

CASE STUDY: USING FINANCIAL MECHANISMS IN THE DEVELOPMENT OF NAMAS IN COLOMBIA, CHILE AND KENYA

Produced for the Mitigation Action
Implementation Network

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Dialogue. Insight. Solutions.

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Introduction

This collection of case studies highlights four climate programs currently under development in Colombia, Chile and Kenya. They showcase nationally appropriate mitigation actions (NAMAs) being developed with the technical support of the Center for Clean Air Policy (CCAP), Ecofys and the Energy Research Centre of the Netherlands (ECN), and describe a variety of financial instruments being designed into the programs to leverage donor funding. These case studies are intended to help illustrate how different financial mechanisms, including concessional loans, guarantees and equity financing, can increase the impact of donor funding to achieve transformational change to a low-carbon economy. The use of different financial mechanisms is particularly relevant as developing countries are now designing NAMAs and begin to seek international support for their implementation. In addition, these case studies can help inform the Green Climate Fund (GCF) Board as it considers the use of different instruments in implementing the Fund.

Significant greenhouse gas (GHG) emissions reductions are needed from both developed and developing countries to achieve global goals to limit temperature increases. The GCF was established to support developing countries efforts to limit or reduce their GHG emissions and to adapt to the impacts of climate change. Since 2012, the GCF Board has been working on the design principles and policies necessary to operationalize the Fund. They have made significant progress and in May 2014 agreed on a consensus package of eight key design elements, opening the door for developed nations, wealthy developing nations, and other donors to make financial pledges to capitalize the Fund. It is projected that billions of dollars will be pledged to the GCF over the next year.

The GCF Board has affirmed that the Fund should maximize engagement with the private sector in order to provide incentives that encourage a paradigm shift to low-carbon development. With over 60 percent of climate finance coming from the private sector,¹ it is clear that mobilizing private sector investment is a critical component to achieving low-carbon development. As discussed in CCAP's [An Emerging Architecture for NAMA Finance](#),² linking government policies with financial mechanisms to address barriers to low-carbon investments offers a way for international financial support to achieve emissions reductions at a sector-wide scale.

The GCF has currently approved the use of grants and concessional loans as financial instruments of the Fund. At the October 2014 GCF Board meeting, the Board will consider whether other types of financial instruments, for example guarantees, equity investments and other risk mitigation instruments, should also be used. As members of the Board, GCF Secretariat, and advisory groups, including the Private Sector Advisory Group, take up this important issue, we hope that these case studies can illustrate how a range of financial instruments can be used to increase the impact of donor funding.

¹ Climate Policy Initiative, [The Global Landscape of Climate Finance 2013](#), October 2013

² Davis, Stacey and Leila Yim Surratt, Center for Clean Air Policy, May 2013

Overview of Financial Mechanisms

A variety of financial mechanisms can be used to increase the impact of donor funds by mobilizing additional investments in mitigation projects. These financial mechanisms should be tailored to the unique financial markets conditions in the host country, and be targeted to address the specific financial barriers to investments in NAMA-related projects. These financial mechanisms serve as credit enhancements for private sector financing of NAMA projects. It is important to emphasize that in the design of a financial mechanism, credit enhancements are not designed to make “bad projects” financially viable. Rather, they are designed to mitigate or remove certain risks to investors/lenders who serve to catalyze investments in NAMA projects. Detailed below are a number of financial mechanisms that could be incorporated into a NAMA proposal.

Performance Guarantees

Many low-carbon projects proposed by NAMAs may have financial and performance risks. While banks are fully capable of assessing the credit quality of a borrower, they often do not have the skills to properly assess performance risk, especially related to mitigation technologies that may be unfamiliar to them. This is especially a challenge for energy efficiency projects where energy and cost savings from investments are expected to cover debt service payments. For large energy projects, banks can retain outside experts to conduct a performance risk assessment of a project but for most energy efficiency and smaller-scale renewable projects this is not cost effective.

To address this impediment, donor funds could be used to capitalize a performance risk guarantee program that provides bankers with assurances of performance (generation of sufficient revenue to meet debt service payments). For energy efficiency projects, this is often done by setting up an energy services company (ESCO) which is responsible for providing performance due diligence for the banks and backing up the assessment with a guarantee. If a project fails to meet performance levels, the donor funds are used to make up the difference for banks.

Partial Credit Risk Guarantees

Partial credit risk guarantees protect lenders from loan defaults for up to a specified portion of the loan. Donor funds are placed in an account to cover a portion (50 percent in many cases) of a project’s credit risk to banks. This mitigates risk to the lender and should reduce the costs of borrowing. Projects will nevertheless need to meet bank credit quality requirements as banks will sustain losses if a project fails.

Revolving Fund and Co-Financing with Local Banks

In high interest rate environments, projects may be unable to generate sufficient revenues to meet high debt service payments. A project that produces a given amount of revenue may be financially viable when interest rates are at 5 percent but would not be viable if rates were at 12 percent. In addition to the soundness of a project, the costs of financing can have a major impact on the credit-worthiness of a project. In these circumstances, NAMA support could be used to establish a revolving fund and deployed in the form of below-market rate co-financing with local banks. The banks would conduct the financial analysis and lend at prevailing rates (e.g. 12 percent) for 50 percent of the loan amount and the NAMA

loan would be provided at below market (e.g. 2 percent) for 50 percent. The resulting blended rate of 7 percent could make a project financially viable. As the loans are repaid, the reflows are used to co-finance future projects.

Equity Funds

Banks most often require an equity contribution in order to finance a project. For example, in Colombia, banks require a minimum of 30 percent equity in order to issue a loan. For municipalities interested in accessing commercial lending for a low-carbon project, coming up with the equity capital can be very difficult to achieve since it is often a onetime expense and may require substantial budget cuts in other government services. Similarly, private sector developers may have the technical skills to develop a low carbon project but if they are thinly capitalized, they are unable to meet the equity contribution requirements for financing. To address this financing barrier, NAMA support could be used to capitalize an equity fund that provides eligible project sponsors with the necessary equity contribution to obtain commercial debt financing. Project sponsors would be required to repay the equity fund at market or on concessional terms. As such, the equity fund revolves and repayments can support additional projects without additional donor contributions.

Special Purpose Entities

Many renewable and energy efficiency projects are often too small to be effectively financed on an individual basis. The transaction costs relative to loan amounts are such that banks don't find the projects attractive.

Special Purpose Entities (SPE) which bundle multiple projects for financing through one debt instrument have been established in many countries to address this barrier to finance. The SPE uses standard eligibility requirements, financial analysis and legal agreements to lower the transaction costs of projects and reach critical mass of financing to attract private sector lenders/investors. A NAMA proposal could create an SPE for this purpose and use any of the above mentioned mechanism to finance NAMA projects on affordable terms.

Summary of Mechanisms

Table 1 summarizes some typical financial barriers that developing countries face while implementing mitigation projects and the financial instruments that could be used to overcome them.

Table 1. Financial Mechanisms to Address Impediments

Risks/Barriers	Instruments
Lack of familiarity with technology	Performance guarantee
Perceived credit quality of borrowers	Partial credit risk guarantee
High interest rate environment and/or lack of project revenues to cover market-terms of financing	Revolving fund, Co-financing, concessional loans
High transaction costs of smaller-scale projects	Creation of special purpose entity (SPE) for project implementation
Project sponsor lacks necessary equity investment to mobilize commercial bank debt financing	Creation of Equity Fund capitalized with donor contributions

Case Study 1: Equity Financing to Achieve Carbon Neutrality in Colombia's Waste Sector

The waste sector in Colombia contributes 5.7 percent of the country's total GHG emissions, amounting to 10 million metric tons of CO₂e, of which most of the emissions are generated through methane emissions from landfills.³

On a business-as-usual trajectory, Colombia's waste sector emissions will rise dramatically, and is expected to double by 2035 relative to 2010.⁴ To minimize the expected rise in waste sector emissions and achieve carbon neutrality in the sector, the Colombian Government is developing a Solid Waste NAMA⁵ that will transform Colombia's waste sector and significantly reduce GHG emissions while also integrating informal recyclers into the formal sector achieving other social and environmental benefits.

The Solid Waste NAMA is framed within Colombia's national climate change policy and sustainable development goals, and couples both policy changes with a financial mechanism to catalyze private sector investments that will improve and change Colombia's current waste management practices.

Currently, Colombia's solid waste tariff applies only to waste collected that is disposed of in landfills. By modifying the regulations to allow the tariff to also apply to waste treated by alternative treatment technologies, the policy change will create economic incentives and encourage private sector investments in new waste treatment technologies, such as mechanical-biological treatment (MBT) facilities. These treatment technologies will not only reduce the amount of waste going to the landfills but can also reduce methane and other GHG emissions. In Colombia, municipal waste is managed directly by municipalities or by private sector operators that have been awarded a concession from a municipality. The NAMA aims to create sustainable sources of revenue for private sector solid waste operators and municipal governments, primarily through the revised tariff structure as well as by promoting the development of sellable commodities from waste including, recyclables, refuse-derived fuel and compost depending on the market.

Creation of the NAMA Equity Fund

An important element of the NAMA is the creation of a financial mechanism designed to leverage limited public resources and encourage private sector investment to achieve the goals of the NAMA.

Colombia has a well-developed commercial banking system that provides funding for viable enterprises. However, commercial banks, investment banks, credit rating agencies and multilateral financial

³ Center for Clean Air Policy. Solid Waste NAMA in Colombia, Transforming the Solid Waste sector while reducing GHG emissions. NAMA Proposal Executive Summaries – Prepared for the Global NAMA Financing Summit. May, 2013.

⁴ Universidad De Los Andes. Estrategia Colombiana De Desarrollo Bajo En Carbono. March 2013.

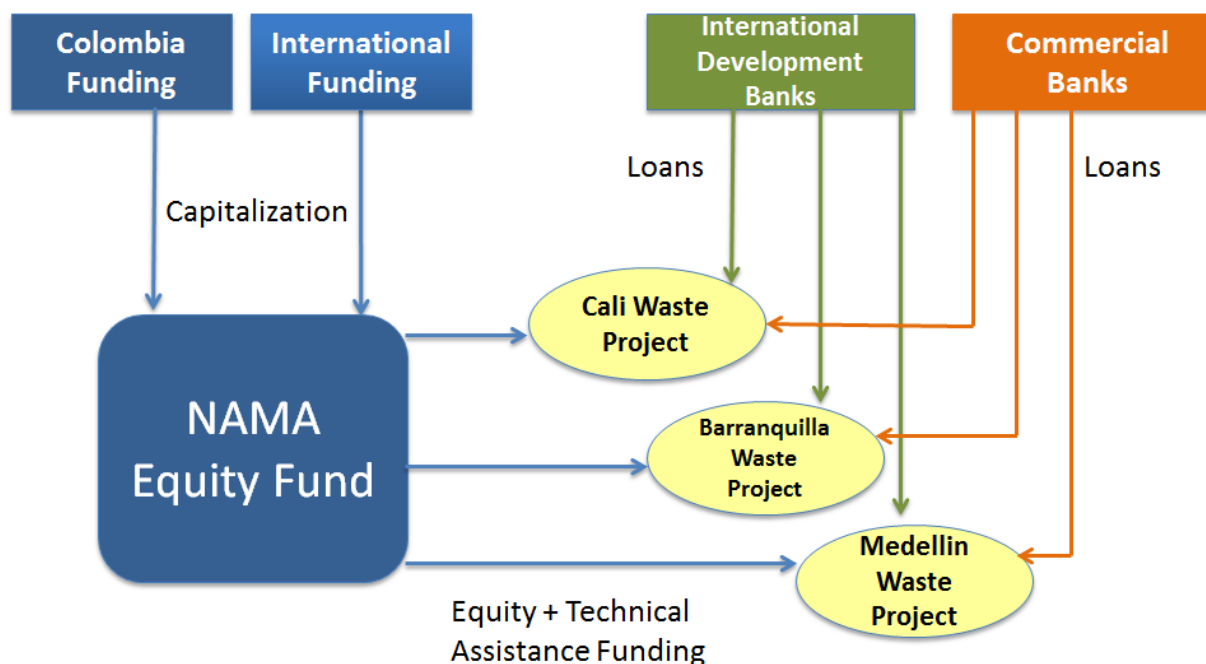
⁵ The Colombian government has developed the NAMA with the support of the Center for Clean Air Policy, through its Mitigation Action Implementation Program with funding from Germany's International Climate Initiative, Environment Canada, and the Danish Ministry of Climate, Energy and Building.

institutions in Colombia have indicated that there is a shortage of affordable equity capital to fund new technologies and business models such as MBT facilities. While these alternative waste management technologies have been widely used in other countries, there is a perceived higher risk for new implementations in Colombia due to lack of familiarity with the technologies and business model.

Commercial banks in Colombia universally require a 30 percent equity contribution for bank financing. This applies to municipal and private sector loans. Most local governments do not have sufficient funds to meet these equity requirements. Many private sector entities, interested in providing MBT services, are often unable to mobilize the 30 percent equity investment from their own resources.

The NAMA **Equity Fund** is designed to address this barrier by providing concessional equity capital for waste treatment facilities. Colombia is seeking international funding to capitalize the NAMA Equity Fund, which would provide concessional equity financing to municipal utilities and private sector operators to implement municipal waste management projects. The NAMA Equity Fund would leverage additional private sector equity investments and affordable debt financing. These NAMA projects would also receive economic support from the Colombia Department of National Planning under their existing Public-Private-Partnership framework, which provides revenue support up to 20 percent of a project's operating costs. Repayment of the NAMA equity investments would replenish the Fund and make it sustainable.

Figure 1. Colombia Solid Waste NAMA - Financial Flows



National and sub-national contributions could provide other support to increase the feasibility of the various projects including in-kind contributions such as land, project development support, and public awareness programs to encourage the source separation of waste. Initial estimates show that the NAMA Equity Fund could leverage additional financing and contributions from other sources by a factor of 11.

Conclusion

The NAMA aims to catalyze projects in multiple cities across Colombia. With a proposed capitalization of €11.8 million from international support, the NAMA Equity Fund could leverage an additional €134 million in investments from the Colombian national government, local governments, concessional and commercial debt, and private sector (equity) investments. Cali, the third largest city of Colombia with strong municipal leadership, is primed to implement the first demonstration facility.

The Colombia waste NAMA provides a paradigm-shifting approach towards waste management that can be replicated in many large and medium-sized cities both throughout the Latin American region, as well as in other developing countries. Using international funding support to capitalize the proposed equity fund allows funders to maximize their impact by mobilizing significant additional investments and catalyzing a pipeline of mitigation projects. Through the combination of policy changes and an innovative financial mechanism, the NAMA seeks to transform the waste sector from a static landfill-oriented sector to one that optimizes economic value of waste, creates jobs, and provides social and environmental co-benefits.

Case Study 2: Self-supply Renewable Energy NAMA in Chile

In line with the country's economic development and associated rising energy demand, Chile is expected to require some 8,000 MW new generation capacity by 2020. Chile has almost no fossil fuel resources and development of its hydro resources is limited because of environmental concerns. At the same time, the country's renewable energy potential is significant, mainly comprising solar, wind, geothermal and biomass resources. This is recognized in the government's National Energy Strategy 2012 – 2030⁶ as well as the renewable energy target approved by the government in 2013 to increase the share of renewable energy sources to 20 percent by 2025.⁷ Self-supply renewable energy systems are attractive for consumers as they provide a secure energy supply option and to hedge against rising energy prices. However, various barriers have impeded their large scale deployment so far.

Through the Mitigation Momentum Project financed by the International Climate Initiative (IKI), Ecofys supported the Chilean Government with the development of a NAMA for self-supply renewable energy⁸ in cooperation with Fundación Chile and the national counterparts, the Ministries of Environment and Energy as well as the Centre for Renewable Energy (CER). In 2013, the Germany-UK NAMA Facility preliminarily awarded €15 million to fund implementation of the NAMA.⁹

NAMA Design

The objective of the NAMA is to promote self-supply renewable energy systems in industry, targeting mainly the agro industry, tourism and retail sectors. All non-conventional renewable energy technologies are eligible, as long as 50 percent of the generated energy is consumed on site. The design of the NAMA was informed by a detailed barrier analysis which concluded that in addition to financial barriers, which are significant, other barriers related to knowledge, technical capacity and “technology confidence” are equally relevant. A detailed financial analysis provided insights into the type of instrument and level of support required to stimulate investment of the private sector ensuring that public financial resources would be used in the most effective way.

Based on this analysis, the NAMA centers around a financial component which includes grants for pre-feasibility studies, co-investment grants for certain technologies, as well as a guarantee fund that enables the establishment of a subsidized loan scheme delivered by commercial banks. This is supported by a range of technical support, capacity building and outreach activities targeting different levels of the value chain.

⁶ Gobierno de Chile. Estrategia Nacional de Energía 2012- 2030. Febrero 2012.

⁷ Gobierno de Chile. Ley de Fomento al Desarrollo de las ERNC 2025.

⁸ Ecofys. Development of a NAMA proposal for self-supply renewable Energy in Chile. October 2013.

⁹ The NAMA is currently undergoing an in-depth appraisal and the final funding decision is expected in 2014.

Finance Mechanism

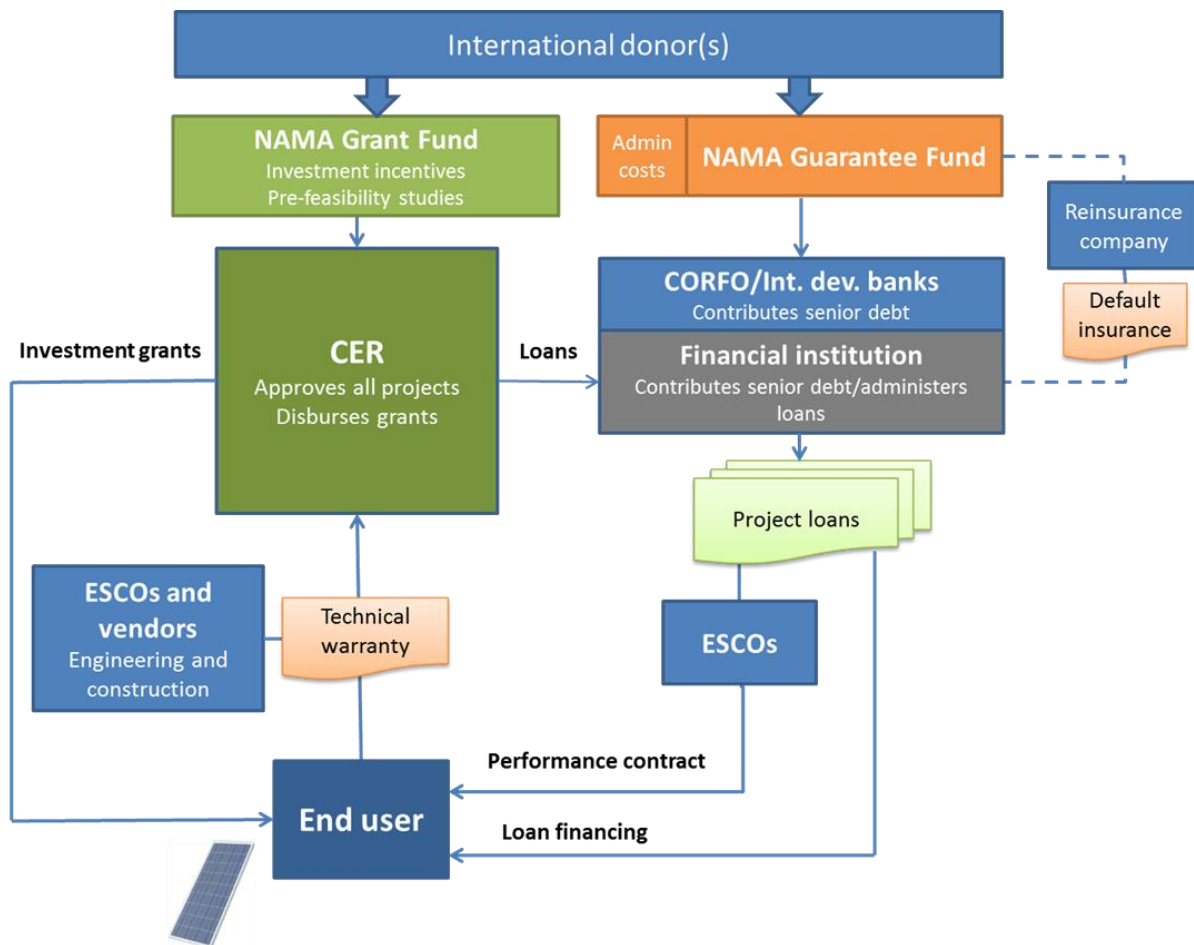
The financial mechanism was designed in close cooperation with financial institutions that have long standing experience with private sector support schemes in Chile. These were consulted throughout the design process to ensure the scheme fits into existing national processes and structures.

The implementation of the scheme is coordinated by the CER which is also the responsible entity for the technical support and outreach components. Funding from the Germany-UK NAMA Facility is sought to capitalize both a grant fund and a guarantee fund. The grant fund will provide grants for pre-feasibility studies to build a pipeline of projects. Reluctance of companies to invest in studies with an uncertain outcome was found to be one of the key barriers to advance deployment of renewable energy technologies. For certain projects which face higher investment barriers as they may be more costly, due to the specific location or the technology being further to market in Chile (for example, remote grid connection, geothermal), additional investment grants may be provided on a case by case basis. The investment grants could fund up to 20 percent of the total installed costs to cover technology, installation costs, connection to the grid, permitting, engineering or other required expenses.

The main element of the finance scheme is a guarantee fund and associated preferential loan scheme. The guarantee reserve will cover the majority share of any loan defaults. There is little experience with financing renewable energy projects in Chile, and risks as well as transaction costs are perceived as high. The guarantee fund will reduce the risk premium typically associated with renewable energy projects and thus enable development banks and commercial financial institutions to capitalize a loan program for renewable energy projects with attractive conditions for participants. The loan scheme, at below market interest rates of 3.75 percent and a term of 15 years, would provide up to 80 percent of the total cost of the installation requiring the applicant to provide at least 20 percent of their own equity. The cost of finance for renewable energy projects is typically higher than conventional alternatives given higher upfront capital costs of the technology. The preferential loan scheme can balance these higher financing costs through reduced interest rates and extended loan maturities.

The framework of the financial component and mechanism is depicted in Figure 2.

Figure 2. Financial component – Self supply renewable energy NAMA Chile



Conclusion

A thorough analysis of the financial and market conditions around self-supply renewable energy systems as well as the deep engagement with the private sector, the financial service industry and international finance providers resulted in the design of a financial mechanism which will maximize the effectiveness of scarce public funds. Only a relatively small injection of public finance is required to capitalize the guarantee fund. The NAMA allows for approximately ten times the volume of investment in renewable energy technologies by the private sector, leading to transformational impacts.

Case Study 3: Catalyzing Low Carbon Urban Transformation in Colombia

Colombia's GHG emissions in 2010 were estimated at 154 million metric tons of CO₂e. On-road transportation made up about 12 percent of the total emissions.¹⁰ That percentage is expected to grow as rising incomes contribute to an increasing national motorization rate. Some sources have estimated that by 2040 the number of automobiles in Colombia could more than triple, from 4 million to 19 million, and the number of motorcycles could grow from 4 million to as high as 15 million.¹¹ The University of Los Andes projects that on-road CO₂ transport emissions will triple by 2040, while CO₂ emissions from private vehicles will increase more than six-fold.¹²

To address this growing source of emissions, Colombia with technical support from the Center for Clean Air Policy (CCAP), financed in part by the Danish Ministry of Climate, Energy and Building, developed a Transit-Oriented Development (TOD) NAMA to reduce private vehicle GHG emissions by creating urban environments that provide alternatives to automobile travel. This allows people to reduce their total vehicle kilometers traveled in private vehicles by substituting non-motorized trips, increasing their share of transit trips and driving shorter average trip lengths. Fewer vehicle kilometers travelled translates directly into reduced GHGs. In 2013, the Germany-UK NAMA Facility preliminarily awarded €14.9 million to implement the NAMA.¹³

The NAMA will transform Colombian cities by focusing on urban development around transit stations, blending low-income and market-rate housing with commercial uses to create neighborhoods where people can safely walk, live, work, shop and play. Colombia is investing USD 8 billion in public housing and transit. One of the goals of this NAMA is to promote "transit-oriented developments" to enhance the benefits of these major national investments in public transit and low-income housing, increasing the ridership and financial sustainability of the public transit, reducing vehicle emissions, and improving quality of life. In addition, the broader goal of the TOD NAMA is to motivate institutional infrastructure investors, such as the national development bank FINDETER, to finance sustainable urban growth. The NAMA is designed to help them recognize and embrace a low-carbon model of urban development for the region to address social equity, climate change and prosperity. Ultimately, this model will attract a large percentage of the private real estate development that occurs in Colombia's cities.

The NAMA will establish CIUDAT, (*the Center for Urban Interventions Advancing Transit Oriented Development in English*), to carry out the core work of the NAMA. CIUDAT will be governed by a board, consisting of the Vice Ministers for Transport, Environment and Housing, the Director of Infrastructure and Energy from the National Planning Department, the President of FINDETER, and the President of CCAP. CIUDAT will provide the cohesive "glue" to integrate the diverse pieces of local TOD development processes and work with public and private partners to implement catalytic TOD projects. There will also be a CIUDAT Technical Advisory Committee comprised of Colombia ministry, FINDETER and CCAP staff. Through the Board and Technical Advisory Committee, CIUDAT will work closely with national ministries

¹⁰ Universidad de los Andes, "Estrategia Colombiana de Desarrollo en Bajo Carbono," April 2013

¹¹ Universidad de los Andes, "**Base de datos sector transporte carretero**". Aug 2014

¹² Universidad de los Andes, "Estrategia Colombiana de Desarrollo en Bajo Carbono," April 2013

¹³ The NAMA is currently undergoing an in-depth appraisal and the final funding decision is expected in late-2014.

to craft transformative policies to make TOD the default development model for Colombia. CIUDAT will also lead a comprehensive measurement and evaluation effort to assess and improve policy performance, and track economic, social and environmental impacts.

Flexible Financial Structure

The CIUDAT Board and staff will oversee the disbursement of the NAMA funds, with approximately €11 million allocated for financial assistance to local entities to fund local TOD projects and approximately €4 million allocated for technical assistance. These funds can be leveraged with additional funds from FINDETER including potentially €200 million from their existing Sustainable and Competitive Cities program and an additional €70 million credit line currently under negotiations with KfW, the German development bank. The French development agency (AFD) has also expressed interest in supporting the NAMA.

The Board and their technical staff will evaluate local proposals and deploy the most appropriate form of assistance to address technical needs, cover investment gaps and maximize financial leverage. The NAMA will establish a NAMA Trust Fund within FINDETER. A portion of the funds in this account will be for grants and the remainder will be for concessional loans and other financial instruments which will be defined by FINDETER as the first step of implementing the NAMA. Possible financial mechanisms that could be used include concessional loans, project equity, guarantees and interest subsidies (see Table 2). These mechanisms are intended to mobilize additional investments from the private sector. Consider an example project involving transit and mixed use development. A local Special Purpose Entity (SPE), created to manage public and private development in a neighborhood area, might receive a grant from the NAMA Trust Fund for design and engineering of a bus rapid transit station integrated into a shopping center. This would overcome the barrier of lack of coordination between the transit agency and the private developer. A concessional line of credit or loan guarantee to local banks could allow the local bank to finance private developers' construction of TOD infrastructure, such as the connection of the shopping center to both sides of the street. FINDETER might also give a market rate loan to the transit agency, linked to the design grant, for construction of the actual station.

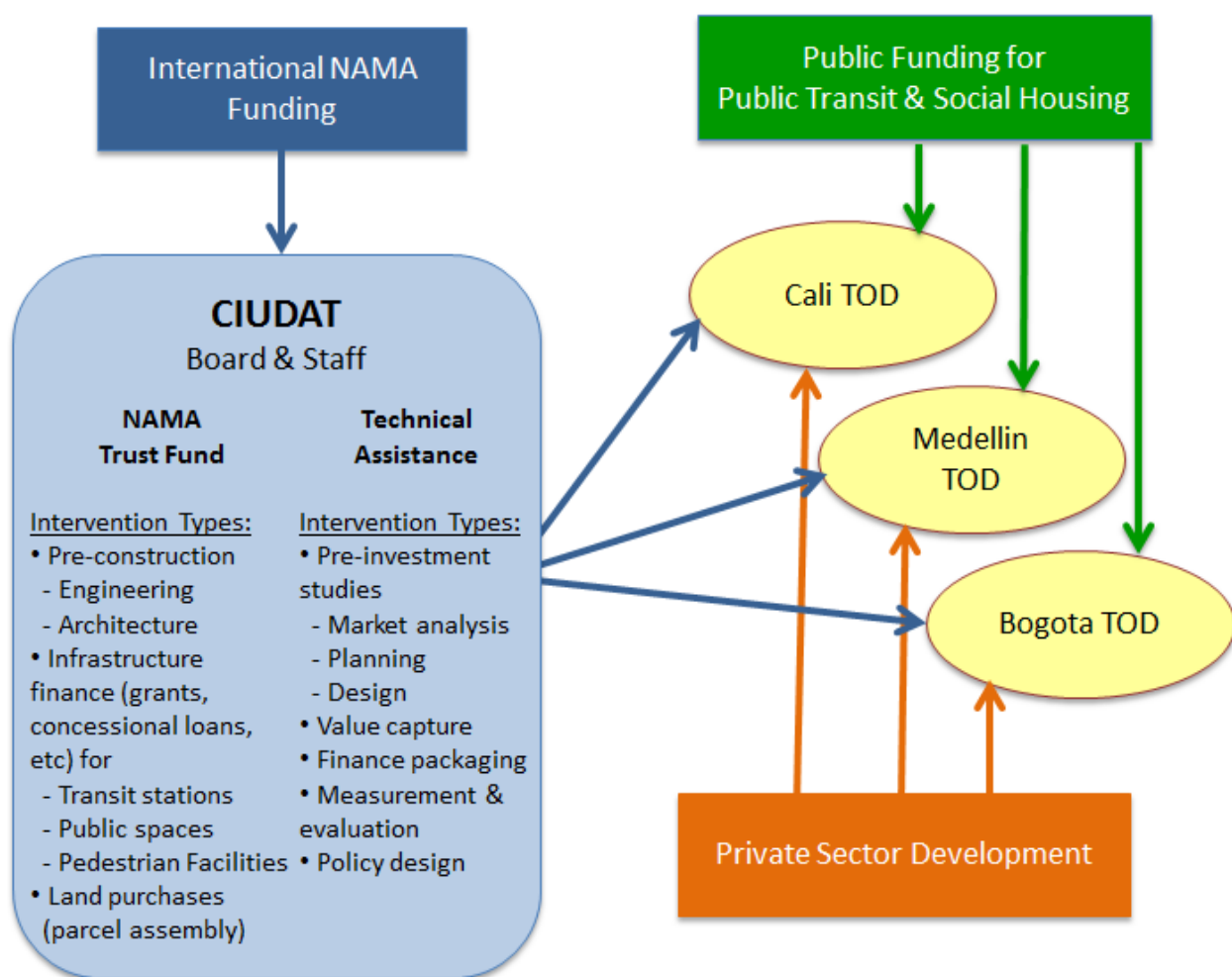
Table 2. Potential financial assistance to be provided by the NAMA Trust Fund

TOD NAMA potential financial assistance mechanisms			
Public sector		Private sector	
To local Special Purpose Entity (SPE)	Concessional loans	To private company	Project equity
	Loans		Grant - incentive
	Grants		Bridge loans
To city projects	Concessional loans	To private bank	Guarantees
	Loans		Interest subsidy
	Grants		

Conclusion

The Colombia TOD NAMA is designed to address the barriers to TOD neighborhood projects at both the local and national levels. It is estimated that this NAMA will result in annual GHG reductions of 3.6 to 5.5 million metric tons of CO₂e by the year 2040 due to improved urban planning leading to a reduction in private vehicle usage. Because neighborhood level urban planning involves many complex decisions made by varying stakeholders, CIUDAT will have the flexibility to identify, prioritize and target the critical points of intervention as they arise from the local circumstances. Their technical assistance toolbox will include the ability to fund or provide direct technical support during the planning and feasibility stages of the TOD concept development in order to facilitate high quality investment proposals. Those proposals will then be transferred to the financial staff for analysis of the best financial mechanism to fund the further progress of the neighborhood.

Figure 3.Colombia TOD NAMA interventions and investments



Case Study 4: Unlocking Kenyan Geothermal Potential by Addressing Geological Risk

The Government of Kenya plans to expand its geothermal power production capacity to 5,000 MW by 2030 (from approximately 209 MW in 2014). Geothermal energy has been identified as one of Kenya's most effective energy sources to meet growing electricity demand and keep the energy sector on a high-growth low-carbon development pathway. In order for Kenya to reach its 2030 geothermal targets, approximately USD 20 billion of investments is needed.

Development of geothermal power is a two-step process. First, wells are drilled to produce steam and then the steam is converted into electricity. The first step (exploration and drilling) is financially highly risky, and in Kenya the current strategy is to undertake this first phase using public money. To this end, the Government of Kenya established the Geothermal Development Company (GDC) in 2009 as a special purpose vehicle, wholly owned by the Kenyan Government. GDC 'opens up' new fields for Independent Power Producers (IPP), who would enter as 'steam to power' converters. In addition to this, further support for IPPs is provided through a feed-in tariff.

Analysis shows that the two main bottlenecks to scaling up geothermal power generation are 1) capital limitations of the two main (government-owned) geothermal developers KenGen and GDC, and 2) long lead-times for bringing capacity on-line.¹⁴ So despite the ongoing efforts by the government and a range of internationally supported initiatives,¹⁵ there is a need to attract (more) private investments. Only then will the sector be able to expand fast enough to meet its ambitions.

NAMA design

In response to this challenge, the Government of Kenya has designed a NAMA that aims to make it more attractive for early stage private investments.^{16,17} The NAMA has two phases (2014-2016 and 2016-2020) and will directly support 820 MW of geothermal to be developed. The support requirements associated with this NAMA are approximately USD 10 million for the first phase and USD 200 million for the second phase.

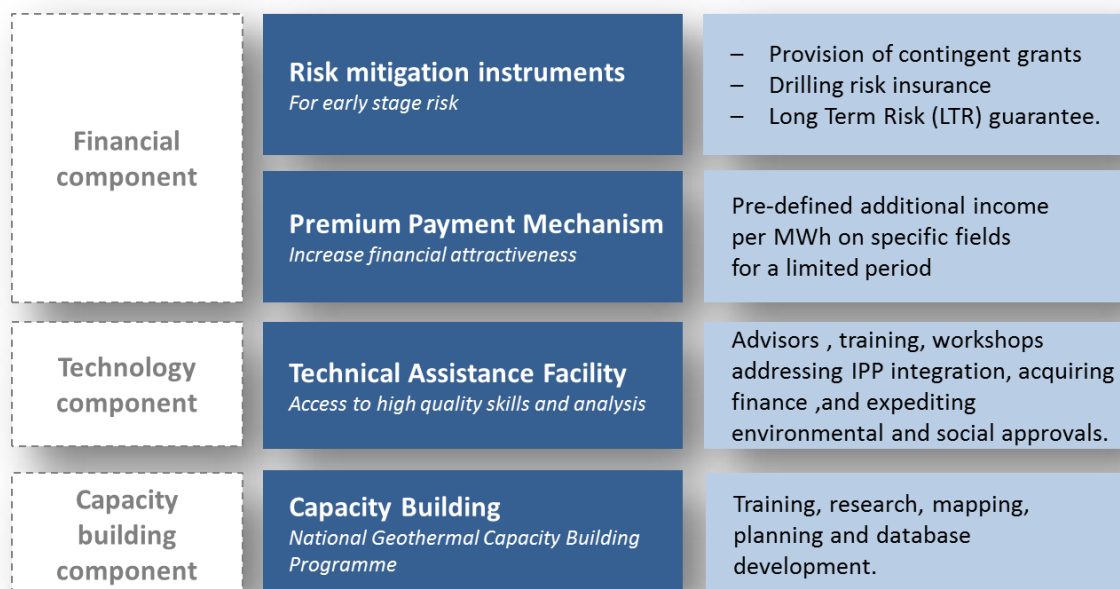
¹⁴ Falzon *et al.* NAMA for accelerated geothermal development in Kenya (Proposal). 2014. http://www.mitigationmomentum.org/downloads/NAMA_proposal_Kenya.pdf

¹⁵ Several support programs are ongoing, for example by AFD, KfW, JICA, and the World Bank.

¹⁶ The NAMA proposal was developed by the government of Kenya in a 16 month stakeholder process, supported by ECN through the Mitigation Momentum project. For more information see Falzon *et al.* (2014).

¹⁷ The NAMA was submitted to the UNFCCC NAMA Registry for recognition early 2014

Figure 4. NAMA structure geothermal proposal Kenya (source: Falzon *et al.*, 2014)¹⁸



Financial mechanism: drilling risk insurance

As mentioned above, the early stages of geothermal development are risky, and especially risks associated with geology are difficult to hedge commercially. Exploration and test drilling, and even drilling the production wells, are known to have high failure rates. In addition, once a well is drilled, there is always the risk (albeit small) of lower-than-expected performance. This results in a risk-return profile that is not very attractive to private investors.

As one of the priority financial instruments of the first phase of the NAMA, a production **drilling risk insurance** is planned. This insurance exists,¹⁹ but is in its infancy and not yet commercially available. The NAMA aims to mainstream *and* field-test the insurance using international support to provide a subsidy on the insurance premium for early movers, as well as grants for preparatory work and transaction advisory support.

In Kenya, the current strategy is to use public money to undertake exploratory and production drilling: Typically, public investments cover up to 59 percent of the required investment costs under this approach. With a drilling risk insurance in place, which repays (private) developers in case of drilling

¹⁸ Falzon *et Al.* NAMA for accelerated geothermal development in Kenya (Proposal). 2014.

http://www.mitigationmomentum.org/downloads/NAMA_proposal_Kenya.pdf

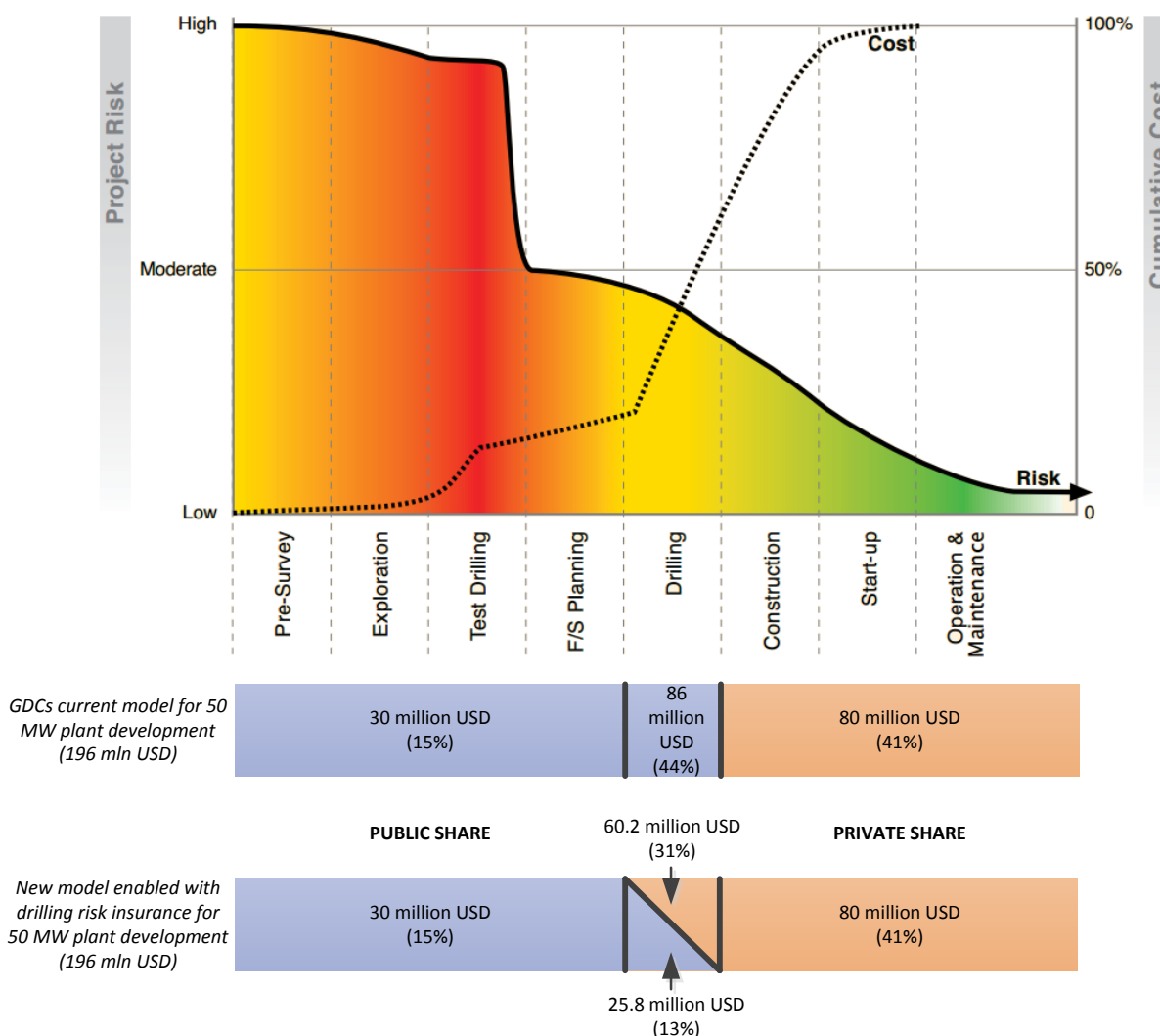
¹⁹ Insurance for production drilling has been in development for some years and attempts to affect it in Turkey (IFC) and Kenya (Marine Power) through Munich RE are on-going.

failure or lower than expected output of the well, the downside risk is significantly lower and this makes the risk-return profile of the investment more attractive for private players.

Figure 5 shows two public-private cooperation (PPC) scenarios. The first scenario illustrates a geothermal field that is developed using largely public funds, and the second scenario illustrates what can be achieved with a public-private partnership that has the risks reduced with insurance. The scenario with the drilling risk insurance in place requires less than half the amount of public investment for the same project: 28 percent in the second PPC scenario compared to 59 percent in the first. So with the same amount of public money, twice as much generating capacity can be financed.

Figure 5: Risks and costs for development of a 50 MW plant under the new GDC model

Adapted from Energy Sector Management Assistance Program 2012²⁰



²⁰ http://www.esmap.org/Geothermal_Handbook

Conclusion

The Kenyan Geothermal NAMA is designed to accelerate geothermal power development by mobilizing the private sector to play a more leading role in geothermal power development. To do so, a variety of barriers are addressed with different instruments, to promote investments and joint developments through Public-Private Cooperation models. The production drilling risk insurance described here provides an example of how a targeted financial instrument can shift the investment burden for a climate friendly technology from public to private actors, allowing public funds to have a greater impact per dollar employed. It also illustrates that for many technologies unique challenges exist that require a bespoke solution to be overcome.

Summary

These case studies are meant to illustrate several overarching benefits to employing a variety of financial mechanisms in NAMAs:

- **Private sector investment** - With over 60 percent of climate finance coming from the private sector, it is clear that mobilizing private sector investment is a critical component to achieving low-carbon development. Co-financing, guarantees, and equity funds can serve as credit enhancements to attract private sector financing of NAMA projects.
- **Affordability** – Many financial mechanisms such as concessional loans are meant to reduce the cost of financing. High financing costs can reduce the financial viability of an otherwise sound project. Providing affordable capital can help to overcome this barrier to investment.
- **Sustainability** - NAMA financial mechanisms that are designed to be self-funding (i.e. repayments from investment are re-invested in the mechanism to fund more projects) can have a greater impact than those that simply buy down project costs or interest rates. Donor grants, for example, can be used to co-finance local bank lending to eligible projects. Even if the donor portion of the loan is at 0 percent interest, the repayment of loan principle can be used for future projects.
- **Leverage** - NAMA financial programs that leverage additional investments from both the private sector as well as other government sources (both domestic and international) will increase the impact of the donor funds. As the case studies illustrate, leveraging can be accomplished through a number of mechanisms, including equity funding, co-financing programs, guarantees, and insurance programs.

Financial mechanisms should be tailored to the unique financial markets conditions in the host country, and be targeted to address the specific financial barriers to investments in NAMA-related projects. When they are effectively designed, financial mechanisms can catalyze additional investments from the private sector and contribute to the transformation to low-carbon development.

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