have a smaller estimated mobilization. We considered that the target policy itself and its descendant policies had a causal, additive impact; one could have made other decisions, such as assuming the impact to be multiplicative. The time frame under which to account for descendant policies varies by project, and it can have a significant impact on the mobilization estimates, as seen in Brazil, whose projects had a short time frame for the materialization of descendant policies.

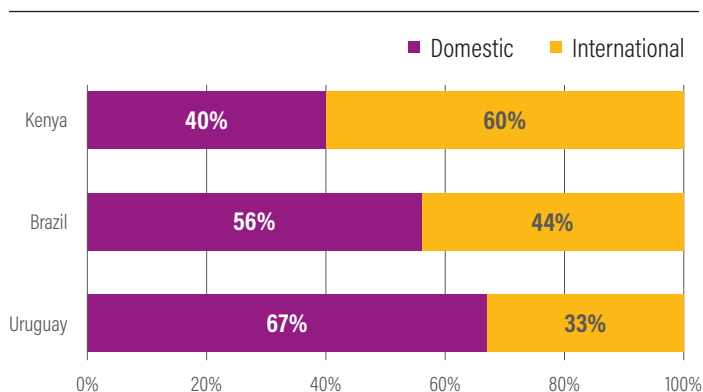
**Data constraints posed a significant, but not unexpected, challenge.**

Most notably, it was difficult to find reliable financing figures for donor support to a target policy and project cost structures. For the latter, much of the information is proprietary, so secondhand databases, which are often incomplete, especially for projects in low-income countries, were used in addition to tertiary sources.

**Other issues included double counting, limited analysis scope, and the omission of international donor interviews.**

Double counting is an inherent problem with qualitative survey questions, as isolating respondents’ answers is not possible. In addition, the investment maps did not include every possible causal factor, and this could have affected mobilization calculations. We did not interview international donors for attribution assessments.

Figure ES-3 | Attribution of Donor Support for the Target Policy



Source: WRI.

**As expected, our assessment criteria included trade-offs.** For example, in the interest of accuracy, we customized each investment map to country specificities, and this limited standardization across case studies. As a first step, we limited our scope of public interventions to policy and did not expressly consider technical assistance or capacity building; this limited the results' accuracy but made the methodology less time-consuming.

## Recommendations

**There are many options for future applications of this methodology.** For example, one could expand the analysis scope to include more factors on the investment map, such as other public interventions or projects with unique financing structures. Additionally, one could consider a sector-wide estimation of mobilization, in addition to the inclusion of adaptation projects. Finally, enhancing the robustness of the survey weightings is possible by interviewing other types of stakeholders, and by conducting more in-depth interviews.

## Conclusion

**Overall, despite the aforementioned limitations, the proposed methodology provides a solid foundation to be expanded upon and applied in future case studies.** Attracting more private finance to projects that are aligned with a low-carbon and climate-friendly future will be critical to fostering a more sustainable planet. Public interventions will be an important avenue to attract this finance, and therefore understanding which interventions, either policy or finance, are needed for which types of projects will be crucial.

## 2. INTRODUCTION

With the entrance into force of the Paris Agreement, there is now a global commitment to keep finance flows aligned with a 2°C pathway. Developing methodologies is technically challenging but necessary to measure our progress toward that future.

Our proposed methodology is important in many contexts. For one, the largest sources of capital lie within private markets, and learning how to attract that finance to low-carbon and climate-friendly projects is essential to the transition to a low-carbon economy. In fact, the 2017 G20 communiqué asserted the importance of mobilizing finance from the private sector. In the context of the international climate negotiations, developed countries have committed to mobilizing \$100 billion in climate finance by 2020 and continuing at that level until 2025 (Westphal et al. 2015). Measuring the amount of climate finance flows to these low-carbon goals is critical in understanding progress toward a global low-carbon economy. Finally, groups such as the World Bank regularly support sustainable development through public interventions in developing countries; some international donors focus more on cofinance, while others support policy development. It is important to develop methodologies to measure and ascertain their relative importance.

Efforts are already under way to measure and track climate finance flows to meet these goals. The OECD-led Research Collaborative on Tracking Private Climate Finance (OECD 2017) aims specifically to advance discussions on data sources and methodologies to estimate publicly mobilized private finance and, on that basis, to conduct pilot studies.

This study has multiple goals. Our main objective is to design and test a methodology to estimate and understand mobilization resulting from a public intervention, which we refer to as the target policy. Second, we would like to estimate mobilization resulting from causal factors (e.g., political stability, international finance), which are factors identified ex ante that have the potential to attract private finance. Third, we want to assess attribution, that is, the amount of recognition each actor receives based on their contribution to the target policy. Cases used to pilot-test this methodology include sustainable urban transport in Brazil, wind energy in Uruguay, and geothermal energy in Kenya.

## Box 1 | Target Policy Definition

For the purposes of this study, we focus on private finance mobilization arising from a specific policy, referred to as the “target policy.” Two criteria characterize the target policy:

1. It should have direct international donor support.
2. It should have the potential to either greatly influence private sector investment or create an improved enabling environment for private capital. Determining such influence was somewhat subjective; we used institutional knowledge coupled with information found in the literature.

Specifically, our principal research questions are the following:

- How much of an effect does the target policy have on private finance mobilization, and how do we assess attribution to the international donors and domestic actors that helped develop the target policy? We define the target policy as *the donor-supported intervention, in each country, that we preidentify as having a strong potential to mobilize private climate finance* (see Box 1).
- What is the relative effect of policy in general versus public project-level cofinance on private finance mobilization?
- What is the importance of “other enabling factors,” such as macroeconomic conditions and political stability, for the mobilization of private finance?
- Is the designed methodology effective and useful?

While a number of political issues surround the calculation of private sector mobilization, such as whether international donors should take “credit” for it, our goal is not to wade into this discussion but simply to develop and test a transparent methodology that attempts to measure mobilization.

The purpose of this report is to test a credible methodology to account for mobilized private finance for the purposes of climate finance tracking and not to provide an academically rigorous way to attribute causality to specific policy reforms or to assess which policies best mobilize private climate finance. At the same time, estimating private capital mobilized by policy interventions may gener-

ate some insights to help us understand better what drives private capital to developing countries for climate-related activities. These insights, when combined with other research and methods, can help advance the debate about which policies are best suited to attract private capital and to “mobilize the trillions.”

The New Climate Economy envisages a scenario to stay on this low-carbon trajectory. It will require an estimated \$93 trillion to be invested in infrastructure between 2015 and 2030 (Global Commission on the Economy and Climate 2014). Enhancing a more enabling investment environment for private sector finance will be crucial to meet this goal. Our methodology seeks to inform ongoing research in this area and advance the discussion for public finance providers and policy makers.

## 3. APPROACH

**We conducted a literature review of past methodologies that estimate mobilized finance.** The main takeaway was that previous studies only focused on the role of public cofinance in mobilization. Recently, this has changed to include more indirect effects, although to date only a few studies have estimated the mobilizing effects of public policies (e.g., Haščič et al. 2015) and examined support for policy development. However, several studies (e.g., Srivastava and Venugopal 2014; Polycarp et al. 2013) have affirmed the importance of such policies in shaping the investment environment and acting as a precursor to project-level finance.

**Our methodology, as well as many others, used the four-stage decision framework of the OECD Research Collaborative to estimate mobilized private finance (see Annex C).** This framework provides decision points or methodological options for quantifying mobilized private finance. Many methodologies that wish to estimate mobilized finance use this framework. Our chosen decision points can be found in Table 1. While the framework provides a guide to help ensure transparency, it is not a prescriptive set of recommendations, and it does not provide suggestions to actionably measure partial or blanket causality.

Our study is one of the few to explicitly look at the role of multiple factors that can each partially cause private investment (e.g., partial causality); previous methodologies often chose the simpler approach of assuming that one factor (i.e., public finance) causes all private investment (i.e., blanket causality).

**We decided to use a qualitative and survey-based approach to calculate mobilization.** For the calculations, we used survey weightings assigned by private and government stakeholders. Additionally, our proposed methodology builds upon a previous methodology by the Climate Policy Initiative (CPI) (Brown et al. 2015), which examines the role of policy and finance two steps upstream from investment in adaptation projects. Remaining aligned with other studies, when possible, is key in advancing toward a common methodology for estimating mobilization. Our methodology, however, is not limited to two steps upstream and includes factors other than policy that contribute to the enabling environment for investment (e.g., political stability, technology costs).

Our study also differs in that we used an additive approach to estimate partial causality; we did not assume that the mobilization effects of an intervention occur at a fixed point in time, but rather that the intervention can have cascading effects. Effectively this means that the target policy can influence a descendant policy that also mobilizes finance, and the percentage of mobilization from the later policy is added to the target policy. Section 5.4 describes this additive approach in further detail.

**Next, we finalized the framework for the proposed methodology and applied it. Section 5 describes this in more detail.**

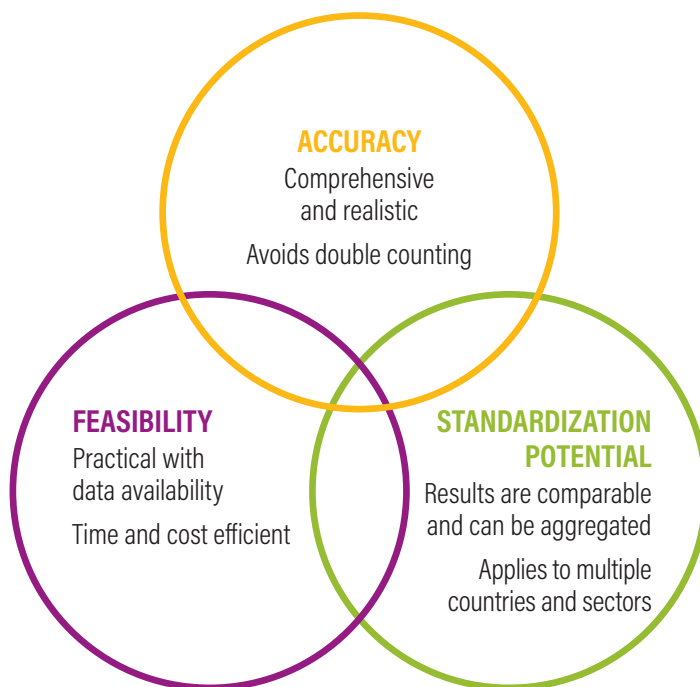
**Finally, we evaluated the methodology using three main assessment criteria.** Section 4 explains our criteria (feasibility, standardization potential, and accuracy).

## 4. ASSESSMENT CRITERIA

As seen in Figure 1, in order to evaluate the usefulness and effectiveness of this methodology, we use three criteria from the Research Collaborative (Jachnik et al. 2015). This paper regularly refers to these criteria, as they are also crucial to overall methodology development. Fully satisfying all of these criteria is not possible due to the current methodology constraints and limitations in data collection. The Venn diagram illustrates these trade-offs.

1. Feasibility: Can this methodology be applied in a timely manner with the current data that are available?
2. Standardization Potential: Can this methodology be applied across diverse countries and sectors?

Figure 1 | **Assessment Criteria**



Source: Adapted from Jachnik et al. (2015).

3. Accuracy: Are the results a realistic estimate of mobilization that avoids double counting, which is defined as accounting for the effect of a causal factor within a case study more than once?

## 5. PROPOSED METHODOLOGY

This section provides an overview of our methodology, beginning with an ordered list of the methodology steps (Figure 2). The following subsections then explain these steps in detail. Section 5.1 provides an explanation of the previous methodological work on which we build (Jachnik et al. 2015). Section 5.2 includes our map selection criteria, specifically those used to determine the factors included in our investment map. Sections 5.4 and 5.5 explain the causality and attribution estimation approaches.

**Determine methodological assumptions (i.e., decision points) for measuring mobilized private finance (see Section 5.1).** These decision points are outlined by the four-stage framework in Annex C. These options ensure transparency in the underlying assumptions of the methodology; for example, how to classify public versus private finance.

Figure 2 | Proposed Methodology



Source: WRI.

**Determine the case studies (see Section 5.2).** We establish guiding principles for selecting case studies, which are the sectors of interest in each country. These principles dictate the development of the investment maps that we use to estimate mobilization.

**Develop investment maps for each case study (Section 5.3) that incorporate factors with the potential to mobilize private climate finance.** The maps illustrate the enabling investment environment for each case study. They show how policies relate to one another (i.e., whether one policy influences a later policy) and include the causal factors that can mobilize private finance. The first step is to determine the analysis scope of these maps; for example, we only included policy and not capacity building or technical assistance.

Sections 5.3.1–5.3.3 provide the selection criteria for the policies, including the target policy, projects, and “other enabling factors” to be included on the map. Project selection includes determining the amounts of public cofinance and private finance invested and by which stakeholders. In addition to the selection criteria for each investment map factor, these factors must satisfy the case study criteria detailed in Section 5.2.

**Develop a survey based on the investment maps, and determine the private and government stakeholders to be interviewed for the influence**

**and causal weightings and conduct interviews.**

The survey (Section 5.4) asks stakeholders to weight the investment map factors on a scale of 0–4 based on importance. The influence and causal weightings (on a scale of 0–100 percent) are assigned based on survey responses to multiple-choice questions. We interview government stakeholders to determine influence weightings or the extent to which one policy influences a later policy. Private stakeholders assign causal weightings to individual factors to show how that factor attracted their private investment. The survey also allows interviewees to provide commentary that explains their weighting decision. Section 5.4 describes these weightings in more detail. Section 5.3.3 presents our approach for determining these interviewees.

**Calculate the amount of mobilized private finance, from the target policy and other causal factors, using the additive approach,** as demonstrated in Section 5.4.1 through a stylized example. A mathematical notation of this methodology can be found in Annex A. As mentioned, we use an additive approach to estimate partial causality, and Section 5.4 explains partial causality and discusses how we conceptualize calculating it.

**Estimate the attribution among actors that contributed to the development of the target policy.** Section 5.5 describes our approach for estimating attribution, in addition to a sample calculation.



## 5.1. Decision Points

As mentioned, this methodology seeks to remain in line with the decision points of the CPI methodology. For the reasons described earlier, differentiation occurs at the points of causality, attribution, and boundaries. Table 1 shows our selected decision points, based on the four-stage decision framework (Jachnik et al. 2015).

## 5.2. Case Study Criteria

To test the proposed methodology, we use three case studies in order to get a diversity of sectoral, development, and policy contexts. This section details the criteria we considered when choosing the case studies to apply the proposed

methodology. Ultimately, we chose geothermal energy in Kenya, wind energy in Uruguay, and sustainable urban transport in Brazil. Future applications of this methodology should use these criteria as guidelines when selecting case studies.

### Geography

*Determine the geographical region.* We focused on policies implemented in three developing countries that are eligible to receive official development assistance (ODA) from the 30 OECD Development Assistance Committee (DAC) member states.<sup>1</sup>

Table 1 | **Methodological Decision Points for Estimating Mobilized Private Sector Investment**

DECISION POINT	PROPOSED METHODOLOGY
Climate change activities	International Development Finance Club—Multilateral Development Bank (IDFC-MDB) guidelines
Public vs. private finance	Organisation for Economic Co-operation and Development–Development Assistance Committee (OECD-DAC) guidelines
Developed vs. developing	Developing countries: OECD–Official Development Assistance (OECD-ODA) list
Geographical origin	<ul style="list-style-type: none"> <li>■ All private flows will be considered (with domestic vs. international finance delineated where possible)</li> <li>■ The basis for geographic origin will be the center of economic interest</li> </ul>
Type of public intervention	<ul style="list-style-type: none"> <li>■ Public finance at the project level and in support of the target policy</li> <li>■ Public policy, which for this policy is known as the target policy</li> </ul>
Instruments	<ul style="list-style-type: none"> <li>■ Public finance: All instruments from developed and developing countries, and for policy and projects (e.g., grants, debt, equity, and derisking instruments)</li> <li>■ Public policy: fiscal (e.g., taxes, market support) and regulatory (e.g., laws, targets)</li> </ul>
Currency	US\$ and OECD conversion rate
Point of measurement	<ul style="list-style-type: none"> <li>■ Both—disbursement when possible, otherwise commitment</li> </ul>
Valuation of interventions	<ul style="list-style-type: none"> <li>■ Public finance: face value</li> <li>■ Public policy: qualitative</li> </ul>
Boundaries	<ul style="list-style-type: none"> <li>■ Public finance: project level</li> <li>■ Public policy: fiscal and regulatory policies (see Section 5.2)</li> </ul>
Data availability of private finance	<ul style="list-style-type: none"> <li>■ Data from the public intervention level</li> </ul>
Attribution	Qualitative (see Section 5.5)
Causality	Partial causality (see Section 5.3)

Source: Adapted from Jachnik et al. (2015).

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## Policy

*Determine which policy types to include in the analysis.* As a first step, we only examined fiscal (e.g., taxes) and regulatory policies (e.g., targets). A detailed list of the types of policies considered and excluded can be found in a Research Collaborative publication (Jachnik et al. 2015).

## Projects

*Determine the number of projects to be examined.* We set out to examine three projects per country to develop a better understanding of mobilization effects within a sector. Unfortunately, for reasons given in Section 7 (predominately, low survey response rates), we were only able to meet this requirement in Uruguay; we analyzed two projects in Brazil and one in Kenya.

## Time Frame

*Determine the time frame over which analysis will occur.* We choose cases in which a relevant group of policies were implemented between 2005 and 2012. While the choice of actual dates was subjective, the following principles guided this decision:

- The group of policies was recent, such that their impacts had not been significantly diluted by the introduction of other market-shaping factors (e.g., macro-economic shocks) following policy implementation.
- Enough time passed from implementation of this group of policies to allow for the development of subsequent projects.

*Financing of the projects must occur within a reasonable time frame from the onset of the policy in order to avoid distortion from time and cascading or tapering effects.<sup>2</sup>* This varies from case to case, but in general we selected projects that commence between 2 and 10 years from the introduction of the policy. However, in instances where the target policy is an amendment of a former policy, we eliminate the lower boundary. The rationale is that we already know the amended policy is potentially having an effect on mobilization because the original policy already exists, and both policies are approximately the same, save for a few adjustments.

## International Support

*As mentioned, the cases must have a specific public intervention that received international support* (see Box 1). Groups such as the World Bank provide international sup-

port to sustainable development objectives through interventions in developing countries, such as direct investment in projects, or through more indirect methods by aiding in policy implementation. For us, the intervention of interest was a specific policy, which is described in Box 1.

## Sectors

*Choose which sectors to analyze.* Electricity generation and transport are among the highest greenhouse gas-emitting sectors (IPCC 2014) and offer significant potential for reducing emissions. Therefore, we selected two countries with policies implemented in renewable energy (excluding large hydro) and one with policies for sustainable urban transport.

## Data

*Choose cases in which data availability is less likely to hinder analysis.* Data availability is a key issue limiting more robust efforts to track climate finance and estimate its mobilization effect. To ensure an adequate level of data availability, we focused on developing countries that are the subject of a variety of studies. Section 5.3 further explains the data sources utilized.

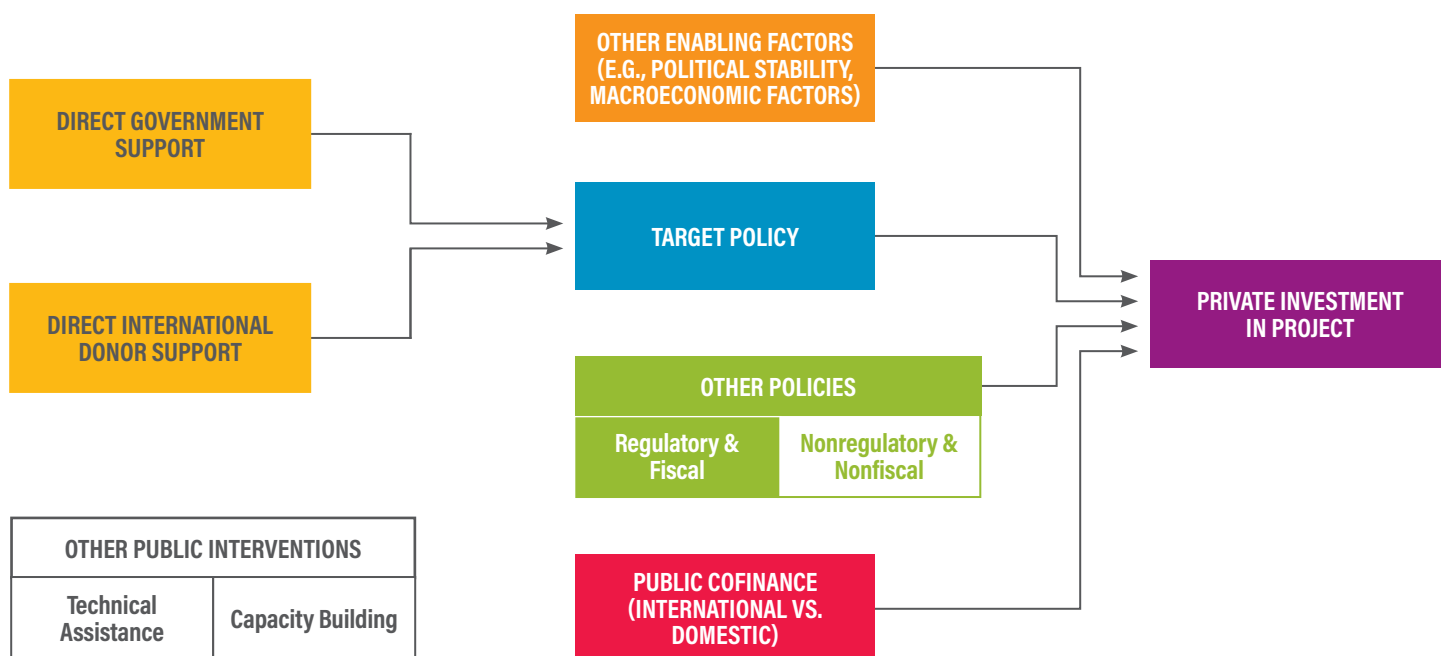
## 5.3. Investment Maps

The third step in the methodology is to create investment maps for each case study that are inclusive of all the factors that could attract private finance to projects within the selected sector. The maps illustrate the possible causal relationships between various policies (including the target policy) that we chose on the basis of our policy selection criteria. Other causal links represented include the connections from “other enabling factors” specific to the individual countries. We also map the causal links from public cofinance and donor support to the private investment.

### Analysis Scope of Investment Maps

*Determine the scope of analysis for the investments (e.g., if one should include all types of policies).* As a first step, in the interest of practicality and simplicity, we did not expressly consider technical assistance or capacity building; we felt including them would make the investment maps overly complex. Additionally, we concluded that collecting data for such a wide range of interventions would be prohibitively time-consuming. Nevertheless, as will be further discussed in Section 5.4, we asked our survey respondents about support that helped create the target policy. Accordingly, if technical assistance (TA) helped to create that policy, then our calculations account for that support.

Figure 3 | Full Investment Map of All Causal Factors



Source: WRI.

However, TA interventions that contributed to project development are not included. Figure 3 shows the potential interventions that compose a full investment map for each country-sector on which we could survey the stakeholders. The clear boxes indicate interventions that are not explicitly included in our analysis. Nonetheless, future applications of this methodology could incorporate these factors.

The following subsections delineate the selection criteria used to select the causal factors included on the investment maps.

### 5.3.1. Policy Selection Criteria

*In the interest of practicality and simplicity this methodology suggests limiting the number of causal links and factors included on the maps, not only to avoid overcomplexity but also to limit long surveys that could discourage stakeholder completion.* For us, the maximum number was eight. While this would potentially overestimate the causal impact of these factors, there is a trade-off

between robustness and practicality. Other applications of this methodology can modify or eliminate this limitation to suit their needs. We prioritized policies found in multiple sources. Moreover, we included a policy if a private sector actor specifically mentioned it as relevant to his or her investment decision in news articles or other commentary. The following steps and selection criteria illustrate how we arrived at the policies included on the investment map.

*Locate any centralized sources of policy information.* We used public and government databases or lists of policies relevant to the sector in question. When applicable, we also used a past WRI paper that established country timelines of policies that may have affected private investment in our sectors of interest (Srivastava and Venugopal 2014). This paper was useful because it summarized much of the literature on potential policies that could be incorporated into our investment maps.

The centralized sources for each country are as follows:

- *Brazil*: Srivastava and Venugopal 2014
- *Uruguay*: International Energy Agency / International Renewable Energy Agency Joint Policies and Measures database (IEA and IRENA 2016); Bloomberg New Energy Finance country profiles (BNEF 2016a); Climatescope<sup>3</sup> 2015; Ministry of Industry, Energy, and Mining (MIEM 2016a)
- *Kenya*: IEA and IRENA 2016; BNEF 2016a; Climatescope 2016a; Srivastava and Venugopal 2014

Select policies for mapping, in the following order, based on the seven criteria.

1. *Eliminate duplicates.*
2. *Prioritize policies directly relevant to the specific sector in focus (e.g., do not include a biomass policy if the case study is on solar).* Nonetheless, nonclimate policies can encourage private sector investment. For instance, economic strategy policies that project developers and various sources cited as being highly relevant (e.g., the Kenyan Vision Plan) were included. Plans such as the Rio Strategic Plan or the pluriannual plans of Brazil were not mapped because the main goals of the plans were not urban transport development, even though they included subcomponents of urban transport in the plans. Ultimately, since for cases such as these the causal effect was likely to be much less significant, they were not prioritized.
3. *Per the assessment criteria, exclude policies that are not in the requisite time frame (2005–2012).*
4. *Eliminate policies in the proposal stage.*
5. *Per the analysis scope of this methodology, do not incorporate nonfiscal or nonregulatory policies.* Also, we did not include policies that created regulatory bodies or funds, nor did we include information and innovation policies, which according to the four-stage framework are defined as policies on data, research and development, or education and awareness. Examples of this policy type include wind speed mapping and labeling schemes.
6. *For countries wherein policy is set at the subnational level, include policies for at least two states.* Unfortunately, due to last-minute and unforeseen circum-

stances, one of our stakeholders, from São Paulo, was unable to complete the survey. Therefore, both projects in Brazil are from the same subnational government.

7. *Eliminate policies unlikely to mobilize significant amounts of private finance.* For these case studies, this predominantly involved eliminating two types of policies: those for small-scale projects and those for self-consumption projects. We only included policies for large-scale projects because, for our chosen countries, the amount of finance involved in small-scale projects (less than 5 megawatts [MW]) was relatively insignificant. For the same reasons, we excluded self-consumption/private-generation policies. This may not be the case in other countries; a large number of small-scale projects could add up to a significant share of private finance.

*Examine other documents and include policies based on the above criteria.* These other data sources mainly consisted of information from private corporations, notably, Credit Suisse, PricewaterhouseCoopers (PwC), and KPMG. Incorporating policies and factors that these large private corporations deem important for investment decisions was crucial because we are estimating private sector mobilization. Understanding the private sector viewpoint was therefore imperative. We consulted further sources as needed.

*For practical and manageability purposes, combine policies into one mapping variable when their effects can be assumed to be similar enough that they do not affect the target policy or projects in dissimilar ways.* For example, this mapping exercise treated various tax incentives or various climate change policies (if they were similar in nature) as one variable, to simplify mapping. Theoretically, however, if the target policy were a tax incentive such as accelerated depreciation, then the investment map would need to include all tax incentives separately.

*As a final precaution, ask private sector actors to list any policies or other causal factors (not included in the survey) that influenced their decision to invest and incorporate these in the investment map.*

#### SELECT TARGET POLICY

After the policy selection process established the relevant policies for each country, and as explained in Box 1, we chose the target policy based on its importance relative to the other policies in the investment map, as well as the fact that it received international donor support. We subjectively ascertained the relative importance from informa-

tion in the literature we read to develop the case studies. We determined donor support for policy development by examining project documents from multilateral, national, and bilateral development banks to ascertain whether direct financial support had been provided for a policy. The complexities of this are discussed in Section 5.5 on attribution.

### 5.3.2. Project Selection Criteria

This section details the project selection process.<sup>4</sup> Data availability and the need to remain consistent throughout the case studies, to ensure standardization, largely influenced this process.

*Most important, choose projects at quasi-random to avoid biases.* To begin, we looked at the Bloomberg New Energy Finance (BNEF) project and World Bank databases for potential projects (BNEF 2016b; WBG 2016a). From here, we chose multiple projects at random, and if they satisfied the criteria below and we were able to determine the financing structures, they were included. Per the case study criteria, we selected three projects. Because the mentioned databases were not always complete or up to date with the latest transactions involved in a project, we used supplemental resources, primarily publicly available data such as IJ Global (IJ Global 2016) and data from other research organizations or news sources. Attempting to gather data for every project through interviews and paid subscriptions could have been both cost-prohibitive and time-consuming; moreover, many private entities do not wish to divulge financing information that is not already publicly available. Using public data for this methodology was more practical because we analyzed multiple projects; nevertheless, collecting data on project financing structures still proved challenging due to the decentralized nature of this information.

*Consider expansions of previous projects even if the same group of financiers is involved in all phases.* While the success of previous phases may influence investment motivations to a greater extent than policy and other factors, expansions warrant consideration for mobilization because they are prevalent in the geothermal and urban transport sectors. In the case of expansions, we only included the money used for that specific phase, if possible. While this is feasible for private finance, a public loan can stretch across multiple phases of a project. Despite allowing for a selection of multiple projects with the same financiers, we did not survey the same investors for more than one project because representing a diversity of private investment motivations was important.

*Exclude acquisitions or refinancing.* The money involved in these types of transactions is already in the pipeline and does not represent new investment flows.

*Determine the level at which policies are generally implemented.* In Brazil, projects can often be implemented at the city and state levels. Consequently, we hoped to represent at least two regions. Unfortunately, funding for the São Paulo project was suspended at the last minute and the confirmed survey participant was unable to complete the survey.

*Exclude project types that do not have identifiable survey participants.* We were unable to include projects with unconventional financing structures. Initial public offerings (IPOs), which Uruguay is currently using for a group of wind projects (IDB 2014), involve listing equity on capital markets to raise funds from institutional investors such as pension funds. Unfortunately, we could not identify private stakeholders to interview.

*Allow expansions and other phases of projects to serve as stand-alone projects on the investment maps (e.g., one can include the expansion phase of a wind farm without including the initial construction phases of that wind farm).* There are two overarching reasons for using phases instead of whole projects. First, the number of eligible projects increases. Second, using phases helps us understand the nuances of private investment motivations.

To the first point, restricting our analysis to whole projects would have greatly reduced the number of projects per country as well as countries that were eligible for this study. For example, Kenyan geothermal energy, on average, has long project time frames (20–30 years) due to challenges unique to large infrastructure projects in developing countries, and this could exclude many projects because the methodology has a 10-year time frame requirement. There are many methods to divide project development into phases.<sup>5</sup> For the purposes of this methodology, we divide geothermal energy infrastructure investments into two main phases: exploration and plant construction. For investments in urban transport, we use distinct phases, as with the BRT TransOlimpica, which is part of a larger transit system. A similar approach may not be necessary for other case studies. Our wind projects in Uruguay were either at or close to financial close by the time of our analysis; we therefore did not have to analyze phases of these wind projects, unless there were expansions of wind farms.

Regarding the second point, the effect or applicability of a policy on one phase of a project versus another phase can differ. For example, in geothermal development, policies that target the plant construction phase are different from those of the exploration stage (Micale et al. 2014). This is because the risk is much higher in the early stage due to the inherent uncertainties in drilling. Additionally, understanding the phases in a project is necessary because if a project is in its early stages, interviewees may say that certain policies are not relevant; however, this might be because those policies are not applicable to that specific stage even though they might be pertinent at later stages. Consequently, we want to cover a range of project phases to fully understand the effectiveness of policy. Allowing survey respondents to remain anonymous was one way to incentivize survey completion; as a result, we could not fully control for the aforementioned issues, but they should be borne in mind.

A further reason to look at different project phases is that large infrastructure projects require a lot of upfront financing, and the amount of private finance in these initial phases, while small, should be measured so that future policies may better target mobilizing private finance for these phases. A CPI paper on geothermal development adopts a similar position (Micale et al. 2014).

*For a project, or project phase, to be eligible for this pilot testing, its investment date must occur at least two years after the target policy.* Ensuring that the investment date follows the official enactment of the target policy leads to a higher probability that the target policy influenced project investments. Hypothetically, the private sector could watch the market in anticipation of a new policy and hedge its bets by investing before the policy passes; however, we cannot account for this.

The investment date is when the private investment is either committed or disbursed to a project. Disbursements are more accurate than commitments. Lack of data, unfortunately, often prohibits the use of disbursement information because it is frequently proprietary. Nevertheless, complications arose when determining a commitment date. In these instances, we used two criteria to estimate the date. First, the company must have indicated that it planned to invest a certain amount in the project; second, a contract (e.g., power purchase agreement [PPA], public-private partnership [PPP]) should have been signed.<sup>6</sup> In reference to the second point, a company can claim to invest, for example, \$80 million in a project, but it can easily renege without a contract. Contract signing does not

only refer to a PPA or PPP. For example, for geothermal, the PPA applies to the second stage (plant construction), whereas a different contract applies to the first stage.

### 5.3.3. Selection of Stakeholders and “Other Enabling Factors”

*Ideally, select three government stakeholders from each country and three private sector stakeholders for each project to survey.* While this was our goal, due to slow response times we only obtained two government stakeholder surveys for each country and 1–2 private sector responses per project. While we had specific agencies in mind, based on the criteria below, the stakeholder we initially contacted often forwarded our surveys to others for completion. Ultimately, therefore, we had little control over survey participants. Annex B lists people and organizations or companies that completed the survey. Some participants asked to remain anonymous. Below, we provide our recommendations on how to select government and private sector stakeholders for interviews.

#### GOVERNMENT INTERVIEWEES

*Select a diverse range of stakeholders with different viewpoints.* For government stakeholders, ministries to target include climate change and environment, energy, finance, and sector-specific agencies.

*Select at least one agency that is directly involved in the target policy.* Often, the project documents from the donors (e.g., World Bank) will list the local government agencies that were involved with implementation of the policy.

*Select agencies that have or are likely to have knowledge of the policies included on the investment map.* For example, Brazil has a specific agency devoted to sustainable transport, and we interviewed a stakeholder from there.

#### PRIVATE SECTOR INTERVIEWEES

*Select stakeholders directly involved in the project.* If we could determine the company that invested in a project, we contacted that group. However, for some projects this was unclear. In these instances, we examined the ownership structures of the projects to determine which companies to contact.

*Do not interview the same stakeholder for multiple projects, to represent a diversity of thought.* Within a sector in a country, it is possible that one company is investing in multiple projects. When this was the case, we took care to interview separate companies for each project.

*If possible, choose only investors to interview, so that results are more comparable.* Initially, we wanted to only interview investors. Our preselected stakeholders, however, would send the survey to other actors involved in the project; we therefore had a mix of investors and project developers. Investment motivations may differ for these investors and developers, but this was a factor for which we could not control given the risk of receiving even fewer survey responses.

**"OTHER ENABLING FACTORS"**

*There is no rigorous selection process for these enabling factors, but this methodology does provide guidelines; namely, citation frequency and institutional knowledge.* One guideline is for the enabling factor to be in more than 50 percent of the publications examined for the case study. Additionally, institutional knowledge of which factors are the most important to each sector (e.g., declining technology costs in the wind energy sector), helped us determine which enabling factors to incorporate in the investment maps. As mentioned, in the interest of manageability, we limited the number of factors initially included on the survey to four, inclusive of macroeconomic factors.

*Allow surveyed private stakeholders to list and weight any other enabling factors that were important to their investment decision and incorporate those weightings into the calculations.*

### 5.4. Causality Assessment and Surveys

After selecting which policies, projects, and "other enabling factors" to include in the analysis (explained in Section 5.3), we survey stakeholders to determine the numbers (i.e., causality weightings and influence weightings) located on the investment map (Figure 5). These numbers are then used to estimate the mobilization of private finance.

There are two concepts one needs to understand when estimating mobilization. The first is that of partial causality. The Research Collaborative four-stage decision framework (Annex C) provides two options to treat causality, through a partial approach or a blanket one. Partial causality can be conceptualized as a multifactor causality because it recognizes that multiple factors (e.g., cofinance, policy, political stability) simultaneously mobilize private investment. This is in contrast to blanket causality, which assumes that project-level cofinance is solely responsible for all private investment. We are using partial causality.

The second concept is the distinction between causality weightings and mobilization. Both concepts refer to the influence of causal factors on private investment. For accounting purposes, however, a causality weighting is the number (Table 2) assigned to a particular causal factor by a private stakeholder during the survey process. Mobilization percentages, in contrast, represent the relative effects of multiple factors that concurrently influence private sector investment. When estimating mobilization, we must first sum the causality weightings, and because these factors cannot mobilize more than 100 percent of finance, we normalize the causality weightings so that their effects, in total, sum to 100 percent. In practice, if there are three factors with individual causality weightings of 100 percent, when taken together they cannot mobilize 300 percent of finance; we therefore must normalize their effects to reach mobilization numbers of 33 percent for each factor.

We conducted two sets of interviews. First, we surveyed private stakeholders to assign causality weightings, on a scale of 0–4 or 0–100 percent, to assess the importance of public finance, various policies, and "other enabling factors" (Table 2). The second set of interviews asked government stakeholders to assign influence weightings

Table 2 | **Private Stakeholder Causality Weightings**

CAUSALITY WEIGHTING (%)	PRIVATE STAKEHOLDER SURVEY ANSWERS
0	0: Not important
25	1: Slightly important
50	2: Somewhat important
75	3: Very important
100	4: It was absolutely necessary (i.e., I would not have invested without this factor/policy in place)
N/A	I do not know
N/A	I do not have an opinion

*Notes:* N/A indicates "not applicable," meaning that the stakeholder either did not know or did not have an opinion on the importance of a policy or factor; we did not calculate these responses as zero in the calculation.

We asked the stakeholders qualitatively how important an enabling factor was, rather than ask them to assign a quantitative weighting, as we thought the latter was rather complex and not very intuitive; see Annex B for a more detailed survey approach.

Source: WRI.

(Table 3) that disclosed (1) how past policies influenced the implementation of subsequent policies (e.g., we asked how important the 2006 Energy Act was to the passage of the 2010 National Climate Change Response Strategy) and (2) how important a particular donor entity, such as the World Bank or domestic government, was to the implementation of the target policy; this concept of attribution is further discussed in Section 5.5. Section 5.3.3 explains the selection of stakeholders, while Annex B provides a more detailed survey protocol.

It should be noted that multiple factors can receive the same causality or influence weightings. Moreover, the respondents may comment after each question. Also, we ask private sector stakeholders to list any additional policies or other causal factors not included in the survey.

We do not ask about every possible link on the map because we want to limit the number of survey questions to a manageable number. Therefore, we only ask about the links between policies if one policy greatly influenced another. This is determined when developing our case study timelines. However, this step could be eliminated if it were used to examine one case study in great depth.

Table 3 | **Government Stakeholder Influence Weightings**

INFLUENCE WEIGHTING (%)	GOVERNMENT STAKEHOLDER SURVEY ANSWERS
0	0: Not important
25	1: Slightly important
50	2: Somewhat important
75	3: Very important
100	<p><i>Policy Influence</i> 4: It was absolutely critical (i.e., the second policy would not have passed without the existence of the first policy)</p> <p><i>Attribution</i> 4: It was absolutely critical (i.e., the policy would not have passed without the support of this institution)</p>
N/A	I do not know
N/A	I do not have an opinion

Source: WRI.

Foremost, between policies, we considered the linkages that the literature said existed; next, we were interested in linkages in which a prior policy likely influenced the passage of a subsequent policy. As our focus is on mobilization from the target policy, we included questions on all links related to the target policy (i.e., we asked about the linkages between the target policy and its descendants' effects on private finance). For each of the remaining policies we looked only at the uninterrupted link between the policy and private finance. We did not ask government stakeholders about linkages between policies that occurred before the advent of the target policy. However, we did ask the private sector about the effect of these earlier policies on their investment decisions.

Lastly, using these weightings, we calculate the mobilization of private capital from the target policy and other causal factors. Figure 5 presents a stylized example of an investment map along with a sample mobilization and attribution calculation, and Figure 4 provides a key to the elements of the investment map. Annex A details the mathematical calculation used in this partial causality estimation.

### 5.4.1. Guide to a Stylized Calculation

This section details the steps needed to estimate mobilization, from the target policy, and other causal factors. Figure 5 shows a simplified and hypothesized investment map with only a few causal links. For the purposes of this illustration, therefore, we only have one public cofinance factor. However, the actual investment maps include international and domestic public cofinance as separate factors. Similarly, we only include one “other enabling factor” on the map; however, the actual maps can have multiple “other enabling factors.”

#### STEP A: ESTABLISH CAUSAL LINKS

##### Causal Links

After establishing the causal factors to be incorporated on the map, draw the causal links from these factors. For all factors, this is the direct link from the factor to the private investment. The causal weightings of these links are determined by averaging the private stakeholder responses.

##### Influence Links (Descendant Policy Links)

These are the links between policies, and they demonstrate how the target policy influenced later policies. As noted, we only include links between policies if there is a strong likelihood that the first policy influenced the latter. Government stakeholders determined these influence weightings.



Figure 4 | **Investment Map Key**

### **TARGET POLICY**

The target policy, represented by blue boxes, can influence private sector investment without intermediate policies or through intermediated (i.e., descendant) policies.

- Causal link 1 = target policy → private finance
- Causal link 2 = target policy → other (descendant) policy → private finance

### **OTHER POLICIES**

The green boxes represent other relevant policies to private sector investment (these may or may not have received donor support); for our purposes, these policies affect private sector investment through an uninterrupted path.

- Causal link = other policy → private finance

### **DONOR SUPPORT**

The yellow circles show the international and domestic government donors that supported the development of the target policy.

- Causal link 1 = target policy → private finance

### **PROJECTS**

The purple boxes represent the projects and private sector investment into these projects.

### **OTHER ENABLING FACTORS**

The orange circles represent the other enabling factors that also influence private sector investment.

### **PUBLIC FINANCE**

The pink triangle represents all public finance, including domestic versus international public cofinancing.

### **LINES REPRESENT THE CAUSALITY LINKAGES BETWEEN VARIOUS MAPPED CAUSAL FACTORS**

#### **BLACK LINE**

Black lines indicate that, from the literature review, we can assume that one policy enabled a latter policy.

#### **DOTTED LINE**

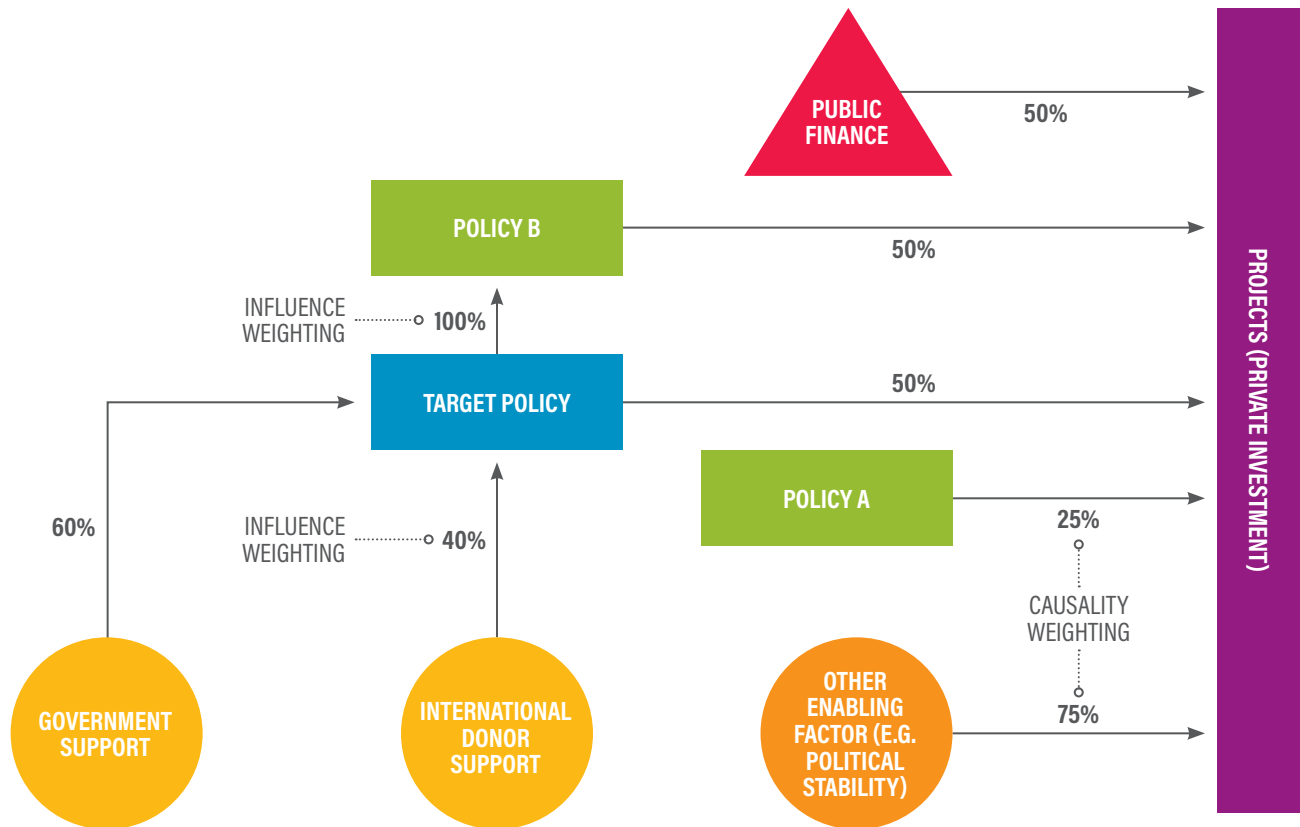
Dotted lines indicate it is unclear from the literature review if one policy enabled another, yet we still ask the government stakeholders about the connection.

#### **YELLOW LINE**

Yellow lines represent causality linkages between government or international donor support and the target policy.

*As mentioned, we ask about all of the primary causal links between policies and public finance. We do not, however, illustrate these links on the investment maps.*

Figure 5 | **Stylized Sample Calculation**



Notes: 'Overall Policy' was assigned a causality weighting of 100% based on survey responses. These are hypothetical responses.

Source: WRI.

#### Estimate the Full Effect of the Target Policy

This involves calculating the effect of the target policy with its descendant policies. The first link is from the target policy to private investment, and stakeholders assigned a causal weighting of 75 percent to this link (Figure 5). The second connection is from the target policy through policy B to the private investment. Given that policy B has a causal link of 50 percent, as assigned by the private stakeholders, and the target policy has an influence weight of 100 percent on policy B, as determined by government stakeholders, the causality weighting for this link is  $(1.0 \times 0.5)$ , or 50 percent.

We consider the causality of the target policy to be additive, therefore the target policy's causality is 125 percent  $(0.5 + 0.75)$ .

#### STEP B: NORMALIZE THE TARGET POLICY

We normalize the causality weighting of the target policy with respect to all other policies. Thus, the normalized causality weighting for the target policy is 83 percent  $(1.25/1.5)$ . This normalization is necessary because we used an additive approach that adds the causality weightings of descendant policies from the target policy. We then need to normalize this to the other policies (policy A in this example).

#### STEP C: ESTABLISH THE EFFECT OF THE OTHER CAUSAL FACTORS

We surveyed the private sector actors about the causality of "policy overall," not just each individual policy. This is because the respondents might not be very familiar with specific policies; all policies, including the target policy, are bounded under this. In addition, we surveyed the private sector actors about public finance and political

stability. Figure 5 shows the causal weightings for these factors: overall policy (100 percent), public finance (50 percent), and political stability (75 percent).

#### STEP D: NORMALIZE PUBLIC FINANCE, OVERALL POLICY, AND "OTHER ENABLING FACTORS" TO ESTIMATE MOBILIZATION (IF NECESSARY)

We normalize all the above factors because their total (100 + 50 + 75) is greater than 100 percent; we normalize to one because the causal factors cannot mobilize more than 100 percent of finance. If the sum were less than 100 percent, it would mean that a factor not included on the investment maps was responsible for attracting private finance to that project. We allow survey respondents to list any factors that we missed in the surveys, and some actors did exercise this option. However, we did not include certain factors, as illustrated in our analysis scope (Figure 3), such as capacity building, and therefore, theoretically it is possible that the sum of these other relevant factors would be less than 100.

The mobilized numbers are the following:

- Overall policy: 44.4 percent ( $1.0 / (1.0 + 0.5 + 0.75)$ )
- Public finance: 22.2 percent ( $0.50 / 2.25$ )
- Political stability: 33.3 percent ( $0.75 / 2.25$ )

Now, since the target policy is a component of policy overall, the final causality of the target policy is bounded by the causality of policy overall: 36.5 percent ( $0.83 \times 0.44$ ) is how much private finance was mobilized by the target policy.

## 5.5. Attribution

As described, this methodology uses a qualitative approach to attribute volumes of private finance among donors that contributed to the target policy. To apply the same approach consistently across all case studies, we do not use the volume-based pro-rata approach (i.e., attribution is in proportion to donor finance) used in multiple recent studies (e.g., Brown et al. 2015; OECD 2015) to estimate donor support for policies. We believe it is more accurate to ask government stakeholders to weight the contributions of international public actors, on a scale of 0–4, rather than attempt to attribute support based on monetary contributions to the projects. We choose this approach because, often, the exact contribution of donor support is unclear. Teasing out financing for policy support from overall project financing, within project plans, is difficult due to the unclear financing structures of the many project plans that can support the development of a target policy. Furthermore, it is impractical to identify

every donor entity that contributed to a certain policy. Even if we examined every energy-related project document from the various donor banks, there might be other relevant projects. For example, a donor may have supported a development project that, in part, helped create a policy relevant to renewable energy.

To estimate attribution, we interview government stakeholders as opposed to donor stakeholders because we feel there is a risk of significant donor bias in that they could attribute most of the policy development to their own actions. While there is also a risk of government bias, it is in the governments' interest to be fair to international donors to encourage donor support for future interventions, and the government is not likely to underestimate its own contributions.

## Step E: Calculate attribution

To calculate the attribution, we survey the government actor(s) on the importance of international and domestic government support for the development of the target policy. If the support of the domestic government and international donors, as determined from survey responses, is greater than 100 percent, then a normalization is necessary. If the sum is less than 100 percent it means that another actor (e.g., a nongovernmental organization [NGO]) not included in the survey could have been responsible for the development of the target policy. However, we do give respondents the chance to mention any actor we may have missed, so this would likely not occur in practice. The mobilization of private sector finance is then the normalized attribution multiplied by the causality weighting of the target policy. In this case, the domestic government mobilized 21.9 percent ( $0.365 \times 0.6$ ) of private finance, while the international donors mobilized 14.6 percent ( $0.4 \times 0.365$ ). This means that international donors contributed to the development of a target policy and that contribution then helped attract 14.6 percent of the private finance in a project.

## 6. CASE STUDIES

We applied the methodology to the three case studies primarily to demonstrate how it can work in practical terms. Given the shortage of data, no firm conclusions should be drawn about the specific countries. We hope that future applications of this methodology will further test these findings. In general, the results do confirm expectations about the effect of causal factors on private climate finance mobilization.

This section describes the context of each case study. It then shows the investment maps, laying out local and international direct support for the target policy, public cofinance, projects, policies relevant to the sector, and “other enabling factors” for each country. Finally, we provide the financing structures of the analyzed projects.

Further detail on the case studies that demonstrates how we operationalized this methodology can be found in Annexes D, E, and F. Each of these annexes is divided into the following subsections, which provide

- information about the target policy, including a narrative about why we selected it as the target policy;
- a brief description of the donor support provided for the target policy; and
- timelines of relevant policies and “other enabling factors.”

The last section of each case study presents the results obtained from testing the proposed methodology. It is important to remember that, for the majority of projects, we were able to interview only one private stakeholder; the resultant percentages and comments are thus not a representative sample of private sector viewpoints. In total, we interviewed one private stakeholder for each project in Brazil and Uruguay and two private stakeholders for the Kenyan project. For each country, we interviewed two government agencies.

The results section for each case study country begins with a discussion of the causality weightings and mobilization percentages for the causal factors identified in the investment map. The first table in each section presents the causality weightings assigned by stakeholders. The subsequent graphs show the percentage of private finance mobilized from the various causal factors for each project. It is important to remember the difference between mobilization and causality factors. As discussed in Section 5.4 the assigned causality weightings from the stakeholders do not equate to the amount of private finance mobilized; instead these weightings show how important a specific factor is to the stakeholder’s investment decision (i.e., a 25 percent causality does not signify that the factor mobilized 25 percent of investment). Mobilization percentages show the percentage of private finance mobilized by the various causal factors.

The second table in each section (except for Brazil) shows the average government stakeholder responses, which

illustrate how past policies influenced descendant policies. From this, we can ascertain the consequent effects of the target policy on private investment through other policies on the map.

## 6.1. Brazilian Sustainable Urban Transportation

### 6.1.1. Context

Brazil is currently striving to increase its urban mobility (PwC 2013). Traditionally, the Brazilian government financed the majority of its infrastructure projects with public funding; however, transportation investments did not meet expectations. Consequently, the government began enhancing its public-private partnership (PPP) framework under the 2004 PPP law (formally updated in 2012) in an effort to attract private sector finance. The case of Brazil demonstrates that public finance, while necessary, is not sufficient to attract private investment; complementary robust policies and regulatory structures are vital (IMF 2015; Credit Suisse 2013; Leipziger and Lefevre 2015). In fact, public finance arguably deterred private investment by crowding it out, as will be discussed below (Leipziger and Lefevre 2015).

Public money for infrastructure projects in Brazil is abundant; the majority of financing provided for the numerous infrastructure projects built for the World Cup came from the government. The private sector cannot compete with this financing because the National Bank of Brazil (BNDES) lends at lower interest rates and over longer periods (Leipziger and Lefevre 2015; Wheatley 2013; Durante et al. 2015). Moreover, Brazil suffers from an overly complex tax environment, in which taxes vary at the state, federal, and municipal levels, in addition to other issues that complicate and increase the expense of conducting business in the country. In fact, some investors have cited this complicated tax structure as a hindrance to their investments (Loman 2014; Deloitte 2007). Consequently, Brazil needs to focus on fostering a more favorable investing environment, which can be accomplished in part by deploying its domestic public money in a more strategic manner through policy interventions.

At the time of these project investments Brazil had a strong economy relative to other developing nations; however, the percentage of GDP used for urban transport in comparison to other emerging countries was significantly lower (Vittor and Samples 2011; IMF 2015; Garcia-Escribano et al. 2015). This underinvestment led to lost productivity time due to unnecessary traffic jams. Accord-

ing to a Credit Suisse report, inadequate transport infrastructure accounted for a loss of 10–15 percent of Brazilian GDP. Compounding this problem was the fact that the Brazilian population predominately used private transport (cars). The government further encouraged this behavior by incentivizing car purchases through credit stimuli and tax incentives (Credit Suisse 2013). The government recently suspended tax incentives for cars, which has led to a decline in car sales (EFE 2015).

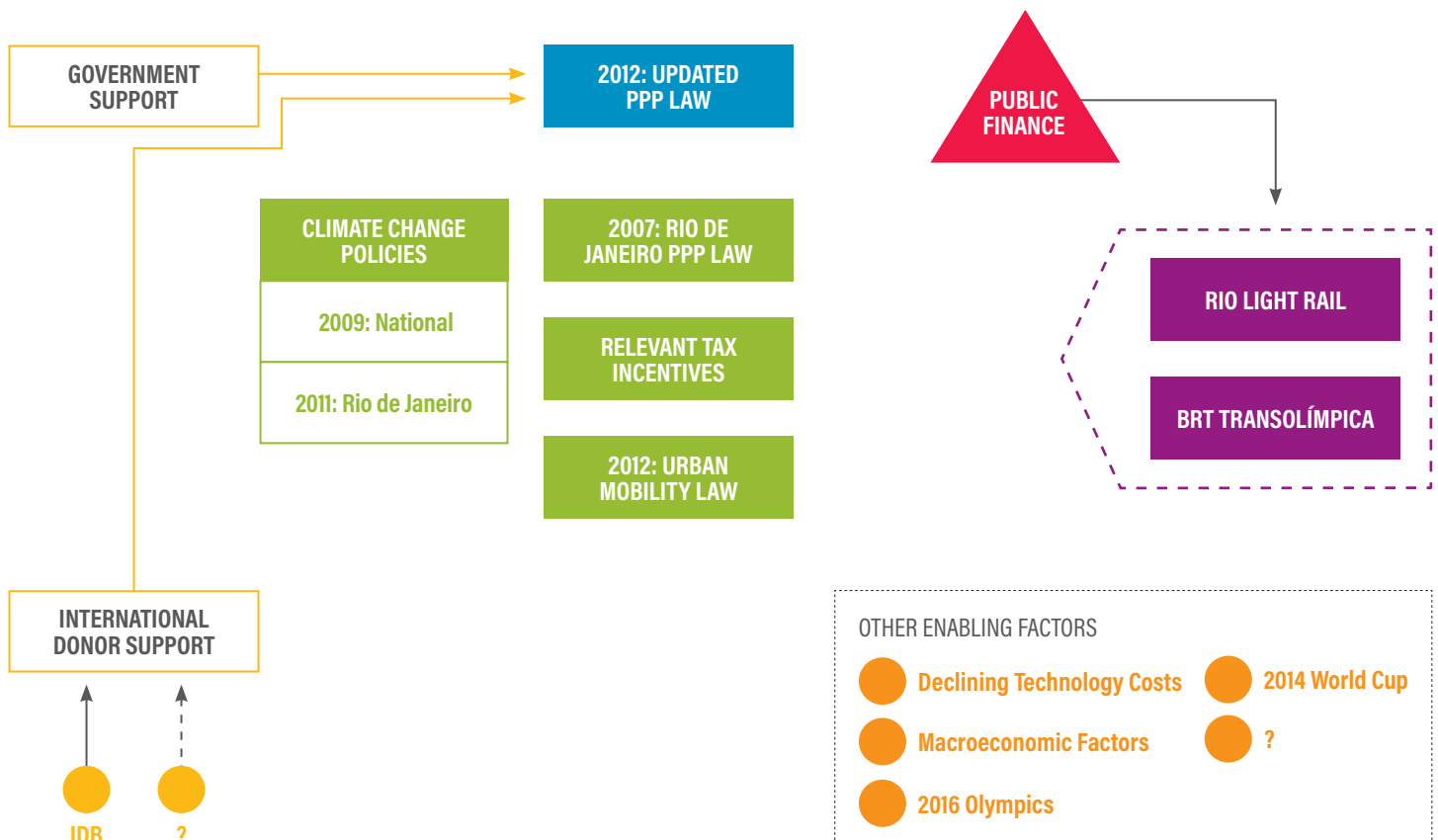
Political instability, partly due to social concerns, also hampered investment conditions and continues to do so. Political backlash against privatization of the transport sector is a concern because much of the population believes that transportation should be a public good. Moreover, urban mobility projects serve low-income communities, which are very price sensitive. Consequently, in concessions where user fees determine private revenues, the private sector cannot increasingly raise tariffs to cover

its own debt because it runs the risk of pricing out the customer base and/or arousing strong community opposition (Credit Suisse 2013; Vittor and Samples 2011). Both of these issues pose serious disincentives for the private sector. Policy risk is particularly pertinent to transportation projects, because much of private sector revenue is dependent upon the government’s ability to repay loans over long periods.

### 6.1.2. Investment Map

The following map (Figure 6) shows the investment map of causal factors for Brazil. Figure 4 shows the legend for this investment map. Annex D illustrates how the specific policies for this country were chosen, including a timeline of other policies relevant to the sector but not included on this map because they were out of the 2005–2012 range.

Figure 6 | **Brazilian Investment Map**



Source: WRI.

Table 4 | **Financing Structures for the Projects in Brazil**

<b>BRAZIL TRANSOLÍMPICA RIO: \$657 MILLION = TOTAL PROJECT COST (TPC)</b>				
AMOUNT (\$MILLION)	FINANCIAL INSTRUMENT	ENTITY	FLOW CLASSIFICATION	COUNTRY OF ORIGIN
552	Not available (N/A)	Government (state funding)	Public	Brazil
105	N/A	Private investor	ViaRio Consortium <sup>a</sup>	N/A

<b>BRAZIL RIO LIGHT RAIL: \$583 MILLION = TPC</b>				
AMOUNT (\$MILLION)	FINANCIAL INSTRUMENT	ENTITY	FLOW CLASSIFICATION	COUNTRY OF ORIGIN
247.5	N/A	Government and BNDES	Public	Brazil
202.5	N/A	Private investor	VLT Rio Consortium <sup>b</sup>	N/A
133 <sup>c</sup>	N/A	KfW	Public	Germany

*Notes:*

<sup>a</sup> ViaRio Consortium members: Invepar (33.4%), CCR (33.3%), and Odebrecht Transport (33.3%).

<sup>b</sup> VLT Rio Consortium members: CIIS (24.9317%), Odebrecht Mobility (24.9317%), Invepar (24.9317%), and Riopar Participações (24.9317%), along with Benito Roggio Transporte (BRT) (0.2506%) and RATP do Brasil Transactions— Participations and Services of Transport (0.0226%).

<sup>c</sup> According to KfW, they provided €265 to a program cofinanced with BNDES that promotes improved public transportation in Brazil. Of that pool, €133 went to the Rio Light Rail (KfW 2016).

Sources: BNEF 2016b; ITDP 2013; stakeholder responses from survey; ViaRio 2016; VLT Rio 2016.

### 6.1.3. Financing Structure of Projects

Table 4 shows the financing structures of the selected projects. It shows the dollar amount invested (first column) by type (second column) and entity (third column). Classification of the entity as private or public is found in the fourth column, and the fifth column shows the country of origin of the financial flows.

Yellow shading indicates a public flow, while green is private. In the last column, orange indicates global North funding, and blue represents domestic financing.

### 6.1.4. Brazil Case Study Results

The objectives of this methodology include determining mobilization resulting from the target policy and understanding the role of policy versus that of public cofinance and other factors. Figure 7 and Figure 8 below show that the target policy mobilized 4 percent of private finance for each project. Policy overall and domestic cofinance were

highly important when compared to the other factors, for each project. For both causal factors, the BRT had equal mobilization percentages of 19 percent, and with the Rio Light Rail project, public finance had a lower percentage of mobilized finance with a factor of 11 percent compared to overall policy’s 14 percent.

The low mobilization of the target policy for Brazil is not surprising because we were unable to map descendant policies from the target policy. Consequently, we do not yet understand the full mobilization effects. In this respect, this case study is different from the others; nevertheless, it is informative to see how the target policy affects mobilization in isolation of its descendant policies.

Compared to the other mapped policies, the target policy had the highest causality weighting, 75–100 percent. However, all the policies were rated above 50 percent, and therefore no policy stood out as being more important to investment than the others.

Domestic finance was a key driver for project development, based on stakeholder responses. The BRT project respondent was unsure whether international financing was involved (our research indicates there was none). The respondent from the Rio Light Rail project said that none of the funding came from international sources; even though an article from KfW reported that it provided a concessional loan to BNDES for the Rio Light Rail. This funding, however, was part of a larger program that KfW is cofinancing with BNDES for improved public transportation (KfW 2016). Because the financing is upstream from the project, project stakeholders may not be aware of the origins of their financing.

In terms of macroeconomic factors, one project included economic stability, sustainable economic growth, and credit sources as the most important indicators, while another project listed a strong economy, political stability, a growing country, and controlled inflation. However, the political economy in Brazil has recently been in flux. One respondent mentioned that, at the time of the investment, macroeconomic conditions were much better than those today due to more stability.

Despite the complex tax structure in Brazil, the average causal weighting for tax incentives was 75 percent, and one respondent specifically mentioned the Regime Especial de Incentivos para o Desenvolvimento da Infraestrutura (Special Incentives Regime for Infrastructure Development, or REIDI) as being necessary for increased project viability. Additionally, some sources have claimed that the 2016 Olympics in Rio de Janeiro have been the main drivers for the BRT TransOlimpica investment. Note that at the time of the interviews, the Olympics had not yet happened. With a weighting factor of 50 percent, however, this was only a modest motivating factor of investment, and the stakeholder stated that, even without the sporting events, the project would still be necessary for Rio de Janeiro. However, for the Rio Light Rail, the interviewees assigned a causality factor of 75 percent to the Olympics.

The factors that mobilized the largest amounts of finance for the Rio Light Rail were policy overall, a robust regulatory framework, and guarantees given to the private sector, while those deemed important for the BRT project included policy overall, domestic finance, and favorable project study results. Least important for the Rio Light Rail were the factors of international finance, declining technology costs, and the World Cup; similarly, the BRT had the same factors, in addition to the Olympics.

 Table 5 | **Brazilian Causal Factors and Mobilization**

CAUSALITY FACTORS	RESPONDENT CAUSALITY WEIGHTINGS (%)	
	BRT TRANSOLÍMPICA	RIO LIGHT RAIL
<b>POLICIES</b>		
<i>Policy overall</i>	<b>100</b>	<b>100</b>
Target policy	75	100
Climate change policies	50	50
Tax incentives	75	75
2012 Urban Mobility Law	50	75
2007 Rio de Janeiro PPP Law	75	75
<b>PUBLIC PROJECT-LEVEL COFINANCE</b>		
<b>Overall public finance</b>		
International cofinance	N/R	0
Domestic cofinance	100	75
<b>Public finance instruments identified by stakeholders</b>		
State funding	100	N/R
Public contribution	N/R	100
BNDES funding	N/R	100
<b>OTHER ENABLING FACTORS</b>		
Declining technology costs	50	50
2014 World Cup	50	50
2016 Olympics	50	75
Macroeconomic indicators	75	75
<b>Factors identified by respondents</b>		
Favorable project study results	100	N/R
Existing regulatory framework is robust	N/R	100
Regulatory stability	N/R	75
Guarantees given to the private sector	N/R	100

*Notes:* N/R (no response) indicates that the stakeholder did not address this issue (e.g., they did not list an "other enabling factor" that a different stakeholder did) or the factor was not relevant to them (e.g., if there was no domestic finance contributed to the project we write in N/R instead of 0 for mobilization). This methodology does not assign a weighting of zero to N/R.

One stakeholder response per project.

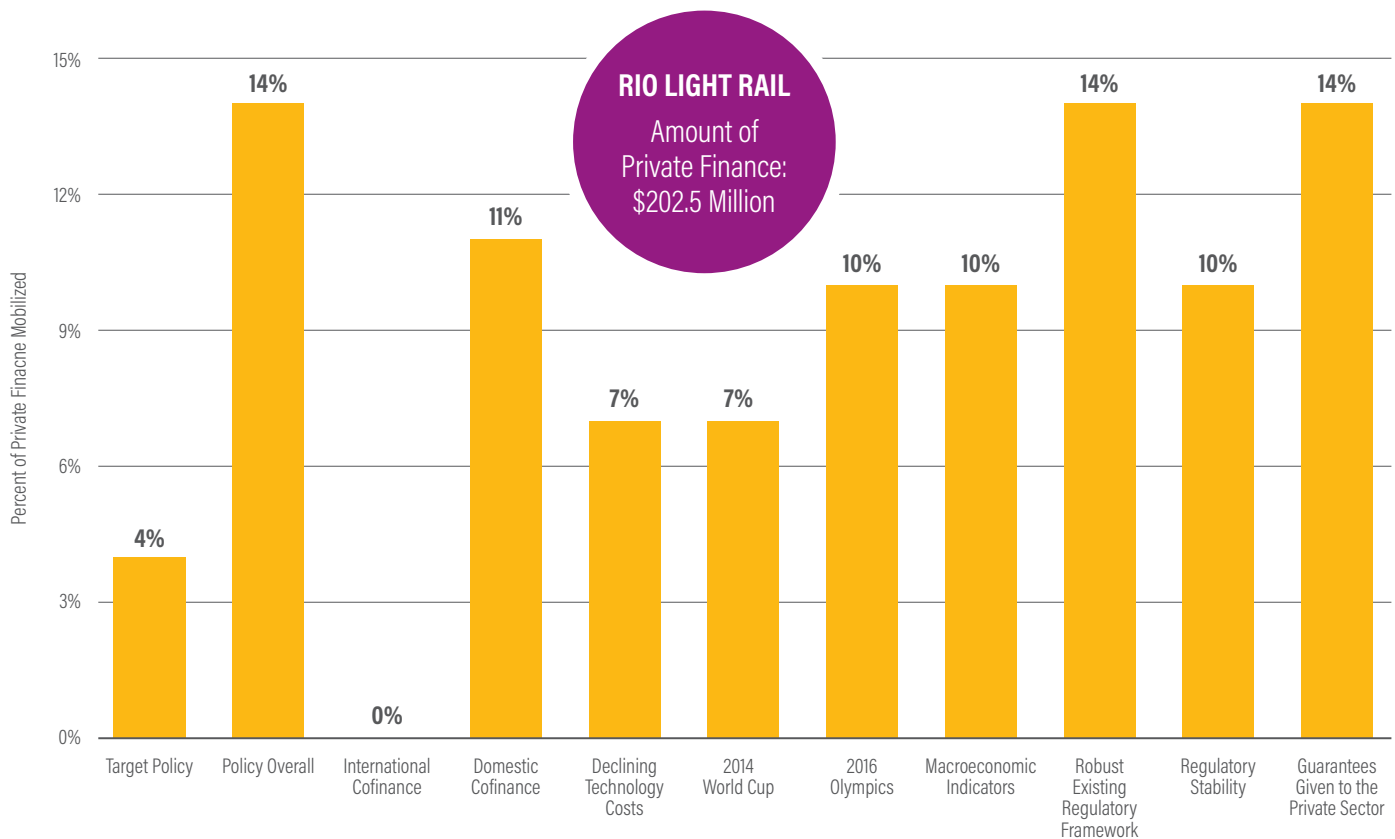
*Source:* WRI; see Annex B for details.

Table 6 | **Brazilian Donor Support: Attribution and Mobilization**

DONOR ENTITY	ATTRIBUTION OF TARGET POLICY SUPPORT (%)	MOBILIZATION OF PRIVATE FINANCE BY DONOR (%)	
		BRT TRANSOLÍMPICA	RIO LIGHT RAIL
Domestic support	56	2	2
<b>INTERNATIONAL DONOR SUPPORT</b>			
Inter-American Development Bank	21	1	1
Other (unidentified) international donor	24	1	1
<b>Total international donor support</b>	<b>44</b>	<b>2</b>	<b>2</b>

Source: WRI; based on two stakeholder responses per project.

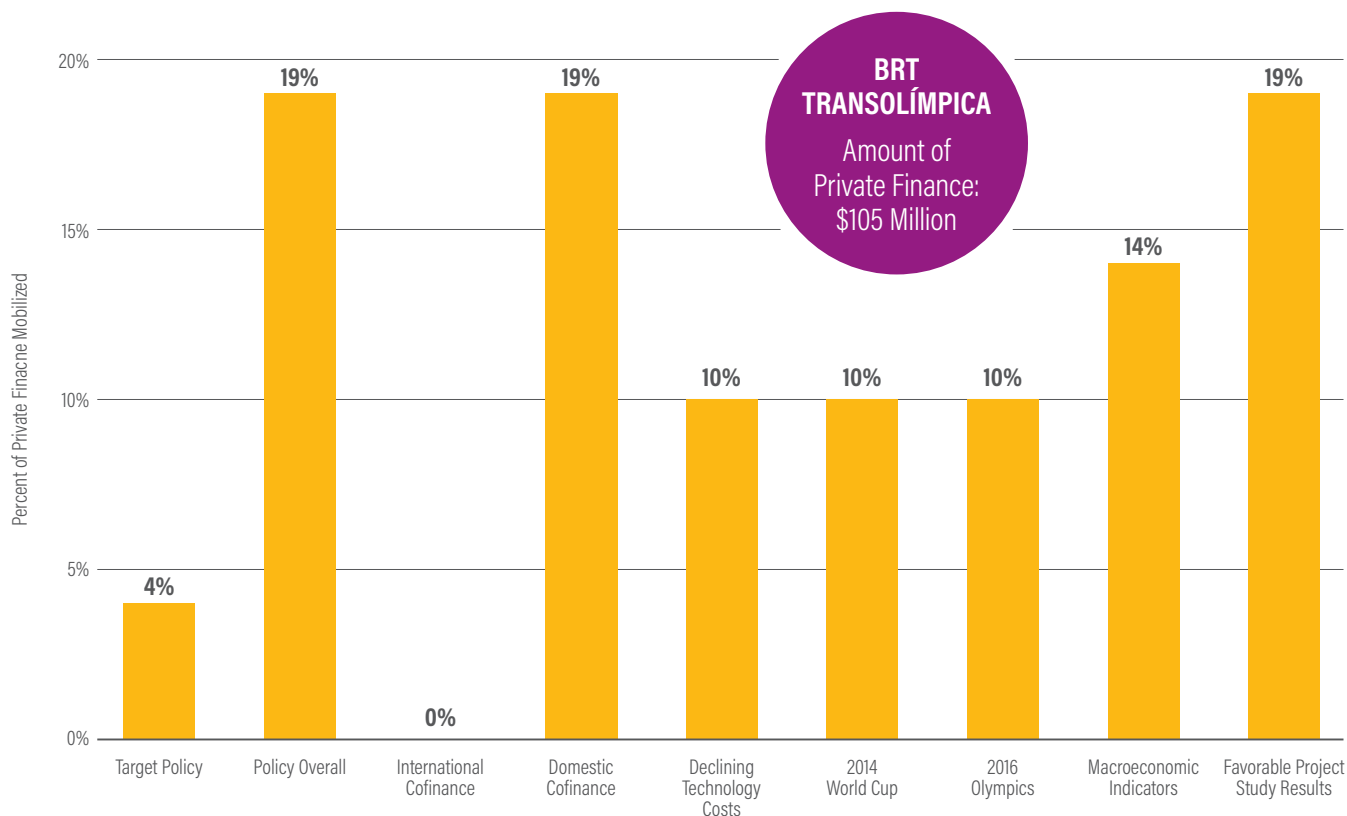
Figure 7 | **Rio Light Rail Mobilization**



Note: Policy overall is inclusive of the target policy. The sum of policy overall, international and domestic finance, and "other enabling factors" may not add to 100 percent due to rounding.

Source: WRI.



Figure 8 | **BRT TransOímpica Mobilization**


Note: Policy overall is inclusive of the target policy. The sum of policy overall, international and domestic finance, and "other enabling factors" may not add to 100 percent due to rounding.

Source: WRI.

Table 5 shows the causality weightings reported by private stakeholders.

Table 6 shows that donor support from domestic and international actors was almost equal, with a 44/56 split in favor of domestic support. Domestic support mobilized 2 percent of overall private finance for both projects, while international support mobilized 2 percent.

## 6.2. Uruguayan Wind Energy

### 6.2.1. Context

Uruguay is a country in which a minimal amount of public money, invested for regulatory change, mobilized large sums of private capital through policy reform (Westphal and Thwaites 2016; Glemarec et al. 2012). In 2005, the country began to identify ways to increase private sector participation in the electricity sector (Jimeno 2014; IDB 2014). Arguably, one of the more notable interventions was the 2008 National Energy Policy. Partly because of this

policy, Uruguay now generates 94.5 percent of its electricity from renewable energy. It was able to accomplish this feat without government subsidies or drastic hikes in consumer pricing (Watts 2015; Glemarec et al. 2012).

Historically, Uruguay relied on hydropower as its source of primary energy for electricity production. Dry periods plagued the country in the decade following 1997, however, and hydropower's share in electricity generation dropped from 90 to 50 percent. Accordingly, the country turned to fossil fuels to meet demand, which subjected people to continually rising fossil fuel prices (Glemarec et al. 2012). Uruguay does not have its own fossil reserves and must import fossil energy; rising fossil fuel prices coupled with an increase in demand resulted in a significant fiscal burden that encouraged the government to shift toward renewables (Glemarec et al. 2012). Increasing the country's renewable energy capacity has allowed it to become an exporter of electricity instead of an importer (Watts 2015).

Uruguay's transition to renewables was rapid. In 2007, the country generated little energy from wind; by 2014 it had installed 466 MW. Uruguay increased its wind capacity per capita more than any other country in the world (REN21 2015; BNEF 2016a).

### 6.2.2. Investment Map

The following map (Figure 9) shows the investment map of causal factors for Uruguay. Figure 4 shows the legend for this investment map. Annex E illustrates how the specific policies for this country were chosen, including a timeline of other policies relevant to the sector but not included on this map because they were out of the 2005–2012 range.

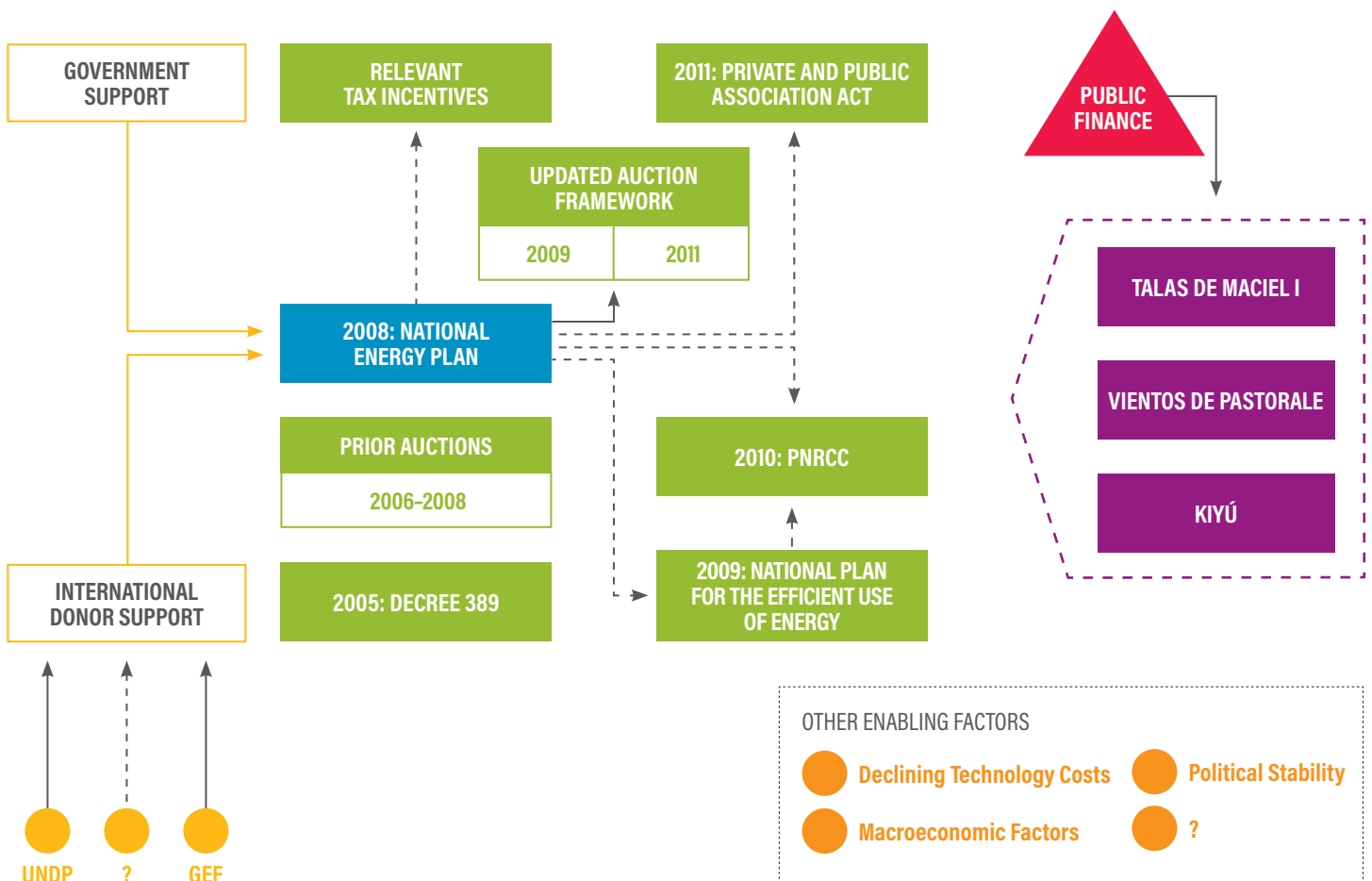
### 6.2.3. Financing Structures

The following table (Figure 7) shows the financing structures of the projects. Yellow shading indicates a public flow, while green is private. In the last column, orange indicates global North funding, blue represents domestic financing, and South-South is purple.

### 6.2.4. Uruguay: Case Study Results

Per our main research questions, the target policy mobilized either 16 or 18 percent of private finance for the three projects (Figure 10, Figure 11, Figure 12). Additionally, international public finance was only pertinent for the Vientos de Pastoreale project. It mobilized the same

Figure 9 | **Uruguayan Investment Map**



Source: WRI.

Table 7 | **Financing Structures for the Projects in Uruguay**

<b>URUGUAY VIENTOS DE PASTORALE<sup>a</sup>: \$144 MILLION = TOTAL PROJECT COST (TPC)</b>				
AMOUNT (\$MILLION)	FINANCIAL INSTRUMENT	ENTITY	FLOW CLASSIFICATION	COUNTRY OF ORIGIN
92	Loan	Deutsche Bank	Private	Germany
		Industrial Bank of China	Public	China
		Intesa Sanpaolo Bank	Private	Italy
52	Equity	SOWITEC	Private	Uruguay

<b>URUGUAY TALAS DE MACIEL<sup>b</sup>: \$117 MILLION = TPC</b>				
AMOUNT (\$MILLION)	FINANCIAL INSTRUMENT	ENTITY	FLOW CLASSIFICATION	COUNTRY OF ORIGIN
64.5	Debt	Export-Import Bank of USA	Public	United States of America
25.5	Loan	Banco Bilbao Vizcaya Argentaria S.A.	Private	Spain
13.5	Equity	Construcciones e Instalaciones Electromecánica	Private	Uruguay
2.0	Equity	Jineral	Private	N/A
11.5	Equity	Inversiones Morsa	Private	Colombia

<b>URUGUAY KIYÚ: \$117 MILLION = TPC</b>				
AMOUNT (\$MILLION)	FINANCIAL INSTRUMENT	ENTITY	FLOW CLASSIFICATION	COUNTRY OF ORIGIN
28.1	Loan	Sumitomo Mitsui Banking Corporation	Private	Japan
56.3	Loan	Crédit Agricole Bank	Private	France
32.6	Equity	Cobra Instalaciones y Servicios S.A.	Private	Spain

**Notes:**

<sup>a</sup> (1) For the purposes of estimation, we attribute one-third of the loan to each actor; (2) the project underwent refinancing in 2016, which led to a change in the overall equity value (SOWITEC 2016). However, as mentioned, we do not include refinancing, nor do we include transactions post-2015.

<sup>b</sup> BNEF reports that the US Export-Import (Ex-Im) Bank and Banco Bilbao Vizcaya Argentaria S.A. approved a \$64.5 million loan in 2014; these data conflict with those presented above.

Sources: IJ Global 2016; BNEF 2016a.

Table 8 | **Uruguayan Causal Factors and Mobilization**

CAUSALITY FACTORS	RESPONDENT CAUSALITY WEIGHTINGS (%)		
	VIENTOS DE PASTORALE	TALAS DE MACIEL I	KIYÚ
<b>POLICIES</b>			
<i>Policy overall</i>	<b>100</b>	<b>100</b>	<b>75</b>
Target policy (2008 National Energy Plan)	100	50	75
Tax incentives	100	100	100
2009–2011 Updated Auction Framework	75	100	100
2011 Public Private Association Act	100	0	75
2009 National Plan for the Efficient Use of Energy	100	N/A	75
2010 PNRCC	100	N/A	50
<i>Not part of target policy's causal chain</i>			
Prior auctions	100	N/A	75
2005 Decree 389	100	100	75
<b>PUBLIC PROJECT-LEVEL COFINANCE</b>			
International public finance	100	0	N/R
Domestic public finance	N/R	N/R	N/R
<i>Public finance instruments identified by stakeholders</i>			
Power purchase agreement	100	N/R	N/R
<b>OTHER ENABLING FACTORS</b>			
Declining technology costs	25	50	100
Political stability	100	100	100
Macroeconomic indicators	75	75	75
<i>Factors identified by respondents</i>			
Policies that allow one to renew the energy matrix with renewable energy sources and provide a framework for the projects to be financed from abroad	N/R	100	N/R

Notes: N/R (no response) indicates that the stakeholder did not address this issue (e.g., they did not list an “other enabling factor” that a different stakeholder did) or the factor was not relevant to them (e.g., if there was no domestic finance contributed to the project we write in N/R instead of 0 for mobilization). This methodology does not assign a weighting of zero to N/R.

One stakeholder response per project.

Source: WRI; see Annex B for details.

amount of money as overall policy. Table 8 presents the causality weightings. The 0 percent weight assigned to public finance by the Talas de Maciel stakeholders indicates that the \$64.5 million contributed by the US Export-Import Bank was not seen to be effective in mobilizing private finance. Policy overall was significant and responsible for 21–25 percent of finance.

The target policy had a causality weighting of 50–100 percent. While other policies had higher causality percentages, the target policy is still viewed as very important to private sector mobilization because it greatly (63–88 percent) influenced the highly weighted descendant policies; the reasoning for this is found in Table 9.

As mentioned, there was no associated domestic cofinance for these projects. One reason for this could be that Uruguay is politically stable, and thus the private sector needs fewer risk-mitigation instruments; stakeholders for all three projects rated political stability at 100 percent. One stakeholder, however, mentioned that procuring public finance involved too many bureaucratic hurdles.

Declining technology costs are often cited as a big driver for investment in wind energy; however, with the exception of the Kiyú wind farm this factor had the lowest nonzero mobilization numbers. Also surprising was the high causality weighting factors of the early 2006–2008 auctions: the literature review indicated that these auctions were failures. One reason for this could be that respondents knew these auctions influenced the later or updated auction framework, under which all three projects fall, and thus they weighted the earlier auctions higher. Macroeconomic factors, namely price and GDP growth stability, consumer price index, and interest rates were rated as very important.

Political stability was seen as a top driver of private mobilization across all three projects. Policy overall was a key mobilizer for the Talas de Maciel I and Vientos de Pastore projects.

Table 9 indicates that the target policy’s effect on descendant policies was strong (>50 percent). The following information from various stakeholders explains why. The target policy captured the shift from conceptualizing energy as a market good to viewing it as a factor that the government must plan. The target policy also led to a greater emphasis on renewable energy and energy efficiency, and this explains its effect on the latter climate-

Table 9 | **Uruguayan Policy Influence on Descendant Policies**

POLICY LINKAGES	AVERAGE INFLUENCE OF PAST POLICIES ON DESCENDANT POLICIES (%)
Target policy → Tax incentives	75
Target policy → Updated auction framework	88
Target policy → PNRCCC	63
Target policy → National Plan for the Efficient Use of Energy	88
National Plan for the Efficient Use of Energy → PNRCC	63
Target policy → Private and Public Association Act	63

Note: Two stakeholder responses per project.

Source: Surveys administered by WRI; see Annex B for details.

relevant policies (i.e., the PNRCC and the National Plan for the Efficient Use of Energy). Tax incentives are tied to the target policy because specific incentives such as Decree 354/009 and the latter Decree 2/012 helped eliminate implementation barriers to the target policy. The subsequent auctions under the “updated auction framework” were instruments that directly resulted from the target policy.

Table 10 demonstrates that donor support from the government was a stronger driver of investment than international donors, with two-thirds of investment compared to one-third, relatively. One government stakeholder indicated that international donors were very helpful in the implementation of the target policy; however, the success of the policy would not have been possible without government support. Unlike in the other two countries, donor support was not split equally among international donors, with the United Nations Development Programme contributing less than its counterparts. Across the three projects, estimated total international support for the target policy mobilized 5–6 percent of private sector finance, while national government support enabled 10–12 percent of finance.

Table 10 | **Uruguayan Donors: Attribution and Mobilization**

DONOR ENTITY	ATTRIBUTION OF TARGET POLICY SUPPORT (%)	MOBILIZATION OF PRIVATE FINANCE BY DONOR (%)		
		VIENTOS DE PASTORALE	TALAS DE MACIEL I	KIYÚ
Local government	67	12	11	10
<b>INTERNATIONAL DONOR SUPPORT</b>				
United Nations Development Programme (UNDP)	7	1	1	1
Global Environmental Facility (GEF)	13	2	2	2
Other (unidentified institution) <sup>a</sup>	13	2	2	2
<b>Total international donor support</b>	<b>33</b>	<b>6<sup>b</sup></b>	<b>5</b>	<b>5</b>

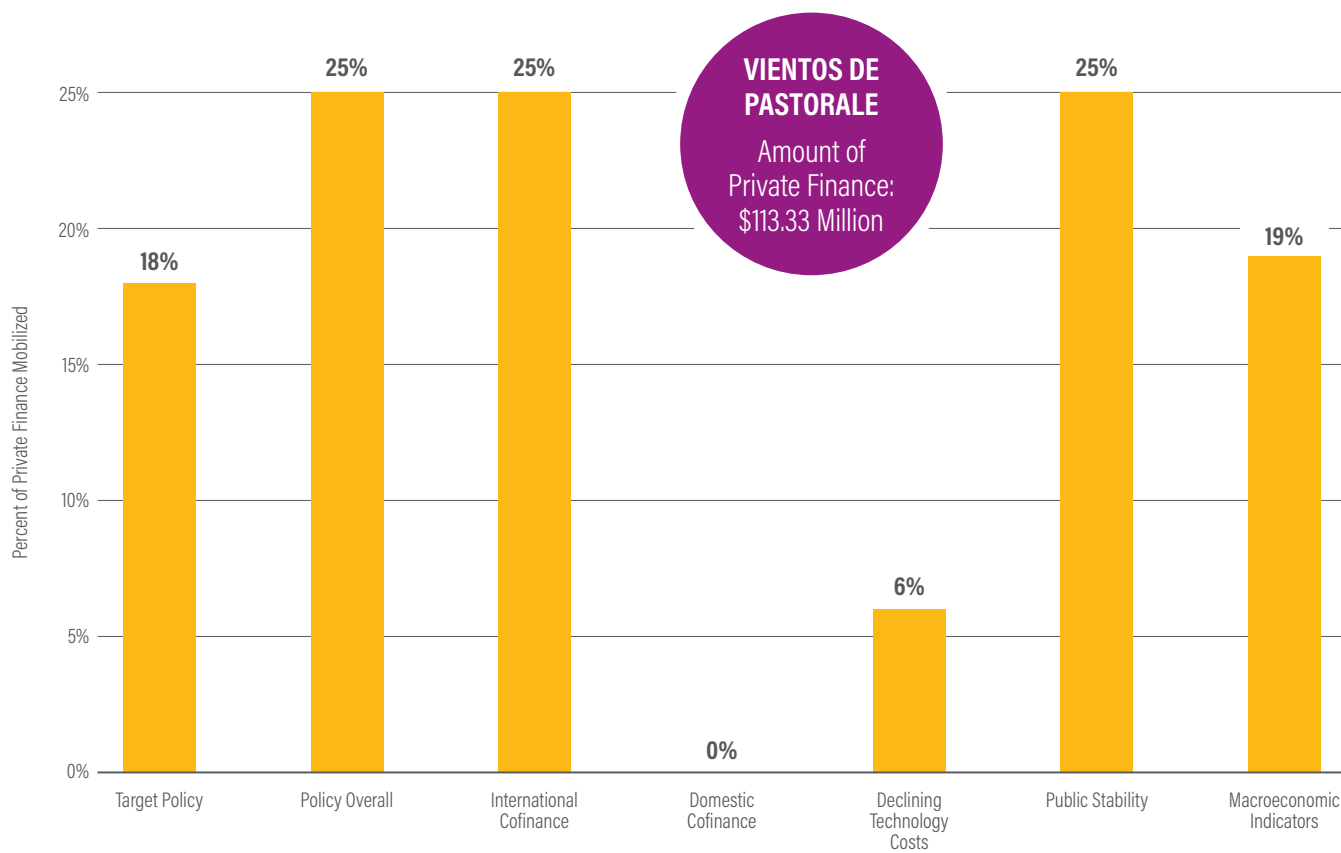
Note:

<sup>a</sup> The survey respondent chose not to reveal the name of this international donor.

<sup>b</sup> The numbers may not add up, due to rounding.

Source: WRI.

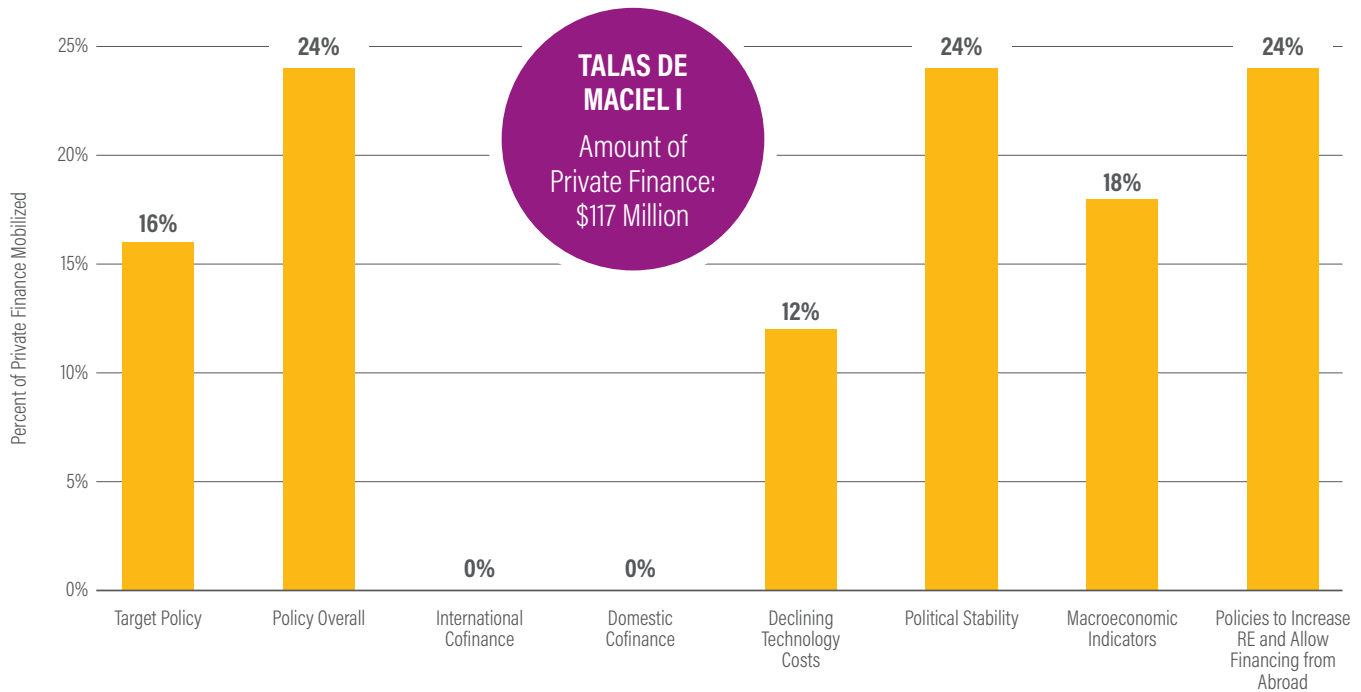
Figure 10 | **Vientos de Pastorale Mobilization**



Note: Policy overall is inclusive of the target policy. The sum of policy overall, international and domestic finance, and "other enabling factors" may not add to 100 percent due to rounding.

Source: WRI.

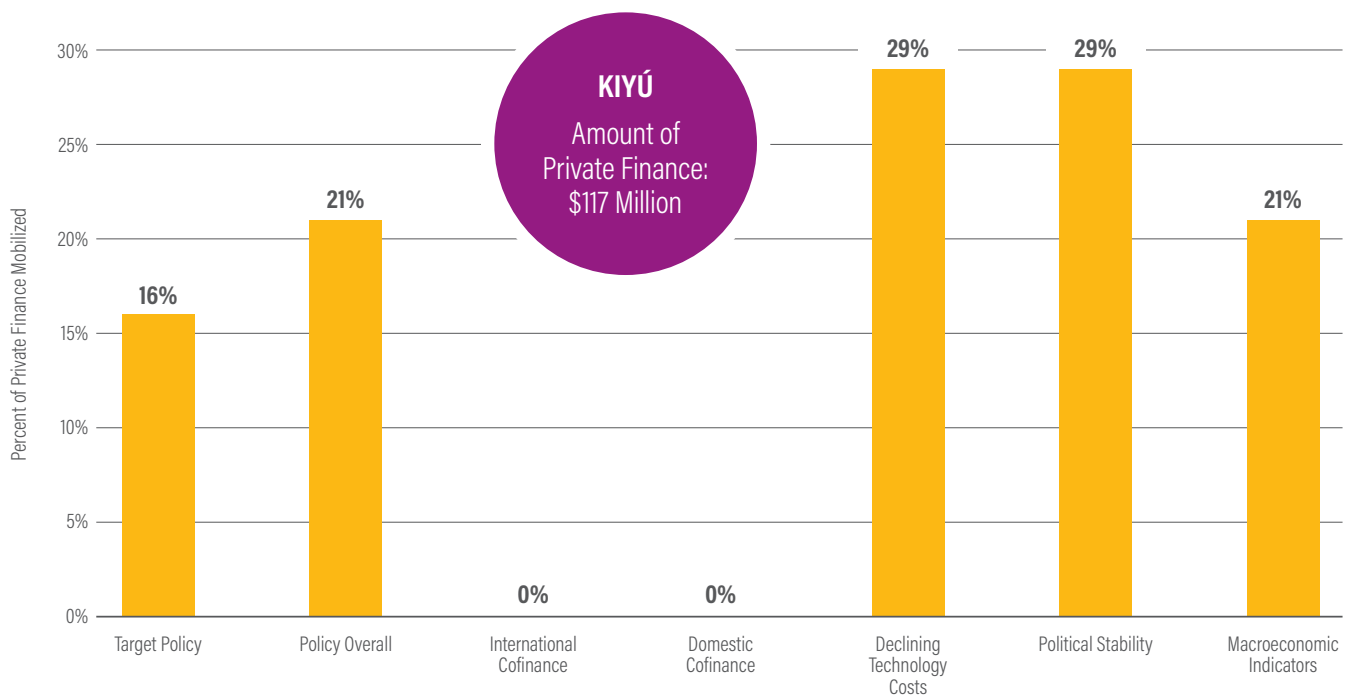
Figure 11 | **Talas de Maciel I Mobilization**



Note: Policy overall is inclusive of the target policy. The sum of policy overall, international and domestic cofinance, and "other enabling factors" may not add to 100 percent due to rounding.

Source: WRI.

Figure 12 | **Kiyú Mobilization**



Note: Policy overall is inclusive of the target policy. The sum of policy overall, international and domestic cofinance, and "other enabling factors" may not add to 100 percent due to rounding.

Source: WRI.

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## 6.3. Kenyan Geothermal Energy

### 6.3.1. Context

Kenya is one of the few low-income<sup>7</sup> African nations with enough data on clean energy investment for incorporation into this study. Moreover, its policy framework for encouraging geothermal development serves as a model for countries such as Ethiopia and Tanzania (Micale et al. 2014). Kenya's pioneering framework, which includes multiple policy interventions to increase private sector participation, has enabled the country to install more than half of the world's new geothermal capacity in 2014, according to the 2015 REN21 report. This framework was in part "kick-started" by the 2006 Energy Act.

Demand exceeding supply was one factor that promoted renewable energy development; this imbalance was due to the country's heavy reliance on hydropower. In 2006, frequent droughts led to severe shortages, and demand growth compounded this problem in the electricity sector (Srivastava and Venugopal 2014). Additionally, Kenya is characterized by extremely high electricity tariffs due to the use of expensive fuel such as diesel; the rates in Tanzania are US¢ 3/kwh and in Kenya they are US¢ 19.7/kwh (Kant et al. 2014).

Geothermal energy has many factors acting in its favor. It is an endogenous and abundant source of energy in Kenya. Unlike other renewables, it can serve as a baseload power, and can be cost-competitive with fossil fuel-based electricity. The country has many enabling policies for renewable energy in place, such as the 2013 Climate Change Plan. Despite this, however, Kenya has historically relied on fossil fuels, and even after the boom in geothermal power the country is still hoping to exploit newly discovered fossil reserves (REN21 2015; Naess et al. 2015). The government is thus sending conflicting signals, which are a deterrent to investors. Further evidence of these conflicting views can be found in the government's long-term economic plan (the Vision Plan), which calls for the promotion of fossil fuels; simultaneously, it has multiple climate change and pro-renewable energy policies that are direct descendants of the Vision. Nevertheless, these conflicting views are more prevalent in the discussions of energy sources such as solar, rather than geothermal (Naess et al. 2015). This is perhaps because exploitation of geothermal began in 1981 with the Olkaria field, and this long time span might have increased institutional knowledge.

Geothermal energy is different from other renewable energy sources in that it is site-specific to subsurface conditions, and exploiting it is very capital intensive. Many investment risks are specific to geothermal energy, which may be due to the long time frames of geothermal energy development. Globally, it takes around five years to develop a geothermal field, compared to one or two years to install a wind or solar plant (Micale et al. 2014). In contrast, the majority of Kenya's past geothermal projects have taken between 20 and 30 years. One explanation could be that fossil interests are still very powerful in the country, because diesel supplies a significant portion of electricity generation. Consequently, the government's focus may not be on quickly scaling up geothermal. Furthermore, the major barriers to private investment in geothermal are found in the first phases of resource and exploration; according to the CPI, many private financiers will not enter a project unless another entity has drilled at least 70 percent of the capacity (Micale et al. 2014). Only in rare cases is the private sector involved in greenfield projects. Despite this, most public policies to date have focused on the final or operational phase of geothermal development (Micale et al. 2014). Once a project reaches successful completion, however, it demonstrates that other projects can be viable. Other project development complications include issues concerning indigenous rights. Accusations of land rights violations have delayed projects such as the Longonot geothermal plant. All of these issues—long time frames, high capital investments, and societal tension—can prevent private sector participation even with the aid of a strong regulatory environment.

### 6.3.2. Investment Map

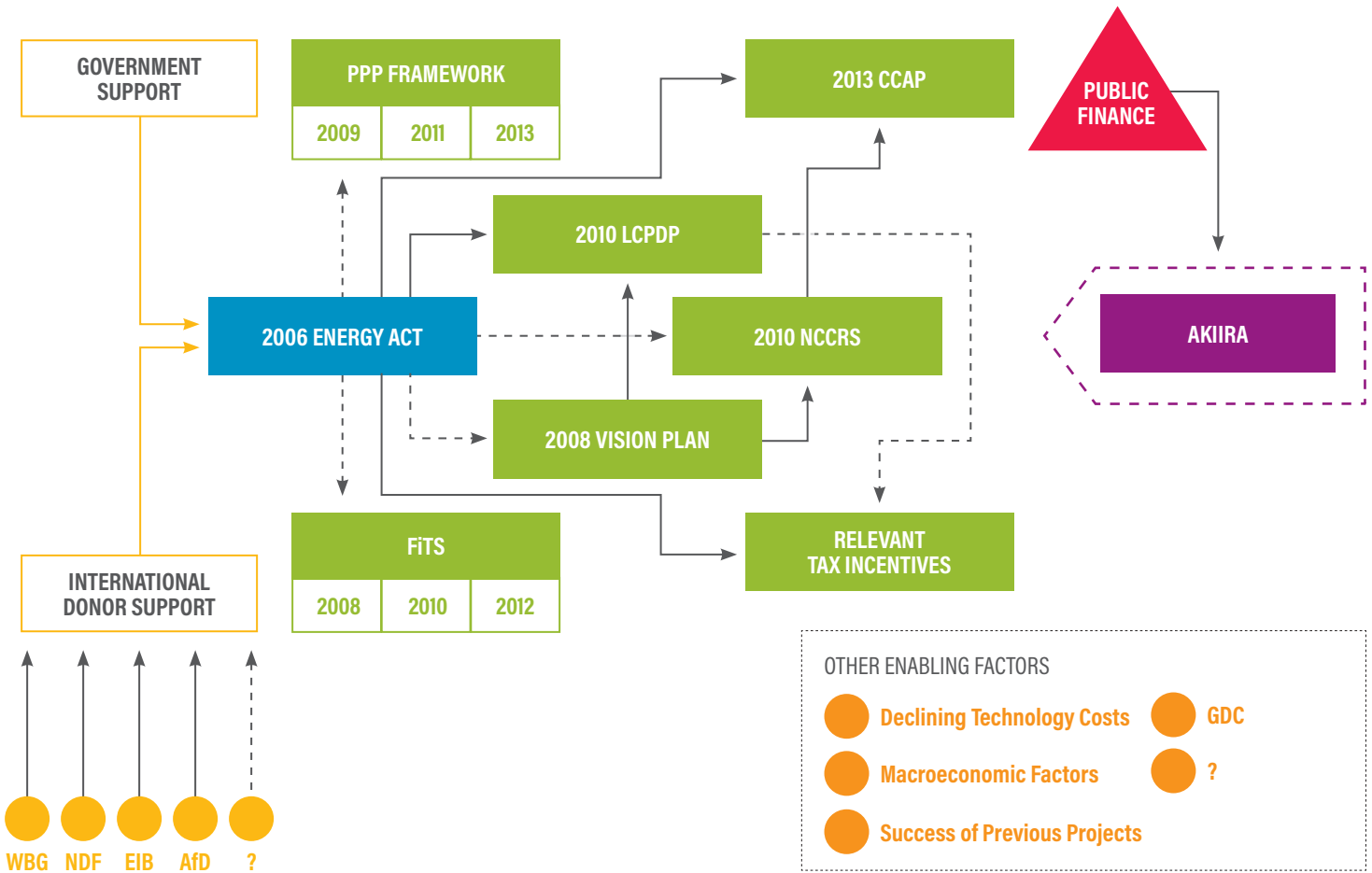
The following map (Figure 13) shows the investment map of causal factors for Kenya. Figure 4 shows the legend for this investment map. Annex F illustrates how the specific policies for this country were chosen, including a timeline of other policies relevant to the sector but not included on this map because they were out of the 2005–2012 range.

### 6.3.3. Financing Structures

This section describes the financing structures of the projects. In Table 11, yellow shading indicates a public financial flow, while green is private. In the last column, orange indicates global North funding, and blue represents domestic financing.



Figure 13 | Kenyan Investment Map



Source: WRI.

Determining the financing structure of the Akiira project was more difficult than for the other projects because there was no single source. Moreover, we found gaps when examining the numbers in the various sources' data, and thus we had to extrapolate the financing. In the instances in which the number was derived, we state this. Many sources report that the loan from the commercial bank will cover 70 percent of the total project cost and that 30 percent will come from Centum Investments and Frontier Management (Geothermal Energy Association 2016; Gachiri 2014). We know from Frontier's statement that it committed \$26 million in equity (Gredsted 2014); there-

fore, we can assume that if 30 percent comes from Frontier and Centum, then Centum will contribute \$64 million. As noted, it is unclear whether Marine Power Generation or RAM Energy provided any financing, because they are project developers. However, along with Frontier, they own a combined 62.5 percent of the special purpose vehicle, while Centum owns 37.5 percent. While the grant is not factored into the \$300 million total, the data come from a reputable source (BNEF 2016b).

Table 11 | **Financing Structures of Kenyan Projects**

<b>KENYA AKIIRA<sup>a,b</sup>: \$300 MILLION TOTAL PROJECT COST (TPC)</b>				
AMOUNT (\$MILLION)	FINANCIAL INSTRUMENT	ENTITY	FLOW CLASSIFICATION	COUNTRY OF ORIGIN
0.95 <sup>c</sup>	Grant	Overseas Private Investment Corporation (OPIC)	Public	USA
26	Equity	Frontier Management	Private	Denmark
64	Equity	Centum Investments Company Limited	Private	Kenya
Unclear	---	Marine Power Generation	Private	USA
Unclear	---	RAM Energy	Private	USA
210	Commercial loan	Standard Bank	Public	South Africa

Notes:

<sup>a</sup> In 2016, the African Union Commission (AUC) gave \$1.3 million to the Akiira project (BNEF 2016a).

<sup>b</sup> Munich RE is providing an undisclosed amount of financing for drilling risk insurance (Ram Energy Inc. 2015).

<sup>c</sup> This money was procured by GreenMax Capital Advisors (2014) from OPIC's Power Africa initiative and was used for drilling.

Sources: BNEF 2016b; GreenMax Capital Advisors 2014; Gachiri 2014; Akiira Geothermal Limited 2015; Gredsted 2014.

### 6.3.4. Kenya: Case Study Results

Figure 14 shows that the target policy mobilized 8 percent of private finance.<sup>8</sup> Policy overall was more important than international public cofinance, mobilizing 10 percent of private investment as compared to 8 percent (the second-lowest percentage). While policy had the highest mobilization percentage, many other factors also had this percentage.

In short, the causal factors all mobilized similar amounts of private finance (8–10 percent), with the exception of declining technology costs, which only caused 5 percent of private finance.

As shown in Table 12, target policy causality was weighted at 63 percent; however, one policy ranked higher at 75. The high causality weighting of the 2008 Vision Plan was not unexpected. Survey responses indicated that the importance of this policy is rooted in its ability to create demand because it allows the Energy Ministry to set overall energy generation targets. However, for the reasons mentioned in the case study, we chose the Energy Act as our target policy (e.g., the Vision Plan focuses on fossil fuels and there is no known policy support). Sur-

vey responses indicated that the target policy was a big enabler because it increases predictability, which in turn fosters a more amenable environment for the private sector; moreover, the policy improves transparency for sector regulation. As expected, target policy mobilization was lower than in the other countries because Kenya had a larger number of causal factors, which were identified by respondents, to normalize against, including legal know-how and community support, among others. The latter component is worth noting because a significant barrier to geothermal development in Kenya is community opposition and issues of land rights.

Policy and international public cofinance were essential to investment decisions, with causality weights of 100 and 75 percent. These same factors mobilized 10 percent and 8 percent of private sector finance, respectively. According to one respondent, international cofinance was important because it covered the funding deficiency of technical studies, which were needed both to attract equity investors and to advance negotiations with debt providers from banks. Investors viewed policy as critical. One respondent explained that it provides energy market policy as well as

capital and tax measures that ease the burden of front-end development costs. Specifically, tax incentives received an average causality factor of 63 percent; the lower rating from one developer is due to relevance of the tax incentives to a particular phase of the project, an issue extensively discussed in Section 5.3.2. The stakeholder said that, while tax incentives help reduce the overall cost, they are more pertinent to the later, plant construction phase (the stakeholder cited the example of power plant components). The stakeholder explained that the early or drilling

stage is much harder to finance (giving the example of test wells), and tax incentives are less applicable here.

Climate was not a strong motivating factor for investments in this geothermal project. Surveys indicated that the National Climate Change Response Strategy (NCCRS) had no influence on investments. According to one stakeholder, Kenya's goal is to replace oil as its baseload power with an energy source that is more cost-effective, and that option happens to be geothermal. The stakeholder further

Table 12 | **Kenyan Causality Factors and Mobilization**

CAUSALITY FACTORS	RESPONDENT CAUSALITY WEIGHTINGS (%)		
	AKIIRA BUSINESS DEVELOPER RESPONSE	AKIIRA PROJECT DEVELOPER RESPONSE	AKIIRA AVERAGE OF RESPONSES
<b>POLICIES</b>			
<i>Policy overall</i>	<b>100</b>	<b>100</b>	<b>100</b>
Target policy	75	50	63
Public private partnership policies (PPP framework)	25	50	38
Tax incentives	50	75	63
2010 National Climate Change Response Strategy (NCCRS)	0	0	0
2013 Climate Change Action Plan (CCAP)	50	50	50
2008 Vision Plan	75	75	75
Feed-in-tariffs (FiTs)	25	75	50
Least Cost Power Development Plan (LCPDP)	75	0	38
<b>Policies identified by respondents</b>			
Policy for Government of Kenya (GoK) issue of GoK letter of support <sup>a</sup>	N/R	100	100
<b>PUBLIC PROJECT-LEVEL COFINANCE</b>			
International	75	75	75
Domestic	N/R	N/R	N/R
<b>Public finance instruments identified by stakeholders</b>			
Grants	75	N/R	75

Table 12 | **Kenyan Causality Factors and Mobilization (cont.)**

CAUSALITY FACTORS	RESPONDENT CAUSALITY WEIGHTINGS (%)		
	AKIIRA BUSINESS DEVELOPER RESPONSE	AKIIRA PROJECT DEVELOPER RESPONSE	AKIIRA AVERAGE OF RESPONSES
<b>OTHER ENABLING FACTORS</b>			
Macroeconomic factors	75	100	88
Declining technology costs	25	75	50
Success of previous geothermal projects	75	100	88
Establishment of the Geothermal Development Company (GDC)	0	0	0
<b>Factors identified by respondents</b>			
Legal know-how	100	N/R	100
Drilling technology	75	N/R	75
Geoscience analytical capacity	100	N/R	100
Community support	N/R	100	100
Water availability	N/R	100	100
Existing infrastructure	N/R	100	100

*Notes:*

<sup>a</sup> Due to the late and staggered response times, this policy was not included in the investment map.

N/R (no response) indicates that the stakeholder did not address this issue (e.g., they did not list an "other enabling factor" that a different stakeholder did) or the factor was not relevant to them (e.g., if there was no domestic finance contributed to the project we write in N/R instead of 0 for mobilization). This methodology does not assign a weighting of zero to N/R.

Two stakeholder responses per project.

Source: Surveys administered by WRI; see Annex B for details.

stated that the rise of geothermal energy in Kenya is not driven by climate policies. Nevertheless, this respondent weighted the 2013 Climate Change Action Plan (CCAP) as somewhat important, believing in its usefulness to push future public policy toward geothermal energy not because of cost but rather because of the need to reduce greenhouse gas (GHG) emissions.

The responses from stakeholders were generally in alignment; however, there were three instances in which the weights for the causality factors differed by more than one scale increment. First, the feed-in-tariff (FiT) policy received weightings of 25 and 75 percent; the stakeholder who assigned the weighting of 25 percent declared that

FiTs were not relevant to the project because it was above the MW limit and therefore ineligible for the FiT. Despite this ineligibility, however, neither person assigned a value of zero to the policy. Market signals, an issue discussed in Annex F, may explain these nonzero values if the stakeholders saw the establishment of geothermal FiTs as a strong or modest market signal, despite its irrelevance to their specific project. The reasoning behind the vast difference between the Least Cost Power Development Plan (LCPDP) weightings is unclear. One respondent indicated that the 75 percent weighting reflected the policy's support of long-term predictability because the plan states that geothermal will likely be dispatched in the future, which could lead to larger revenue gains. The final major weight-

ing discrepancy was for declining technology costs, which were rated at 75 and 25 percent causality. According to the survey respondents, the higher rating was given due to the advanced drilling techniques that lead to faster drill times, while the lower rating was assigned because geothermal energy is already a mature technology, and the respondent felt that, currently, there is little room for improvement.

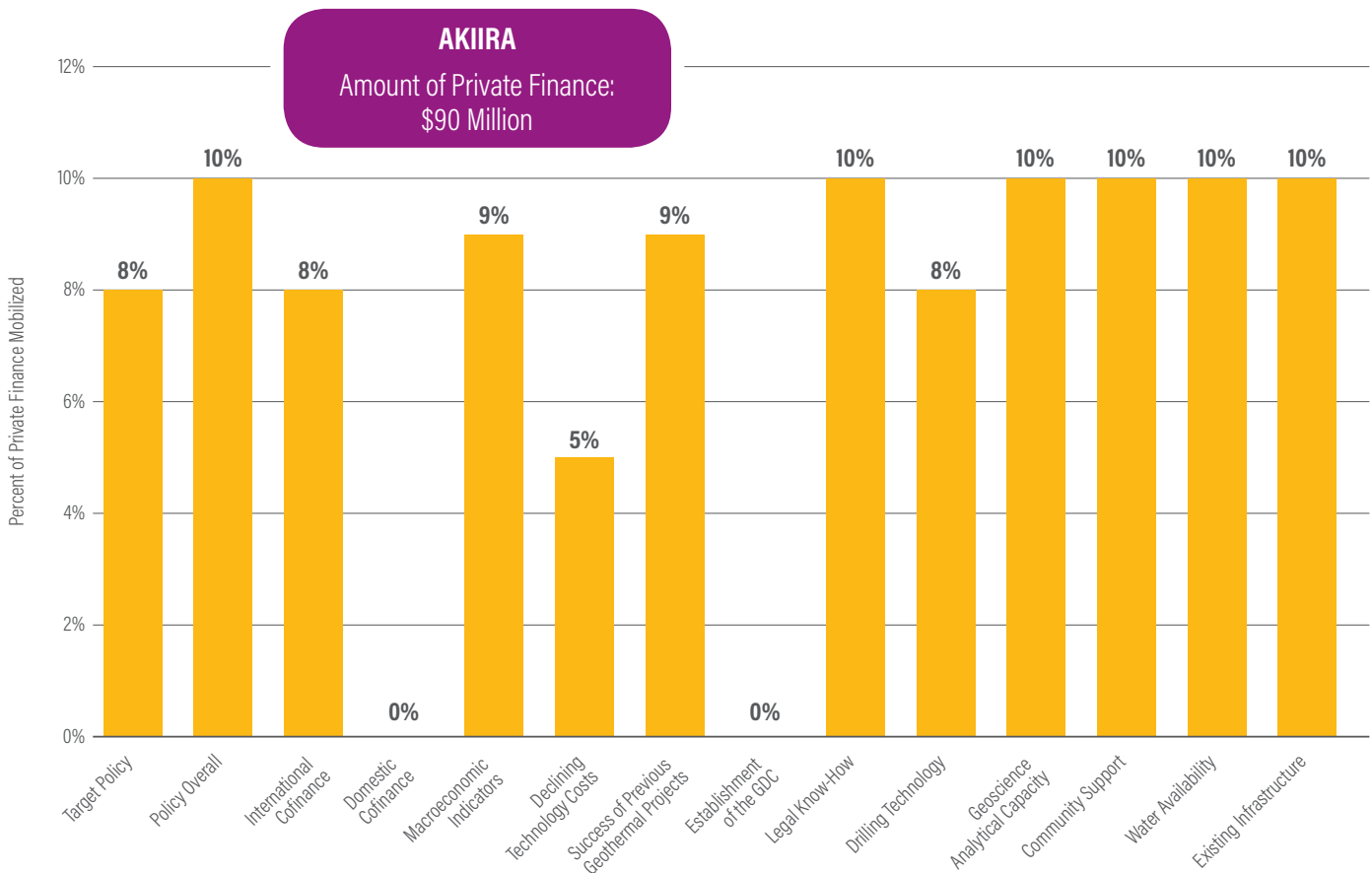
Macroeconomic factors and the success of previous geothermal projects had equal mobilization scores of 9 percent. Macroeconomic conditions identified by one respondent included favorable inflation and exchange rates. The respondent mentioned that economic stability and energy development are linked and necessary to private sector investment. The stakeholder also mentioned that understanding long-term stability is important because the PPA lasts 25 years. This person saw continued

economic expansion and industrial growth as robust macroeconomic signs. The other stakeholder cited government support and political stability. Survey comments indicated that the past success of geothermal projects was important because it reduced risk by decreasing entry costs for labor, services, and equipment. Past successes also provide a benchmark against which companies can measure their performance.

The lack of importance assigned to the Geothermal Development Company (GDC) was surprising; however, this was only one project’s experience.

One stakeholder mentioned issues that need to be addressed to further the geothermal sector’s expansion in Kenya. These include an increased focus on transmission and distribution. Support should also be allocated to

Figure 14 | **Akiira Mobilization**



Note: Policy overall is inclusive of the target policy. The sum of policy overall, international and domestic finance, and “other enabling factors” may not add to 100 percent due to rounding.

Source: WRI.

more administrative issues, such as enlisting the use of engineering consultants, drilling service providers, and financial and legal structuring entities.

In general, many factors, including policy and international finance, were very important, with mobilization factors of 8–10 percent.

Table 13 shows the average of the government survey responses. Kenya had a larger number of linkages than Uruguay, but as with that country, the linkages from the target policy to its descendant policies were weighted very high (greater than or equal to 50 percent), as were the linkages between the other policies on the map.

Table 14 demonstrates that attribution of the target policy tipped in favor of international donors, with a 60/40 split. Overall, government support mobilized 3 percent of private finance into the Akiira project, and international support mobilized 4 percent, with each donor equally mobilizing

Table 13 | Kenyan Policy Influence on Descendant Policies

POLICY LINKAGES	AVERAGE INFLUENCE OF PAST POLICIES ON DESCENDANT POLICIES (%)
Target policy → LCPDP	88
Target policy → 2013 CCAP	63
Target policy → NCCRS	75
Target policy → Tax incentives	63
2008 Vision Plan → NCCRS	75
2008 Vision Plan → LCPDP	75
2008 Vision Plan → CCAP	75
LCPDP → Tax incentives	100
2010 NCCRS → CCAP	100
Target policy → PPP framework	50
Target policy → FiTs	63
Target policy → 2008 Vision Plan	50

Note: Two stakeholder responses per project.

Source: Surveys administered by WRI.

Table 14 | Kenyan Donors: Attribution and Mobilization

DONOR ENTITY	ATTRIBUTION OF TARGET POLICY SUPPORT (%)	MOBILIZATION OF PRIVATE FINANCE BY DONOR (%)
Local government support	40	3
<b>INTERNATIONAL DONOR SUPPORT</b>		
International Development Association (IDA)—World Bank	15	1
Nordic Development Fund (NDF)	15	1
European Investment Bank (EIB)	15	1
Agence Française de Développement (AFD)	15	1
<b>Total international donor support</b>	<b>60</b>	<b>4</b>

Source: WRI.

1 percent. These percentages are lower because the donor intervention only mobilized 8 percent of private finance. As mentioned earlier, this lower number is expected because there are a greater number of causal factors.

## 7. DISCUSSION

This section details key takeaways from the study and summarizes the methodology limitations and lessons learned from developing our approach to estimating mobilization and attribution from public interventions. The organization of this section is divided into initial insights, survey limitations, calculation considerations, data constraints, and a discussion of alternatives to our bottom-up survey approach. The section concludes with an evaluation of the methodology against our three assessment criteria.

### Initial High-Level Insights

These insights are based on a limited sample size and should be viewed as preliminary or initial for these countries. We hope that future applications of this methodology will further test these findings.

#### A. Policy is effective in mobilizing private investment.

When compared to all other causal factors, policy overall was always one of the top drivers of mobilization. Additionally, the importance of a supportive policy environment is evident in projects with and without public cofinance

(see Figure 15). In projects that received public finance, overall policy and public cofinance mobilized comparable amounts of private finance, although policy was slightly more effective in a couple of projects. For projects in Kenya and Uruguay, the target policy was effective in mobilizing private finance. As discussed, we expected the low target policy mobilization of Brazil because the investment map did not include any descendant policies.

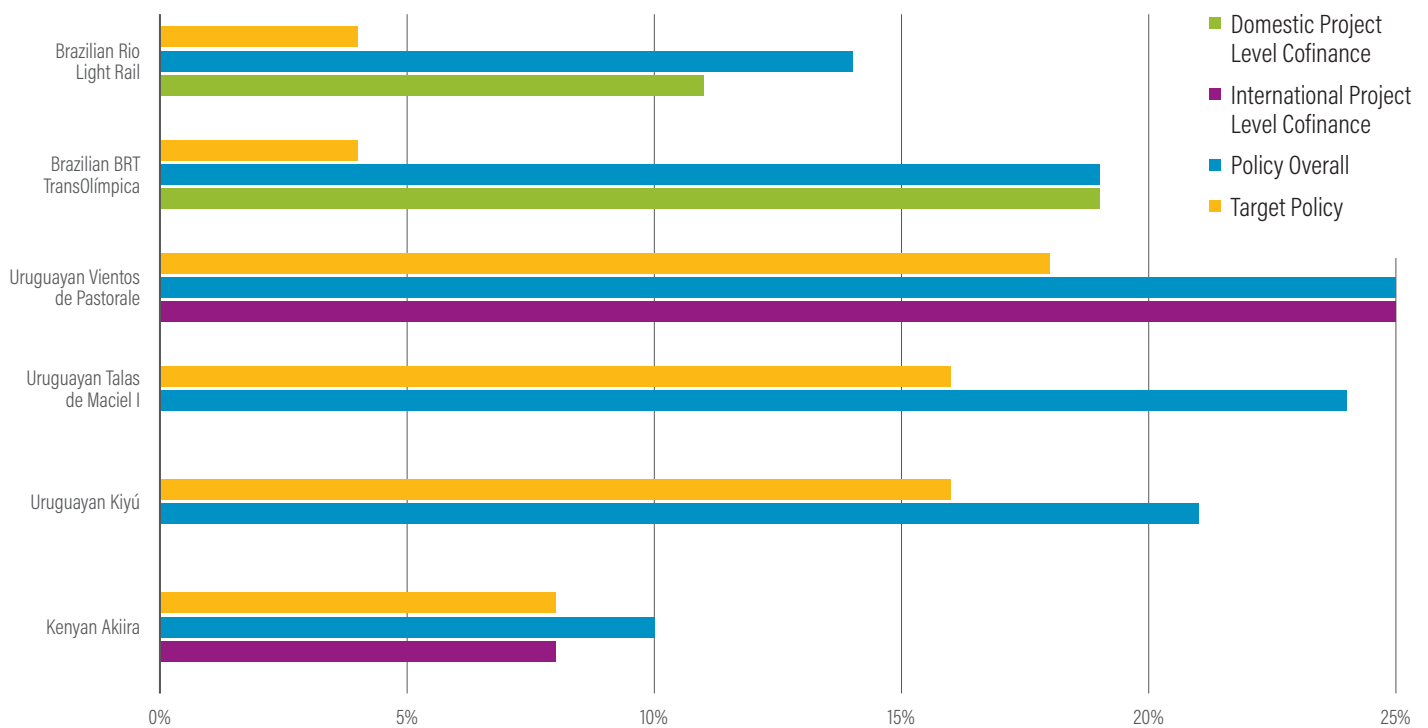
**B. Policies that are not necessarily climate-specific can mobilize significant amounts of private climate finance.**

Climate does not have to be a motivating factor for investment to occur in low-emission, climate-resilient projects. For example, the target policy in Brazil is not a climate-specific law, yet it played a significant role in channeling large amounts of private investment in sustainable urban transport. Moreover, we asked the private sector about investment

motivations and, in the case of the BRT, they said that the urban mobility and climate change policies were not a strong motivating factor for project development. Additionally, based on the project document, it appears that the Inter-American Development Bank (IDB) instigated the PPP policy structuring not for climate change reasons but rather for ones of development and economic growth.

In Kenya, while the target policy was climate-relevant, the private investment in the geothermal project predominately resulted from economic reasons, private respondents cited the 2008 Vision Plan, an economic plan that predominately sought to increase use of fossil fuels. In fact, as mentioned earlier, the climate change policies had little to no importance in direct investment decisions; however, according to one stakeholder, they did contribute to the overall enabling environment for geothermal investment.

Figure 15 | Percentage of Private Finance Mobilized by Policy and Finance



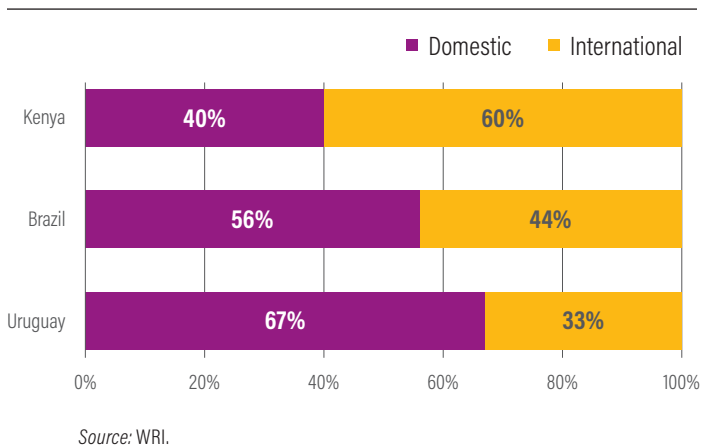
*Note:* This graphic is not inclusive of all the causal factors we analyzed; it only shows mobilization from the finance and policy interventions. "Policy Overall" includes the target policy. Additionally, this summary graphic must be taken in context. The Kiyú project had no associated project-level cofinance, while the Talas de Maciel and Vientos de Pastoreale wind farms had no domestic finance. The BRT TransOlimpica project had no finance from international actors. The Akiira geothermal project had no contributed domestic finance.

Source: WRI.

### C. Domestic and international actors are needed to mobilize private capital.

Our results (Figure 10) indicate that both domestic and international support for policy development are important. For Kenya's target policy, 60 percent of the mobilized private capital was attributed to international support, while 40 percent was attributed to government support; this is despite our decision to only survey government stakeholders and not donor institutions. In contrast, Uruguayan respondents said that only 33 percent of the target policy development was attributed to international donors. Uruguay, however, is more developed than the other two countries; in fact, it is currently eligible for graduation from the OECD-DAC list in 2017, and thus it follows that it would need less international support than the other countries. Brazil weighted domestic and international support fairly equally with an attribution split of 56 percent/44 percent in favor of domestic support.

Figure 16 | Attribution of Donor Support for the Target Policy



### Survey Limitations

#### D. Generalizations within country sectors or across countries are difficult, due to the moderate number of responses and slow survey response time.

As shown in the results section, we calculate the mobilization percentages of the causal factors at the individual project level. Due to our limited sample size of six projects, which resulted from a lower than anticipated survey response, we cannot estimate how the target policy, and other causal factors, affected mobilization at the sector level for each country. However, we do draw some prelim-

inary or initial project-level insights that may be relevant to the sector level, and we hope that further applications of this methodology can test the validity of these insights with deep dives into the specific countries; this will also help us better understand the intricacies of these sectors.

The response rate for each project was low, which makes us more cautious about generalizing within a country. With the exception of one project, we only received one private sector response per project, not three, as anticipated. Potential reasons for this vary. In Brazil, project delays due to the current political environment most likely contributed to a low survey response rate; in fact, the political situation was the reason why one project foundered at the last minute. In Kenya, the geothermal process takes a very long time, and it is possible that we requested survey completion during an inopportune or "down" time of the project. The total number of surveys incorporated in our analysis was therefore much lower than planned. Response time from stakeholders was also slow, and this led to longer data collection times.

One way to address this issue is to focus on more established sectors, with many projects, that have readily available data in comprehensive databases. For example, it was difficult to find a comprehensive urban transport database. Projects with shorter time frames would alleviate the issues encountered in Kenya. Generally, these sectors that fit the aforementioned criteria would include solar and wind. Additionally, countries in a current state of political instability, such as Brazil, should be avoided if they are receiving high amounts of domestic financing. Ultimately, there is a depth versus breadth conflict; analyzing multiple countries comes at the expense of thoroughly understanding mobilization within one country.

Lastly, as mentioned, we carefully selected stakeholders to ensure we had knowledgeable survey participants; however, our surveys were often forwarded to other people for completion.

#### E. Double counting and omitted "other enabling factors" are a concern.

Double counting (i.e., counting the effect of a causal factor more than once) was a risk due to the qualitative nature of the questions. Phrasing our questions in a way that ensured that answers were completely unique was not possible. For example, the Uruguayan surveys asked about macroeconomic factors and political stability, which can have overlapping components depending on how the



respondent interprets the question. Nevertheless, because political stability was potentially a significant factor for mobilization, its inclusion as an enabling factor was necessary. In this case, double counting would lead to a reduction in the mobilization percentages of the other causal factors, including the target policy, because we would be normalizing against a larger factor.

Although respondents could, and did, offer additional enabling factors, each person's responses are likely influenced by the set that was provided in the survey, so omitted variable bias is a concern.

#### F. Interviewing international donors was outside of the scope of this study.

As discussed, there are bias considerations to account for when interpreting survey responses. We did not include interviews with international donors because we felt that their responses would be more biased than those of the government stakeholders. International donors might have inflated the importance of their contributions to policy development. Governments, in contrast, may not overweight their role in developing the policy because they want to incentivize future international donor support. However, governments will still want credit for their contributions to the target policy, thus the risk of the government vastly overstating the support of international donors is only minimized.

### Calculation Considerations

#### G. Mobilization results vary depending upon our calculation assumptions.

For example, decisions on how those qualitative responses translate into quantitative numbers have a large impact on the mobilization calculations. We decided to convert each response into one value instead of a range (e.g., instead of using zero as the lower bound we could have used 0–20 percent). We considered that the target policy itself and its descendant policies had a causal, additive impact; one could have made other decisions, such as assuming the impact to be multiplicative. We decided to normalize the target policy with regard to all policies, and to treat policy overall, not each individual policy, as a separate causal factor on par with other factors, such as public finance and political stability. Likewise, we could have averaged the causal weightings for “other enabling factors.” Ultimately, many upstream decisions regarding the calculations had repercussions for the estimations. There will always be arbitrary decisions on how causation and attribution are

calculated when using a qualitative survey approach like this. Nevertheless, we have attempted to be very transparent about our calculation decisions.

#### H. Donor mobilization estimates are low, but this is an intuitive result due to our normalizations against multiple factors.

Estimates of target policy mobilization from our case studies were low because we normalized against multiple factors; as discussed, when more factors are incorporated, the relative contribution of any one factor, including the target policy, decreases. When we attributed a percentage of this mobilization across actors, the estimate for donor mobilization was even lower.

#### I. The amount of time allowed for a cascading effect can impact mobilization percentages.

As illustrated by the Brazilian case study, the effect of descendant policies in increasing the amount of finance mobilized by the target policy is very important. The Brazilian projects had lower mobilization percentages because the target policy did not have any descendant policies. This occurred because the cutoff date of when we took the snapshot of mobilization was closer to the implementation of the target policy than with the other projects. We initially established a consistent cutoff date because we were anticipating a sector-wide scale-up for each country; however, there are many difficulties in doing this (see Point B in Section 8). An alternative to this approach would be to dispense with the common cutoff year for all case studies, and instead the cutoff year could be five years after the passage of the target policy.

### Data Constraints

#### J. Data availability and reliability were unsurprising challenges. Further efforts in systematic tracking and reporting of finance can help ease many of these challenges.

Despite data availability being one of our case study criteria, data availability problems were not unexpected as this is a common challenge in the testing of most mobilization methodologies. Overall, the absence of sources that provided standardized data complicated our analysis because qualifications and modifications were necessary to ensure comparability. Low data availability, for example, limited our ability to collect accurate project financing data in a timely manner, and it further restricted which projects we could include in the investment maps. We were only able

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to locate donor support for one policy (the target policy) because it was not feasible to find data on donor support for every relevant policy in the country. Identifying just one policy that had donor support was time-consuming.

Financing structures of infrastructure projects were also difficult to determine; not only was there a lack of data, there were also conflicting data. Many issues could be responsible for these discrepancies, such as rounding or reporting year errors; this is relevant because 2012 will have different reported numbers than 2013 for the same projects. Additionally, the year in which the translation of currencies to US\$ occurs will determine the conversion rate. Moreover, different reporting entities use varying classifications; for example, the Institute for Transportation and Development Policy (ITDP) in Brazil does not provide a transaction breakdown, reporting instead the type of entity responsible for the transaction.

To avoid accounting issues related to these discrepancies, within one project's financing structure we sought to use the same source, unless the actual financier listed a discrepant value for a transaction from the source we were using. The most accurate commitment data came from the actual financier; however, the private sector is often reluctant to release this information. Databases composed the next level of accuracy because they generally have a systematic accounting or reporting method that reduces the risk of double counting, which can happen if one combines multiple sources within one project. Ideally, the use of one database for all projects across the case studies would lead to a higher accuracy that would allow for easier generalizations. Unfortunately, the databases were not always comprehensive or up to date, and the majority of the information provided was for more developed countries. News articles also house data; however, we tried to limit our use of news sources unless the article quoted an investor or project developer. When there were multiple relevant sources, we tried to use the financing structure most commonly cited.

Data availability and reliability are closely aligned with tracking; if the latter increases, then the former will also increase. Better systematic tracking will decrease data collection times for donor-supported policies and financing structures of projects and increase the comparability of data by reducing the number of sources, which often provide potentially conflicting information. This in turn will lead to more confident estimates of the amount of private finance mobilized from public interventions.

## K. Investment mapping complexity precluded including every possible causal factor.

Practical issues prevented us from mapping every single factor that could have influenced private investment, because data collection is very time-intensive. As we mentioned, mapping a smaller amount of causal factors, including policies, could have led to overestimates of mobilization percentages for the target policy and other causal factors, due to division by a smaller number. However, we did ask the interviewees to add any mobilization factors they deemed important, and respondents took advantage of this option.

## Alternatives to a Bottom-up Survey Approach

We have explored a bottom-up, case studies approach to estimating causality and attribution through surveys. There are alternative approaches to estimating the importance of policy. One could conduct an econometric analysis, exploring how various independent variables such as policy can affect private finance mobilization. This top-down approach would have the advantage of utilizing large datasets on private sector climate finance across countries, and it is possible that assembling the datasets and doing the statistical analyses would be less time-intensive than conducting surveys. However, this approach would only be correlative in nature. An alternative survey approach would be to conduct a large survey of private sector actors on the importance of policy versus other factors, such as cofinance, to their investment decisions in general and not attempt to calculate causality. Ultimately, it is hard to imagine a way to merge top-down and bottom-up, case studies approaches for evaluating the indirect effects of causal factors such as policies.

## Methodology Evaluation

As we noted, our goal has been to test a credible methodology to account for mobilized private finance for the purposes of climate finance tracking, and not to provide an academically rigorous way to attribute causality to specific policy reforms or to assess which policies best mobilize private climate finance. Nevertheless, it is important to evaluate the methodology against the three assessment criteria found in Figure 1 to assess the methodology's robustness and usefulness. This section provides such an assessment. It evaluates our methodology and case study results, from our application of the methodology, against the established assessment criteria.

Trade-offs exist among these criteria. For example, we traded accuracy in favor of feasibility because we constrained the analysis scope (e.g., we did not include public interventions such as capacity building), which created a less comprehensive picture. Additionally, retrieving financing structure numbers directly from the project stakeholders would have been more accurate than using secondary public data. However, there are time and difficulty costs in contacting people about this information, which is often proprietary. There are other, similar trade-offs.

Largely, low data availability affects these criteria; however, the OECD Research Collaborative on Tracking Private Climate Finance is currently working to enhance tracking and reporting efforts. If these efforts are fruitful, the results from this methodology will be more accurate, and the methodology itself will become more feasible. Specifically, databases that track financing provided to policy development and projects would allow for an easier identification process for the target policy and mapped projects (which, as mentioned, were very time-intensive components of this methodology). A simplified data collection process would allow for the inclusion of more projects.

## Summary of Methodology Evaluation

### Feasibility

#### DEFINITION:

- Is the methodology practical with current data availability?
- Is the methodology time- and cost-efficient (i.e., are utilized data low-cost or is labor-time manageable?)

#### ASSESSMENT:

*Methodology:* The methodology is time-intensive and consequently not very cost-efficient. Free, publicly available data, however, largely underpins this methodology. These data, nevertheless, take time to compile, which increases the labor hours needed.

Regarding feasibility, some applications of this methodology are less time-intensive than others. For example, this methodology will be more time-efficient if there are centralized databases or sources for the policies, which often exist for the renewable energy sectors. In a similar vein, this methodology is more applicable in countries with a larger selection of projects; this ensures the availability of other projects if survey stakeholders do not respond. Gathering a sufficient number of stakeholders takes a lot of time, because one must find projects that have financ-

ing information, and stakeholders can have slow response times. If they do not respond, one has to select new projects. While there was no visible systematic difference between those that responded to the survey versus those that did not, Point D discusses the reasons why certain case studies had a lower response rate. As mentioned, having a comprehensive database of projects would greatly streamline this process.

### Standardization Potential

#### DEFINITION:

- Are the methodology and results applicable to multiple countries and sectors?
- Can you aggregate the results within a case study and compare them to other case studies?

#### ASSESSMENT

*Results from our case studies:* A weak survey response rate prohibited us from drawing generalizations and limited the comparability of our results across and within country case studies.

*Methodology:* Provided there are sufficient data (e.g., policy databases and information on project financing for a large pool of projects), this methodology is applicable in all countries and sectors. Middle-income developing countries, however, are likely to have higher data availability. As explained, this methodology is more applicable in certain sectors (e.g., wind, solar) than others (e.g., adaptation and to a lesser extent transport and geothermal). It is also more applicable in certain countries (Point D).

Note that while one can standardize how one applies the methodology, the resultant investment maps likely cannot be standardized when comparing different countries, due to the variability in policy structures and the broader enabling environments. If one were to standardize these maps, this could result in a less accurate representation of the individual case studies.

### Accuracy

#### DEFINITION:

- Do the methodology and results reflect reality comprehensively?
- Do they avoid double counting?

## ASSESSMENT:

*Results from our case studies:* While the results did provide initial insights for understanding mobilization, overall, the mobilization numbers would have been more accurate and representative with a stronger survey response. As mentioned in our case study criteria, this would entail at least three projects per country and three responses per project. Unfortunately, we found three responses per project to be an overly ambitious target, and two responses per project to be more attainable, although less robust. Additionally, financial data for projects were difficult to confirm (Point J).

*Methodology:* The methodology strives to reflect reality in a thorough manner by including many causal factors. However, in this application of the method, because our analysis scope is limited, we do not consider all factors; nevertheless, the scope could be expanded in future applications of this methodology. This survey approach is inherently subjective, so it is not possible to make a truly objective assessment of causality or attribution.

Additionally, we made certain judgments that affected how we calculated mobilization (Point G). Depending on one's views, these decisions could affect accuracy. Due to the qualitative nature of the survey questions, the possibility of double counting exists, and it affects both the methodology and the results (Point E).

## 8. RECOMMENDATIONS FOR GOING FORWARD

Despite the survey limitations, calculation issues, and the lack of data, we think there is merit in further exploring and elaborating this survey-based approach to calculating mobilization. Therefore, we offer the following recommendations going forward.

### A. Further expansions of this methodology could incorporate accounting for capacity building and technical assistance provided to a project.

As mentioned, the scope of analysis in this methodology was such that we focused on policy interventions. While the investment map complexity would greatly increase with incorporation of these other indirect interventions, a deep-dive application in one country of such an expanded methodology could be feasible.

### B. Explore the possibility of expanding this methodology to estimate country-level sector mobilization.

In the future, one could adapt this methodology to make an aggregated estimate of mobilization at the sector level for a country. This would entail the following actions:

- *Including a larger, more representative sample of projects.* Because of issues with survey responses, it would be difficult to select a statistically rigorous sample of projects within a country. However, we suggest that at least 10–20 percent of projects within a sector be sampled. It will be important to make sure that there are no strong biases in terms of geographic location, project phase (e.g., early-stage projects, expansions, and operational phases of projects), or financing structure. For example, India sets policies at the subnational level; therefore, incorporating projects and policies from various states is imperative for understanding national mobilization trends. Given the issues with data, it will be easier to estimate mobilization for certain sectors, such as renewable energy.
- *Revisiting the policy and project-selection criteria to ascertain whether they exclude policies and projects that could have a significant impact on the mobilization calculation.*
- *Collecting enough finance data to confidently estimate the amount of mobilization, not just the effect, at the sector level for a country.* For example, determine the exact financing structures of projects through direct primary sources (e.g., the actual financier) instead of secondary ones. This would also involve obtaining national-level investment data for private finance and understanding the underlying assumptions.
- *Surveying a larger sample of private and government stakeholders;* however, stakeholders would still vary in their familiarity with the project, tenure, and seniority.
- *Deciding how to aggregate the project-level mobilization estimates.* For example, one could treat all projects the same; that is, calculate the percentage of private sector finance mobilized for a certain causal factor (e.g., target policy) for each project, average this across all the projects, and use this to calculate total mobilization for the sector. Alternatively, one could weight the percentage of private sector finance mobilized by the total investment size. Other approaches

are possible, including analyzing the distribution of the mobilization values (percent finance mobilized) across projects and using the value at a specific point in the distribution. This would allow for more-liberal or conservative estimates. We do not advocate any specific approach, but one should be transparent about the approach adopted.

- *Understanding the significance of causality weightings for policies other than the target policy.* Based on our survey approach, we can understand information about other policies on the investment map. However, one has to interpret these causality weightings differently when doing a sector-wide scale-up. When analyzing the relevance of policies that are not the target policy, the policies eligible for overall sector mobilization will vary, depending on the investment date for the project. If the project investment date takes place before the policy in question, the stakeholder might weight the policy a factor other than zero. This can occur due to an incorrect investment date, which can happen when relying on public data, or when investors hedge their bets that the policy will pass and invest accordingly. However, if the policy is weighted zero, we do not assume it was irrelevant to overall sector mobilization, because it was not eligible to begin with (i.e., the policy was not in effect when the project came into being). Nevertheless, if a policy before the investment date is rated as zero and then a later policy is rated as three, we know that the first policy is not relevant to overall sector mobilization.

### C. Include projects with unconventional financing structures.

As mentioned, we were unable to incorporate projects with unconventional financing structures (e.g., projects financed through IPOs) into our case studies; however, institutional investors hold some of the largest pools of capital for future sustainable projects. Encouraging investment by these institutional investors will be essential for the larger transition to a low-carbon, climate-resilient economy.

### D. Expand into adaptation.

There is a strong possibility that policy and “other enabling factors” will have a different mobilization effect on adaptation projects versus those of mitigation. As noted, data difficulty limited the number of projects from which we could choose for our case studies; this problem will be further compounded for adaptation projects as the

subset of these projects with demonstrable private finance is smaller.

### E. Increase robustness of survey weightings by complementing them with weightings from stakeholders of differing viewpoints.

As mentioned, interviewing donors can provide a more nuanced perspective, but one must be careful to consider biases. To strengthen the government influence weightings that determine how prior policies influenced latter policies, the survey could expand to include responses from legal scholars, political scientists, bilateral agencies in the country, and civil society. Private sector responses, from those who were directly involved in the project, could be complemented with perspectives from private sector analysts, other private sector participants who are investing in similar projects in the same sector, and the general counsels.

### F. Supplement survey responses with more-in-depth interviews.

As mentioned, we found very insightful information in the comments section of the survey. Consequently, it is worthwhile to have thorough conversations with survey participants to understand more of the nuances involved.

## 9. CONCLUSION

**We conclude that this proposed methodology provides an improved understanding of the indirect effects on mobilizing private climate finance, but that the method is not without its limitations and needs to be further tested and elaborated.**

Future applications of this methodology need to account for these limitations accordingly; nevertheless, this methodology provides a solid foundation, and it substantially advances the discussion on how to measure and demonstrate the effect of policy and other causal factors on mobilization.

We need further refinement to estimate a more accurate amount of mobilized finance. As noted, there are many challenges, some of which are more difficult to address, such as the uncertainty in the financing structures due to sourcing from secondhand public data and double counting. In addition to improved data availability, one way to increase accuracy would be to target countries and sectors that lend themselves to strong survey response rates.

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Nevertheless, our results do demonstrate the imperative-ness of policy for increased private finance mobilization.

Staying on the pathway of a 1.5 or 2.0°C scenario will require private sector investments in low-carbon and climate-resilient infrastructure. Public interventions, such as international and domestic support for policy actors, will be imperative in incentivizing the requisite private investment. Methodologies such as these, moreover, will be necessary to track the successes or failures of these interventions in order to create and sustain progress toward a more sustainable low-carbon future.

## ANNEX A: PARTIAL CAUSALITY CALCULATIONS

This section explains our mobilization and attribution calculations in mathematical notation. The full reasoning for each step is explained in section 5.4.1.

### Causality

The causal link between policy  $i$  and private investment,  $p$ , is

$$C_{i,p} \text{ where } \forall C \in \{0,0.25,0.5,0.75,1\}$$

The value of the causal link,  $C_{i,p}$ , is determined from a survey and is scored from 0–4 (0 percent to 100 percent enabling) (below).

CODING KEY	
SURVEY ANSWERS	CAUSALITY WEIGHTING
0: Not important	0
1: Slightly important	25
2: Somewhat important	50
3: Very important	75
4: It was absolutely necessary (i.e., I would not have invested without this factor in place)	100

If a policy under consideration leads to  $n$  descendant policies in the causal chain, then the calculation becomes

$$C_{i,p} = C_{i,j} * \prod_{j=1}^n C_{j,j+1} * C_{n,p} + \hat{C}_{i,p}$$

We consider the impact of the target policy to be additive. Thus,  $\hat{C}_{i,p}$  reflects the fact that the policy itself may have had a causal impact on the private finance, besides its impact on its descendant policies. For this calculation, only the descendant policies of the *target policy* are considered.

We normalize the scores for the target policy with respect to all other policies:

$$C'_{i,p} = \frac{C_{i,p}}{C_{i,p} + \sum_{k=1}^m C_{k,p}}$$

Where  $C_{k,p}$  is the causality link of each policy  $k$  that is not part of the target policy causality chain.

Moreover, for each project, the private interviewee is surveyed on the impact of various causal factors, not just the target policy; namely, overall policy, public finance, and “other enabling factors” (e.g., fossil fuel reserves, constitutional changes, macroeconomic factors). The weighting of each causal factor  $R_x$  is also scored from 0–4 (0–100 percent). We surveyed the private sector actors about the causality of policy overall, because in some cases they may not be able to identify and disentangle the impacts of specific policies.

If the sum of all the causal factors (e.g., overall policy, public finance, and “other enabling factors”) exceeds 100 percent, the causality weightings of these causal factors,  $R_x$ , needs to be normalized by the weighting of  $y$  total causal factors:

$$R'_z = \frac{R_z}{\sum_{x=1}^y R_x}, \text{ if } \sum_{x=1}^y R_x > 100\%, \text{ else } R'_z = R_x$$

The causal weighting of the target policy cannot exceed the causality of policy overall, because policy overall is inclusive of the target policy. Thus, the final adjusted causality of the target policy is,

$$C''_{i,p} = C'_{i,p} * R'_w$$

where  $R'_w$  is the causality of policy overall.

### Attribution

In order to estimate the amount of finance by donor,  $d$ , we need to combine the causality assessment with an assessment of attribution. The attribution of donor  $d$  to target policy  $i$  is  $A_{d,i}$ , determined by surveys of the government actors (using the same scale above). If the sum of the attribution weightings exceeds 100 percent, we normalize as above. The result is the normalized attribution of donor  $d$  to target policy  $i$  is  $A'_{d,i}$ .

Finally, the total share of private finance  $P$  for project  $p$  mobilized by donor  $d$  through the development of the target policy is

$$P_{d,i,p} = P_p * A'_{d,i} * C''_{i,p}$$

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## ANNEX B: SURVEY PROTOCOL

We distributed online surveys through Google forms. To make answers as comparable as possible, we did not conduct phone interviews because asking questions in a standardized manner is more difficult when conversing. Additionally, since two of our case studies were in countries where English is not the primary language, we had to translate those surveys into Spanish and Portuguese, and doing phone interviews in those languages would have been difficult. Refer to Table 15 for a list of the private and government stakeholders.

The following information is the text included for the Kenyan Akiira project survey.

*Overall Purpose of Survey:* The Organisation for Economic Co-operation and Development (OECD) and the World Resources Institute (WRI) are conducting a study on the mobilization of private sector climate finance into low-carbon, climate-friendly projects. Private sector investment is crucial to the development of such projects and your insights would greatly contribute to informing decision makers on creating a more robust enabling environment for future investments into the Kenyan geothermal sector.

*Instructions:* The following questions will ask you to weight the importance of various factors on your decision to invest in the Akiira geothermal project, on a scale of 0–4. You may assign a weighting factor of four to all factors if you feel they were all critical to your investment decision.

*Sample Question:* How important was domestic public finance, directly contributed to your project, to your investment decision?

- 0: not important
- 1: slightly important
- 2: somewhat important
- 3: very important
- 4: it was absolutely critical (i.e., I would not have invested without domestic public finance)
- I do not know
- I do not have an opinion

Comments? (Here, respondents were able to note any thoughts regarding their weighting selection.)

We asked a similar question for policy overall, international finance, and the “other enabling factors” included on that country’s investment map. When we asked about macroeconomic conditions, we requested that the stakeholders list the specific conditions. We also asked them to list any public financial instruments that were influential and assign a weighting of 1–4. The next page of the survey asked questions about specific policies. As we were unsure whether investors would be able to recall specific policies, we had previously asked them to weight the importance in policy in general. The following text shows the instructions provided in the survey as well as a sample policy question.

### Policy Questions

The following questions will ask you to weight the importance of a policy, IN RELATION TO OTHER KENYAN POLICIES, to your investment decision. You may provide the same weighting for different policies.

Overall, how important were the (2008, 2010 & 2012) Feed-in-Tariffs (FiTs) to your investment decision?

- 0: not important
- 1: slightly important
- 2: somewhat important
- 3: very important
- 4: absolutely critical (i.e., I would not have invested without this policy in place)
- I do not know
- I do not have an opinion

Comments?

Before we sent out the finalized survey, we asked experts knowledgeable about the country (e.g., someone familiar with the Kenyan energy sector) to offer any suggestions that would make the survey more robust. Following this consultation, we decided to provide brief high-level descriptions of policies in the event that a certain policy was relevant to an investor who could not recall the policy by name. An example of such a question is below.

How important was the Least Cost Power Development Plan (LCPDP) to your investment decision? This is a long-term energy plan, updated yearly, that forecasts future generation. It established geothermal targets and determined geothermal to be the least-cost technology choice for energy generation.



Table 15 | **Surveyed Stakeholders**

PRIVATE STAKEHOLDERS		GOVERNMENT STAKEHOLDERS	
<b>BRAZIL</b>		<b>BRAZIL</b>	
<i>Project</i>	<i>Respondent</i>	<i>Organization</i>	<i>Respondent</i>
Rio Light Rail	Augusto Schein, Director of Operations	National Secretary of Transportation and Urban Mobility (SeMoB)	Anonymous
BRT TransOímpica	Leonardo C. Vianna, Director of New Business Development at CCR	Ministry of Transport	João Ricardo Torres Behr, Civil Engineer Analyst
<b>URUGUAY</b>		<b>URUGUAY</b>	
<i>Project</i>	<i>Respondent</i>	<i>Organization</i>	<i>Respondent</i>
Vientos de Pastorage	Rosa Tarragó, Head of Structured Finance	DNE/MIEM	Wilson Sierra
Kiyú	Project Developer from Bow Power	Ministry of Economy and Finance	Antonio Juambeltz
Talas de Maciel I	Anonymous	<b>KENYA</b>	
<b>KENYA</b>		<i>Organization</i>	<i>Respondent</i>
<i>Project</i>	<i>Respondent</i>	Energy Regulatory Commission (ERC)	Anonymous
Akiira (Response 1)	Robert Bunyi, Business Development	Kenya Investment Authority	Anonymous
Akiira (Response 2)	Project Developer		

## ANNEX C: FOUR-STAGE DECISION FRAMEWORK

Table 16 | **Four-Stage Decision Framework**

DECISION POINT	DESCRIPTION OF DECISION POINT
<b>STAGE 1: DEFINE CORE CONCEPTS</b>	
Climate change classification	Which sectors, activities and projects count as low-carbon, climate-resilient (LCR) specific? Should only part of given activities and projects count as LCR specific?
Public vs. private finance	Which criteria for categorizing actors as public or private? Which public finance is included as mobilizing private finance? How to handle actors with both public and private capitalizations or origin of funds?
Developed vs. developing country	How to classify countries as developed or developing?
Geographical origin classification	How to assign finance to a country of origin? How to handle multiple country ownership/funding? Which private finance (geographic origin) can count as being mobilized?
<b>STAGE 2: IDENTIFY PUBLIC INTERVENTIONS AND INSTRUMENTS THAT CAN BE CREDITED FOR MOBILIZING PRIVATE CLIMATE FINANCE</b>	
Type of public intervention	Which relevant public interventions can be credited for mobilizing private climate finance?
Instruments	Which instruments are included as potentially mobilizing private climate finance?
<b>STAGE 3: VALUE PUBLIC INTERVENTIONS AND ACCOUNT FOR TOTAL PRIVATE FINANCE INVOLVED</b>	
Currency	What reporting currency and exchange rates should be used? How to calculate the value of local vs. international currency?
Choice of point of measurement	Which point of measurement should be used?
Value of different public interventions	How to account for different characteristics of public finance instruments? How to account for the value of public policy and public finance interventions?
<b>STAGE 4: ESTIMATE MOBILIZED PRIVATE CLIMATE FINANCE</b>	
Boundaries and value of total private finance	How to define the boundaries associated with private finance?
Data availability	What is the availability of climate-specific private finance data or proxies?
Attribution	How to attribute mobilized private climate finance to public interventions and instruments?
Causality	How to assess causality between public interventions and private finance?

Note: Table adapted from Jachnik et al. (2015).

## ANNEX D: BRAZIL CASE STUDY

### Annex D.1 | Target Policy: Updated 2012 Public-Private Partnership Law

Why did we choose this target policy, and what is it?

The amended 2012 PPP Law has arguably been the most effective in promoting private investment for urban mobility projects in Brazil; without this law in place, private investors would be very limited with respect to infrastructure investments, including those of urban transport (Credit Suisse 2013). Moreover, we selected this as the target policy because the other potential policies of influence did not meet our case study criteria. First, the 2001 Estatuto da Cidade is ineligible in the context of our methodological approach due to the timeline criteria, and the 2012 urban mobility law is ineligible because the effective start date of mobilization is more than two years after the target policy (i.e., 2014), and after 2014 there were too few projects that we could analyze. As mentioned, we can use the 2012 PPP Law because it is an amendment. From the literature review it appears that this PPP law played a larger role than the aforementioned policies in attracting private finance, and the following paragraphs argue for this point.

In this context, a public-private partnership (PPP) is a long-term contract between the public and private sector in which they share the investment risk in public transport infrastructure or services (Leipzig and Lefevre 2015). The Brazilian law is inclusive of administrative<sup>9</sup> and sponsored<sup>10</sup> concessions and, prior to PPP awarding, Brazil conducts a bidding process (Werneck and Saadi 2015).

The federal PPP law, originally enacted in 2004, followed the establishment of certain state and municipal PPP laws, most notably the 2003 Minas Gerais PPP Law and the 2004 São Paulo PPP Law. However, these laws would have been unable to proceed had the 2004 law not been enacted (Kassis and Girolami 2004).

Prior to the 1995 Concessions Law (No. 8.987) there was no legal recourse for using private concessions. In 2004, the Public-Private Partnership Law (No. 11.079) passed; this built on and replaced parts of the original 1995 law, which was ineffective for financing infrastructure projects (Vittor and Samples 2011).

Creation of the 2004 law strove to generate a legal framework that would enable the government to supplement user tariffs with reimbursements to the private sector as an additional revenue source. This intervention sought to remedy the problem of user tariffs failing to cover the whole cost incurred by the private sector. Nevertheless, private sector involvement in Brazil remained lower than expected, and passage of the 2012 amendment, which formalized the provisory measure 575/012 into law, aimed to remedy this by creating a more favorable investing environment for the private sector.

As will be further described below, this paper estimates mobilization from the 2012 amendment rather than the 2004 law. Most important, the amendment greatly reduced the risk of government nonpayment. This reduction allowed for the construction of more urban transport projects that utilized private investments.

The 2012 amendment differed from the 2004 law in several important ways but, overall, it created a more favorable risk/return ratio. Of most consequence was the government's new ability to provide reimbursements to the private sector for project development during the construction and equipment acquisition phase, rather than only at the start of the operational phase. Urban mobility projects are mainly greenfields, and allowing payment during the construction phase encourages investors because it eliminates the private sector's burden to finance all infrastructure phases before receiving governmental support. The limit for reimbursements increased from 3 percent of government<sup>11</sup> fiscal revenues to 5 percent, and the amendment added certain tax exemptions. Additionally, the federal government has a collateral fund that was previously ineligible for use as a guarantee for state and municipal PPPs. However, following the amendment, project actors can access the fund so long as the federal government is involved with the project (Credit Suisse 2013; Ribeiro and Meyer 2006). These updates help to reduce the risk of the government defaulting on its payment obligations. This is particularly important because, as mentioned, user tariffs can only increase to an extent; consequently, the government plays a large role in the private sector's ability to turn a profit (Credit Suisse 2013).

### Annex D.2 | Donor Support

The Inter-American Development Bank (IDB), in conjunction with the Brazilian government, greatly supported Brazil's PPP framework. According to the IDB, it supported Brazil through a variety of projects, some of which Brazil cofinanced; these included the National Program for the Institutional Development of Public-Private Partnerships and a 2002 project that helped create the original 2004 PPP Law. The bank also contributed "ad hoc" at the state and federal level (Queiroz et al. 2014).

### Annex D.3 | Timeline of Enabling Investment Environment

This element of the case studies includes regulatory changes and policies that allowed the current investment environment to come to fruition. Certain regulations and policies in the timeline are not included in our investment map yet warrant discussion, as they greatly contributed to the sector's development. The timeline ends with an explanation of the "other enabling factors."

The following table illustrates the various policies and "other enabling factors" that influenced the urban transportation sector in Brazil. Per our case study criteria, the factors highlighted in green are incorporated in the investment map, while those shaded in orange are not.

Table 17 | Policy Timeline for Brazil

POLICY	POLICY DESCRIPTION AND REASONING FOR INCLUSION IN INVESTMENT MAP	YEAR
Decentralization	Brazil transferred the urban rail systems from the federal level to the state and municipal levels.	1990
Concession Law (Law 8.8987)	Law 8.8987 replaced Law 8666/1993 and expanded on the concession terms to permit the federal government to concession out projects to the private sector without transferring control to the states or municipalities (Srivastava and Venugopal 2014; Credit Suisse 2013).	1995
Tax incentives	<p>Examples of tax incentives that directly impact the urban transport sector include Law 11.488/2007, or the Regime Especial de Incentivos para o Desenvolvimento da Infraestrutura (REIDI) tax incentive, which allows for the suspension of certain transport-related equipment taxes. In general, it aims to reduce the burden of development capital expenditure for large infrastructure projects, including transport (Deloitte 2016; Climatescope 2016b).</p> <p>Other tax incentives include tax benefits for foreign investors who invest in transport (Leipziger and Lefevre 2015). State tax incentives can include value-added tax (VAT) reductions, and under Law 12.431/2011 the federal government created the infrastructure debenture bond along with other tax incentives to help attract foreign private finance (PwC 2015; Credit Suisse 2013; Leipziger and Lefevre 2015). Finally, specific tax incentives exist for projects related to the Olympics, many of which are ones of urban transport (PwC 2016). Note that at the time of writing, the Olympics had not yet happened.</p>	Ongoing
Estatuto da Cidade	Urban mobility became a priority with the passage of the "Estatuto da Cidade," a federal law that called for the creation of urban mobility plans for cities with more than 50,000 occupants.	2001
Ministry of Cities	Brazil created the Ministry of Cities to coordinate urban development efforts and, in part, to encourage private sector and government cooperation (Srivastava and Venugopal 2014).	2003
Early state PPP laws	These laws include PPP policies such as the Minas Gerais PPP Law of 2003 and the São Paulo Law of 2004. These types of laws served as models for the later state and federal PPP laws (Werneck and Saadi 2015).	2003 & 2004
Federal Public-Private Partnership Law	As described earlier, Law No. 11.709/2004 is a federal law, and it created the PPP Guarantee Fund (FGP) discussed below.	2004
PPP Management Committee (PMC)	This federal regulatory body is responsible for managing issues related to PPPs (La Porta Arrobas and Lopes Enei 2009).	2005
PPP Guarantee Fund (FGP)	This fund grants guarantees to the private sector on behalf of the federal government. In theory, it should help to reduce the risk to investors of government nonpayment (Srivastava and Venugopal 2014). However, as of 2015, only one project had used this fund. Moreover, in its initial conception, only federal projects could use the fund (Leipziger and Lefevre 2015).	2005
Growth Acceleration Plan (PAC 1 & PAC 2)	Further impetus to advance infrastructure development in Brazil came with PAC 1 and PAC 2. PwC claims that the original PAC spurred investment in infrastructure and that both PACs have led to the creation of multiple private and public infrastructure projects overall; however, others contest this point as private investments in urban transport have been slow to meet expectations (PwC 2013; Tsay and Herrmann 2013). Approximately half of the nearly trillion dollars that makes up the PAC 2 is allocated for oil, gas, and biofuel projects (PwC 2013).	2007
Rio de Janeiro PPP Law	Law 5.068/2007 is a PPP law aligned with the federal law. It established the Conselho Gestor do Programa Estadual de Parcerias Público-Privadas (CGP), which is the governing body of PPP structuring, in addition to other management entities (Assembleia Legislativa do Rio de Janeiro 2007).	2007
Estruturadora Brasileira de Projectos (EBP)	Another intervention in the urban transport sector involves a conglomerate of banks known as the EBP, which determines cost-effective projects by utilizing feasibility studies for PPP structuring. Purportedly, this organization has not been effective in the urban transport sector (Leipziger and Lefevre 2015).	2008

POLICY	POLICY DESCRIPTION AND REASONING FOR INCLUSION IN INVESTMENT MAP	YEAR
Climate change policies	Climate change policies range from the federal level to the municipal level. Examples of these policies include a 2009 national law (No. 12.187) and the 2010 Rio de Janeiro policy known as Policy on Global Climate Change and Sustainable Development (PEMC). All of the policies set targets for GHG emissions and mention transport sector modifications as a means to achieve these climate goals (EDF 2013; Neele 2012).	2009 & 2010
Urban Mobility Law	This law requires cities with more than 20,000 inhabitants to create urban mobility plans; failure to do so makes the locality ineligible for federal grants (ITDP 2013; Leipziger and Lefevre 2015).	2012
Updated PPP Law (Law 12.766 )	Target policy (see description in Section 6.1.1)	2012
<b>OTHER ENABLING FACTORS</b>		
2016 Olympics	Certain projects were built for the 2016 Olympics.	
2014 World Cup	As mentioned, the World Cup was not a likely driver of private investment. Nevertheless, it is included as an enabling factor because it may have influenced investors.	
Declining technology costs	In an effort to include certain factors that were consistent across countries, we asked about technology costs for urban transport as we do with wind and geothermal.	
Macroeconomic factors	We included these in each case study, as macroeconomic conditions can greatly sway investment decisions for a variety of reasons. For example, strong conditions are conducive to more stability and predictability, which investors greatly value.	

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## ANNEX E: URUGUAY CASE STUDY

### Annex E.1 | Target Policy: 2008 National Energy Plan

Why did we choose this target policy, and what is it?

We chose the 2008 National Energy Policy for its direct relevance to and substantial influence on descendant and influential policies; namely, reverse auctions and wind targets. Moreover, the advent of this policy sent a strong market signal that Uruguay was ready to adopt renewables (Watts 2015). According to IRENA, the reverse auctions were the main mechanism for promoting renewable energy development and were created as a means to reach the renewable energy targets. The reverse auction decrees, while very popular, last produced an auction in December 2011; since then, other means have produced many of the recent projects. Consequently, we felt that examining the 2008 National Energy Policy, which was the impetus for the subsequent targets and auctions, would be most appropriate. The absence of a national policy for renewable energy prior to the target policy further demonstrates its importance.

The National Energy Policy called for diversification of the energy mix and set out guidelines to reach 15 percent renewable electricity generation by 2015 (Perna and Cagno 2015). The first wind target, set in 2009, was to reach 300 MW of wind energy by 2015. This target has been updated (both formally and informally) multiple times; one of the more recent updates, in 2012, was the formal target change to 1.2 GW of wind energy by 2015 (MIEM 2016b). This law has been particularly effective due to its political neutrality. In 2010, all political parties agreed to it (IEA and IRENA 2016b), signaling that the innovative policy would stay intact even when regimes changed. It is therefore clear that the policy can significantly increase investor confidence.

As mentioned, prior to the 2008 policy, there was no formal national policy in place for renewable energy development. However, the Uruguay Wind Energy Programme (UWEP), a Global Environmental Facility (GEF)-UNDP project (discussed in the following section), states there was an enabling environment prior to establishment of the program (Rodriguez 2013).

Consequent effects of establishing the National Energy Policy were very important to sector development for a number of reasons. It has been argued that the absence of a fully developed policy framework deterred the private sector from entering the wind market. Various factors contributed to this; for example, there was little structure for PPAs (Glemarec et al. 2012). This is particularly imperative in developing countries because PPAs provide stable contractual agreements, and they ensure fair and worthwhile pricing for energy projects. Absent or inadequate PPAs can lead to fluctuations in pricing that either hurt the end user if they are too high or decrease future private investor interest if they fall too low (OPIC 2014). Additionally, there were no wind guidelines, and wind projects that sold electricity to the grid had low returns, which deterred private investors (Glemarec et al. 2012; Rodriguez 2013). A lack of technical understanding and data presented another challenge. Uruguay did not have sufficient wind-siting data or the capacity to implement wind farms. The country required assistance, due to financial constraints and knowledge gaps. For example, UTE, Uruguay's national utility, had no experience with large-scale intermittent generation.

However, the UWEP project remedied this through a 5 MW demonstration wind farm, which was effective due to the policy framework that UWEP helped to create (Rodriguez 2013; Glemarec et al. 2012). Overall, the objectives of the UWEP project—in addition to building the demonstration wind farm—were to create a regulatory framework to address barriers inhibiting wind generation and increase investments in wind projects.

### Annex E.2 | Donor Support

Establishing the target policy played a critical role in addressing barriers. Specifically, Decree 159/011, which established the 2011 auctions, further incentivized wind power production by providing a \$/MWh bonus payment to developers who brought projects online prior to 2015 (Westphal and Thwaites 2015). The decree established a broader energy market structure and independent power producer (IPP) regulations (Glemarec et al. 2012). As mentioned, the GEF and the UNDP were involved in the project.

### Annex E.3 | Timeline of Enabling Investment Environment

The following table illustrates the various policies and “other enabling factors” that influenced the wind sector. Per our case study criteria, the factors highlighted in green are incorporated into the investment map, while those shaded in orange are not.

Table 18 | Policy Timeline for Uruguay

POLICY	POLICY DESCRIPTION AND REASONING FOR INCLUSION IN INVESTMENT MAP	YEAR
Regulatory change	Electricity liberalization allowed for more private sector participation.	1997
Law 16.906	This law was the impetus for many future policies that helped promote wind generation.	1998
Tax incentives	<p>Under the Investment Law 16.906, Decree 354/2009 grants corporate income tax (CIT) benefits to actors who generate electricity from renewable sources such as wind and solar. Other actors, granted income tax reductions, include service providers and manufacturers. Exemptions begin with a 90 percent reduction of the tax, a percentage that decreases over time (KPMG 2015; IRENA 2015). Overall, the law is designed to promote the diversification of renewable energy (IEA and IRENA 2016; MIEM 2016d).</p> <p>Resolution 67/2002 (updated in 2011) provides wind equipment with a VAT exemption (IRENA 2015; BNEF 2016a). VAT exemptions often spur renewable energy growth. Moreover, instruments such as investment tax credits (ITCs), VAT exemptions, and import duty concessions (discussed below) are important because many of the costs and thus risks for renewable energy are concentrated in the construction phase, and the aforementioned instruments address those risks by lowering equipment costs (Ockwell and Mallett 2012).</p> <p>Decree 2/2012 established CIT reductions for investors who invest in the clean technology space. This reduction ranges from 20 to 100 percent of the fixed asset investment; the percentage is determined by a weighted scoring system. It falls under Law 16.906 (KPMG 2015; IEA and IRENA 2016; Rodriguez 2013). Decree 2/2012 is a modification of Decree 455/2007; the 2012 version applies a different methodology to assess the reduction percentage (Rodriguez 2013). In 2013, an updated decree created import duty reductions for wind equipment (ClimateScope 2015).</p>	Ongoing
Decree 389/005	This policy allowed UTE to call for tenders and created a fixed price for electricity contracts; it was Uruguay's first act to promote renewable energy. Purportedly, it largely failed due to the imposition of various limitations (Leal Filho 2013; Rodriguez 2013). Nonetheless, there is reason to assume it could have mobilized finance; thus we assess the decree for causality.	2005
Prior auctions	Decree 77/2006, the first wind auction, failed even though the limitations of the 2005 decree had been relaxed (Leal Filho 2013; Ribeiro and Krink 2013, 141). Decrees 397/2007, 296/2008, and 299/2008 followed the 2006 one; however, these tenders were mostly ineffective for the wind sector, although they did have some in the biomass sector (Rodriguez 2013). These prior auctions are included as potential causal factors because of their direct relevance to the later wind auctions that greatly attracted private finance.	2006 & 2008
National Energy Plan and targets	Target policy (see description in Section 6.2.1)	2008
Updated auction framework	<p>To achieve the renewable energy targets, the government deployed reverse auctions. As illustrated above, the first auctions, for wind, began in 2006. Unlike previous auctions, the auctions following the 2008 policy were highly successful, to the point that Uruguay surpassed its wind targets. The competitive bidding began with 150 MW to be auctioned under the 403/2009 decree, wherein one project was awarded per auction bidder; this auction was initiated with the intention that another 150 MW would be auctioned at a later date. Decree 159/2011, for 150 MW, represented the second phase of the first auction. It had similar rules to the first decree, with some exceptions in addition to those previously mentioned; instead of receiving only one project, a bidder could bid for up to 100 MW. Moreover, it attributed carbon credits under the Clean Development Mechanism (CDM) to the project owner. Both auctions had local content requirements, which help stimulate renewable markets in the local economy (IEA and IRENA 2016).</p> <p>The decrees were highly successful and resulted in awarding more MW of wind energy than anticipated. 150 MW was awarded for the tender under Decree 403/2009; and 192 MW was awarded under Decree 159/2011 (tender K41938), surpassing the 150 MW goal. Decree 424/2011 passed, due to the overwhelming number of competitors under the 159 decree; it awarded 437.8 MW.</p>	2009 & 2011

Table 18 | **Policy Timeline for Uruguay (cont.)**

POLICY	POLICY DESCRIPTION AND REASONING FOR INCLUSION IN INVESTMENT MAP	YEAR
National Plan for the Efficient Use of Energy	Law 18.597 mandates the efficient use of energy to reduce GHG emissions in an effort to promote a sustainably developed future and to increase economic competitiveness (MIEM 2016b).	2009
Plan Nacional de Respuesta al Cambio Climático (PNRCC)	The PNRCC identifies strategies for GHG mitigation (Government of Uruguay 2010).	2010
Private and Public Association Act	This act established a new regulatory framework for PPPs and created a more enabling environment for private investors (PPPIRC 2015; Pereira and Ejenberg 2011).	2011
<b>OTHER ENABLING FACTORS</b>		
Political stability	Corruption is a major risk that investors consider before entering a developing country market. Uruguay has very tough laws on corruption practices and the lowest corruption rate in Latin America (PwC 2014).	
Declining technology costs	Wind's cost competitiveness with fossil fuels has led to a global increase in installed capacity.	
Macroeconomic factors	We included these in each case study, as macroeconomic conditions can greatly sway investment decisions for a variety of reasons. For example, strong conditions are conducive to more stability and predictability, which investors greatly value.	



## ANNEX F: KENYA CASE STUDY

### Annex F.1 | Target Policy: 2006 Energy Act

Why did we choose this target policy, and what is it?

Kenya's policy framework is unusual in our study because no one policy stands out as being the most influential for mobilizing private finance. This may be partly due to the perceived strong interconnections among the policies; many policies appear to be descendants of older policies (which apparently is not the case for Brazil and Uruguay). Nevertheless, according to our criteria, the 2006 Energy Act was the only policy to meet the requirements. Moreover, this act helped "kick-start" Kenya's pioneering framework for geothermal development.

The Least Cost Power Development Plan (LCPDP) and the 2030 Vision Plan may have been key drivers in current geothermal projects. For example, project actors involved in the Longonot plant have cited their acknowledgment of the 2030 Vision Plan, established in 2008 (Africa Geothermal International Limited 2012). However, the 2030 Vision Plan is an economic plan, not an energy plan, and its primary motivation is to increase not renewable energy but fossil fuel use. The Agence Française de Développement (AFD) purportedly contributed to the LCPDP plan (in the form of technical assistance, though the output was a policy); however, many of the projects received their initial private financing prior to the commencement of the 2011 LCPDP. Thus, according to our boundary criteria, this policy is ineligible. While later policies, such as the Climate Change Action Plan (CCAP), may influence current projects, these projects are still in their early stages, and they have yet to secure private finance. The 2010 feed-in-tariff (FiT) is a policy that many people thought would mobilize large amounts of finance; in fact, one of the explicit objectives of the FiT was to incentivize private investment in Kenya (Meier et al. 2014). However, at least in the case of geothermal energy, as of mid-2015 no significant generating capacity had been contracted under the FiT (Government of Kenya 2013b).

Sessional Paper No. 4 sought to guide the development of a national energy policy; the passage of the 2006 Energy Act fully operationalized this. The 2006 act grants the minister the power to promote renewable energies (Ministry of Energy 2012). Overall, the act encouraged an environment in which renewable energy and private sector participation could flourish (Njagi 2012; Ministry of Energy 2012).

The 2006 act created the legal and institutional framework for the energy sector, and it further allowed the minister for energy to promote various sources of renewable energy. The act led to the creation of the Energy Regulatory Committee (ERC), the energy tribunal, and the Geothermal Development Company (GDC). Moreover, it supported the creation of the Rural Electrification Authority (REA), which is responsible for increasing rural access to electricity and to date has been successful in its mission (PPP Unit 2013). It further helped establish tax incentives (IEA and IRENA 2016). Overall, this policy sought to increase investor confidence and to fully, or partly, privatize power stations (Ministry of Energy 2004).

### Annex F.2 | Donor Support

The World Bank Group (WBG) initiated the "Energy Sector Recovery Project" (WBG 2004) that contributed to the 2006 Energy Act. The project began operations in 2004, with additional financing provided in 2009. Actors involved included the International Development Association (IDA), which is the WBG institution that assists the world's poorest nations, the European Investment Bank (EIB), the AFD, the Nordic Development Fund (NDF), and the Government of Kenya, including the Ministry of Energy, Kenya Power and Lighting Company (KPLC), and KenGen (Independent Evaluation Group 2015; WBG 2004). The WBG, through the IDA, also supported the development of the 2004 policy that directly led to the 2006 policy (Independent Evaluation Group 2015).

### Annex F.3 | Timeline of Enabling Investment Environment

The following table illustrates the various policies and "other enabling factors" that influenced the geothermal sector in Kenya. The factors highlighted in green are incorporated into the investment map, while those shaded in orange are not.

Table 19 | Policy Timeline for Kenya

POLICY	POLICY DESCRIPTION AND REASONING FOR INCLUSION IN INVESTMENT MAP	YEAR
Electricity Power Act	This electricity liberalization policy allowed independent power producers (IPPs) to enter the market.	1997
Tax incentives	As a whole, Kenyan tax exemptions have the potential to reduce project costs by 30 percent (Achieng 2015). The main incentives are the zero-rated import duty and value-added tax exemptions for equipment and accessories related to geothermal exploration; these incentives were most recently updated in 2014 (BNEF 2016a; Republic of Kenya 2013a). Exemptions are important because most geothermal equipment is not locally sourced (Achieng 2015).	ongoing
Sessional paper no. 4 on energy	This paper directly led to the establishment of the 2006 Energy Policy (Independent Evaluation Group 2015). The paper laid out the policy framework for Kenyan energy. Under this, the government committed to use renewables for electricity generation (Srivastava and Venugopal 2014). Among other initiatives, the paper stated the need for a special purpose company (the Geothermal Development Company [GDC]) and a new energy act (the 2006 Energy Act) to increase investor confidence (Srivastava and Venugopal 2014; Ministry of Energy 2004).	2004
Energy Act	Target policy (see description in Section 6.3.1)	2006
Feed-in-tariffs	Geothermal technology was not included under the 2008 structure, but in 2010 a new feed-in tariff (FiT) that incorporated geothermal superseded this; a 2012 version subsequently replaced the 2010 FiT. As mentioned, the FiTs for geothermal have been largely ineffective. According to some, the FiTs failed to attract private investment because they were not indexed for inflation, and they did not fully reflect investment costs (Kant et al. 2014). Nevertheless, while the FiTs have not been directly relevant for producing geothermal projects, the establishment of such a widely used tool for renewable energy development may have sent a market signal to private investors that Kenya was more serious about renewables and geothermal development.	2008, 2010, & 2012
2030 Vision Plan	<p>The importance of this plan is clear, as it seeks to make Kenya a medium-income country by 2030. While it is not specific to energy or climate, one of the key components of this strategy is to increase energy and electricity access, and the Rural Electrification Authority hopes to have 100 percent electricity connectivity by 2020 (Government of Kenya 2016; BNEF 2016a). It is composed of five-year-increment, medium-term development plans (which also call for increasing fossil fuel generation). These plans will ensure the achievement of the Vision goals; essentially, they are an implementation mechanism (Government of Kenya 2016).</p> <p>The plan itself makes no specific mention of a geothermal target, and it mentions renewables, to a much smaller extent than fossil fuels, as a means to achieve Kenya's electricity access goal. Despite the plan's heavy focus on fossil energy (the vast majority of interventions to take place between 2008 and 2012 involved increasing oil capacity), geothermal developers have indicated their knowledge of it. This may be because people often misattribute Kenya's geothermal targets to the Vision Plan, when in fact the Least Cost Power Development Plan covers these.</p>	2008
Least Cost Power Development Plan (LCPDP)	Due to the low cost, the plan established geothermal energy as the best option to advance Kenya's future energy demand. It is a long-term energy development plan, updated yearly, that forecasts future generation and demand (Srivastava and Venugopal 2014; Republic of Kenya 2011). In 2011, the plan established a target of 5,530 MW by 2031; the 2013 plan updated the target to 7,264 MW by 2033. As noted, the Vision Plan strongly enabled this policy. However, the 2006 Energy Act also mandated its establishment (Republic of Kenya 2011).	2010
PPP framework	<p>An effort to promote power purchase agreements (PPPs) began in response to a need for private finance involvement in public projects (Baxter 2015). In 2009, the Public Procurement Disposal Regulations were established; a PPP policy statement, stating the government's commitment to PPPs, followed this in 2011. These earlier policies culminated in the 2013 PPP Law (PPP Unit 2013). Despite these efforts, many issues with contract negotiations remain (Kant et al. 2014; Baxter 2012).</p> <p>The 2012 Standardized PPA is for small-scale projects; while it can be applied to projects greater than 10 MW, the overall terms are negotiable (Ministry of Energy 2012).</p>	2009, 2010, & 2013

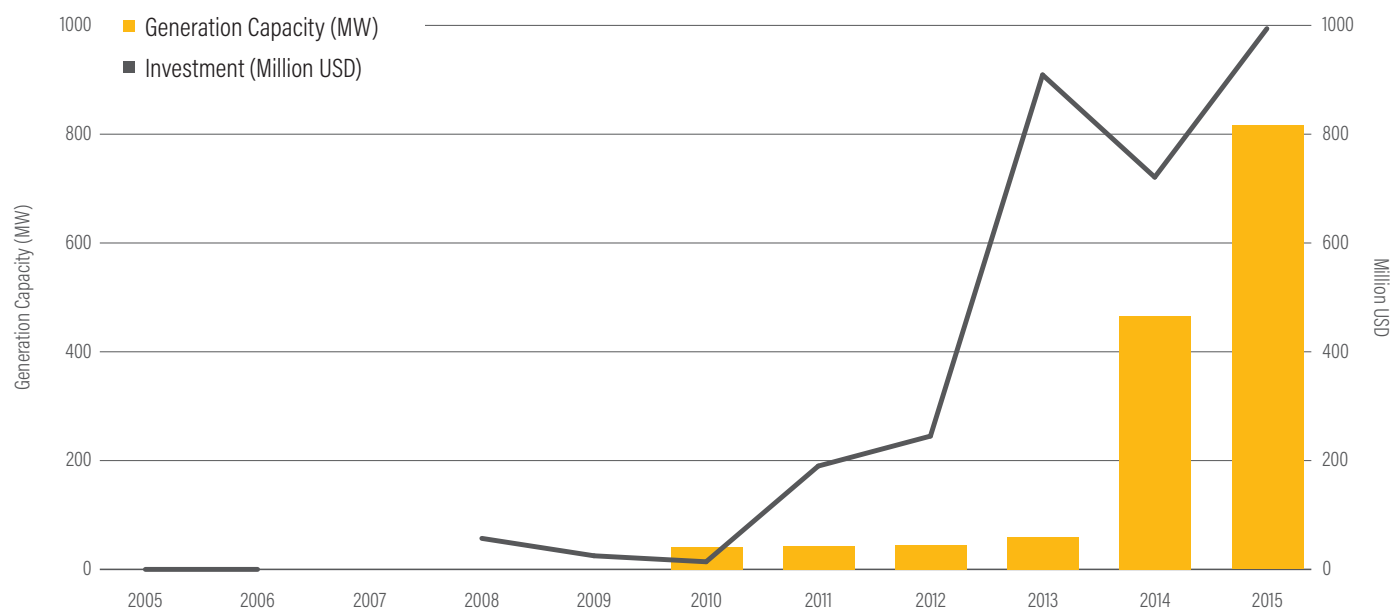
Table 19 | Policy Timeline for Kenya (cont.)

POLICY	POLICY DESCRIPTION AND REASONING FOR INCLUSION IN INVESTMENT MAP	YEAR
National Climate Change Response Strategy (NCCRS)	The strategy's creators state they developed this policy to promote the incorporation of climate information into Kenyan policies such as the 2030 Vision Plan (Government of Kenya 2010). According to a government document, many private investors are not aware of this bill (Ministry of Environment and Mineral Resources and Ministry of Finance 2012; Government of Kenya 2010).	2010
New constitution	This constitution shifted the power balance by giving more responsibilities to county-level officials than to those at the national level. It resulted in a shakeup of many previous regulations, including those of energy, and it was the impetus for the National Energy Bill that has yet to pass into law (Climatescope 2016c; Gettleman 2010). The new constitution also helped create an environment for future adaptation and mitigation policies (Government of Kenya 2013a).	2010
Geothermal Risk Mitigation Facility (GRMF)	The GMRF is a fund established by KfW, the EU, and the African Union. It supports geothermal development in Kenya and other African countries.	2012
National Climate Change Action Plan, 2013–2017 (NCCAP)	This was a key policy for supporting climate change initiatives in Kenya to help its transition to a low-carbon, climate-resilient economy (Naess et al. 2015, Government of Kenya 2013a). One action point of the plan was to use climate finance more effectively, although this was mainly for adaptation projects (Naess et al. 2015). Although this is part of the 2030 Vision Plan, the plan calls for increased fossil fuel use, so the policies are not fully aligned (Kant et al. 2014). The NCCRS was operationalized through the passage of the NCCAP (Republic of Kenya 2013b).	2013
<b>OTHER ENABLING FACTORS</b>		
Success of previous projects	Often, for large-scale projects, investor confidence increases if previous projects demonstrate that success is achievable in that particular region.	
GDC	Establishment of the GDC in 2008 was a significant milestone for the geothermal sector. It is a state-owned company incorporated as a special purpose vehicle (SPV), intended to undertake exploration and appraisal as well as some drilling to establish geothermal reserves; it can also sell steam to power sector entities (PPP Unit 2013). Essentially, it bears the risk of exploration, and its existence seeks to attract private finance (Pérou 2013).	
Declining technology costs	We included this factor to be consistent across the case studies, because it is applicable to all of them.	
Macroeconomic factors	We included these in each case study, as macroeconomic conditions can greatly sway investment decisions for a variety of reasons. For example, strong conditions are conducive to more stability and predictability, which investors greatly value.	

## ANNEX G: TIME-SERIES GRAPHS OF INSTALLED CAPACITY VERSUS POLICY AND INVESTMENTS

Figure 17 shows the investment amounts per year against the installed capacity (BNEF 2016a), as well as the policies and projects present.

Figure 17 | **Map of Policy, Installed Wind Capacity, and Investment over Time in Uruguay**



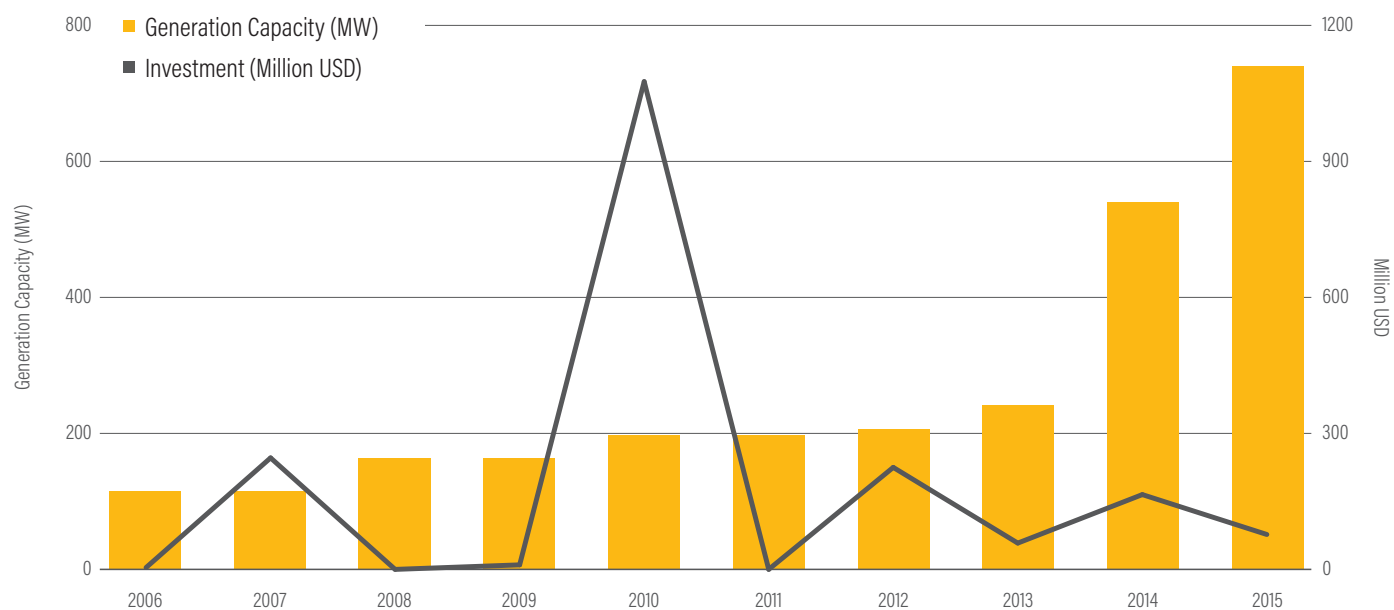
Source: WRI; BNEFa 2016.

YEAR	POLICY	TYPE
2012	Talas de Maciel I	Mapped Project
2012	Kiyú	Mapped Project
2012	Vientos de Pastorela	Mapped Project
2011	Decree 424/011	Mapped Policy
2011	Public Private Partnership Act	Mapped Policy
2011	Decree 159/011	Mapped Policy
2010	Plan Nacional de Respuesta al Cambio Climático (PNRCC)	Mapped Policy
2009	Uso Eficiente De La Energía en al Territorio Nacional	Mapped Policy
2009	Decree 403/009	Mapped Policy
2008	National Energy Policy	Target Policy
2008	Decree 296/008 & 299/008	Mapped Policy

YEAR	POLICY	TYPE
2007	Decree 397/007	Mapped Policy
2006	Decree 77 first wind auctions	Mapped Policy
2005	Decree 389/005	Mapped Policy
On-going	Tax Incentives	
1998	Investment Law (Law 16.906)	
1997	Electricity Liberalization	

Figure 18 shows the investment amounts per year against the installed capacity (BNEF 2016a), as well as the policies and projects present.

Figure 18 | **Map of Policy, Installed Geothermal Capacity, and Investment over Time in Kenya**



Source: WRI; BNEFa 2016.

YEAR	POLICY	TYPE
2015	PPA Signing of Akiira	Mapped Project
2014	1st contract signing of Akiira	Mapped Project
2013	National Climate Change Action Plan	Mapped Policy
2013	PPP Law	Mapped Policy
2012	2nd Revision of FiT	Mapped Policy
2012	Geothermal Risk Mitigation Facility (GRMF)	Regulatory Change & Other Intervention
2011	PPP Policy Statement	Mapped Policy
2010	New Constitution	Regulatory Change & Other Intervention
2010	National Climate Change Response Strategy	Mapped Policy
2010	Least Cost Power Development Plan (LCPDP)	Mapped Policy

YEAR	POLICY	TYPE
2010	Revision of FiT	Mapped Policy
2009	Public Procurement Disposal Regulations	Mapped Policy
2008	Geothermal Development Company (GDC)	Regulatory Change & Other Intervention
2008	2030 Vision Plan	Mapped Policy
2008	FiTs	Mapped Policy
2007	Energy Regulatory Committee (ERC)	Regulatory Change & Other Intervention
2006	Energy Act 12 of 2006	Target Policy
2004	Sessional Paper No. 4	
1997	Electricity Power Act	
On-going	Tax Exemptions	

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## ENDNOTES

1. <http://www.oecd.org/dac/dacmembers.htm>.
2. Cascading effects: effects that reinforce the overall impact of the policy in question; tapering effects: effects that reduce the overall impact of the policy.
3. Climatescope is a collaborative of which BNEF is a part; it differs from BNEF in that BNEF is more limited.
4. Initially, we sought to estimate national mobilization numbers for each sector. This methodology therefore excludes post-2015 financing from projects because we do not have aggregate data beyond this year. As mentioned, we exclude small-scale projects and those for self-consumption.
5. One report illustrates the possible phases of geothermal development at a granular level (Micale et al. 2014).
6. We tried to ensure that the date of the first investment of the project or project phase came after the policy enactment date. Due to the limited number of projects, this was not always possible. For the BRT TransOlimpica, the PPA signing took place before the target policy; however, we made an exception for this because the target policy was an amendment of an earlier policy and our choice of projects was limited. Consequently, it is possible that certain transactions took place before the target policy; however, the target policy only mobilized finance for the latter transactions.
7. Low-income according to the official OECD-ODA list.
8. For the following results, we use the average of the stakeholder causality weightings because the responses are for the same project. However, we do address the responses individually if they differ by more than one weighting increment (e.g., if there is a weighting of 50 and 100 percent).
9. The government provides all of the fees for the private sector.
10. Concessionaire receives payment from user fees from services and the government.
11. Here, "government" refers to the federal, state, and local levels.
12. In instances such as this, the target policy can only influence the later, 2013, policy through the 2010 policy.

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