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Avet Khachatryan

with contributions from Jason Dion, Dave Sawyer, Melissa Harris and Deborah Murphy

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Head Office
161 Portage Avenue East, 6th Floor, Winnipeg, Manitoba, Canada R3B 0Y4
Tel: +1 (204) 958-7700 | Fax: +1 (204) 958-7710 | Website: www.iisd.org

Financing Nationally Appropriate Mitigation Actions (NAMAs): Leveraging private investment

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Written by Avet Khachatryan with contributions from Jason Dion, Dave Sawyer, Melissa Harris, Deborah Murphy

Executive Summary

Developing countries have increasingly taken transformative actions to tackle climate change by increasing the generation of clean energy, improving energy efficiency, reducing greenhouse gas (GHG) emissions from transport and waste and other measures. Nationally Appropriate Mitigation Action (NAMA) mechanisms aim to help developing countries reduce GHG emissions and to facilitate low-carbon development in those countries. NAMAs are an important climate mitigation mechanism because of their potential to transform sectors and economies. Considering the growing number of countries adopting NAMAs, and the scale of these initiatives, sustainable long-term funding of NAMAs is an important issue. Organisation for Economic Co-operation and Development countries have pledged to provide US$100 billion per year for developing countries by 2020. Yet it is estimated that mitigation efforts in developing countries will require up to US$300 billion per year by 2020. In light of potentially insufficient public funding, the private sector has played an increasingly important role in global climate finance. This paper discusses various aspects of NAMA funding, including the challenges and opportunities that developing countries may face in securing sufficient and sustainable finance, case studies of successful interactions with private funders, and recommendations to NAMA developers and their international partners to help attract private investment to NAMAs.

NAMAs, the global climate finance landscape and the role of the private sector. In 2012, 68 per cent of the US$359 billion of climate funding worldwide came from the private sector. In addition to finance, the private sector has significant project management, monitoring and evaluation capacities. Yet, out of the 45 NAMAs listed in the United Nations Framework Convention on Climate Change NAMA registry as of May 2014, only 36 per cent have acknowledged that they are planning to work with the private sector. Reliance on international public sector funding for NAMAs and the developers' unfamiliarity with the private sector may have contributed to its limited engagement in these initiatives. However, the situation is changing as more international NAMA support mechanisms are focusing on using public funding to leverage private capital and NAMA bankability, or their capacity for revenue generation, is becoming an important success criteria.

The roles of public and private actors in NAMA funding. When designing bankable NAMAs, developers should consider the strengths and opportunities brought to the table by national governments and agencies, bilateral and multilateral stakeholders, and private actors. Of special importance are mechanisms ensuring cross-sector collaboration, such as public-private partnerships.

Key aspects of initiatives that have attracted private finance. Many such initiatives exist both within and outside the NAMA domain. To help NAMA developers learn more about them, this paper reviews eight case studies of climate change mitigation and public infrastructure creation or transformation projects and programs that have successfully mobilized, or have the potential to mobilize, private investments. The case studies include initiatives from Bulgaria, Cape Verde, Croatia, Mexico, Morocco, the Philippines, Tunisia and the United Kingdom. The eight case studies demonstrate the following six aspects of bankable projects and programs: their implementing bodies and ownership, the role of national public actors, domestic and international private sectors, international stakeholders and the needs of end users. The eight case studies show the need for an implementing body to manage the public and private financial flows effectively. Ownership is the structure of an initiative and the roles of various stakeholders in it. Of particular interest here is the role of the private sector in decision making and implementation. The role of government funding and policy support, especially in countries with developing capital markets, is important for a project or program's success. The roles of domestic and international private actors are important as a source of equity or debt finance, management and technical support. The roles of international stakeholders such as development banks, climate funds and international

organizations are also prominent, as they provide grants, concessional and market-rate loans, and loan guarantees, as well as management support and technical assistance. Finally, bankability is affected by a project or program's ability to take into account the demand of end users and the situation in relevant markets and by its ability to correctly identify the challenges and opportunities that exist for end users.

Risk mitigation mechanisms. In addition to discussing the roles of various stakeholders and their interactions, the case studies demonstrate diverse mechanisms that projects and programs employ to mitigate various risks for private funders, including political, economic, financial, performance and other risks. The eight case studies have employed a wide range of risk mitigation tools, including government policies, risk and credit guarantees, demand stimulation measures, loan repayment facilitation schemes, credit ratings, power purchase agreements, and operations and maintenance contracts. A key lesson to be learned from the case studies is that risk mitigation is crucial to the success of bankable NAMAs.

Recommendations for NAMA developers and international stakeholders. Considering that transformative initiatives such as NAMAs require sophisticated management and financial frameworks, strengthening coordination between relevant government agencies, bilateral and multilateral stakeholders, and private funders is of utmost importance. NAMA developers should study the global NAMA finance landscape to identify as many domestic and international funding sources as possible. They should take steps to attract private investments early in the NAMA development process and use public finance to leverage the maximum possible amounts of private finance. To facilitate private investment, NAMA developers should utilize a broad range of risk mitigation mechanisms.

Activities to link NAMA developers and sources of private finance are especially important for successfully leveraging private investment. Considering that, international stakeholders can help NAMA developers by collecting and disseminating information about possible funding sources and best practices in private funding. They can also proactively engage the private sector in NAMAs by supplying potential investors and lenders through information and training related to NAMAs.

The NAMA mechanism is in an early stage of development. It is hoped that designing bankable NAMAs will help make climate change mitigation efforts in developing countries sustainable and contribute to low-carbon development in those countries, thus creating long-lasting economic, social and environmental benefits.

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List of Acronyms

AFC	Africa Finance Corporation
AFD	French Development Agency
AfDB	African Development Bank
AMC	Advance market commitments
ANME	National Agency for Energy Conservation of Tunisia
BEEF	Bulgarian Energy Efficiency Fund
BFI	Bilateral financing institutions
CDM	Clean Development Mechanism
CER	Certified Emission Reductions
CONAVI	Mexico's National Housing Commission
CSP	Concentrated solar power
CTF	Clean Technology Fund
DBP	Development Bank of the Philippines
DCA	Development cooperation agency
DFID	U.K. Department for International Development
EE	Energy efficiency
EIB	European Investment Bank
ESCO	Energy service company
FDI	Foreign direct investments
GCF	Green Climate Fund
GEF	Global Environment Facility
GHG	Greenhouse gas
GIZ	German Society for International Cooperation
HBOR	Croatian Bank for Reconstruction and Development
HEP	Hrvatska Elektroprivreda d.d.
IBRD	International Bank for Reconstruction and Development
IDB	Inter-American Development Bank
IFI	International financial institution
JBIC	Japan Bank for International Cooperation
KfW	German Development Bank
LAIF	Latin America Investment Facility
LGU	Local government units
MASEN	Moroccan Solar Energy Agency
MATTM	Italian Ministry of the Environment for the Protection of Land and Sea
MDB	Multilateral development banks
MDG	Millennium Development Goals
MEDREC	Mediterranean Renewable Energy Centre
NAMA	Nationally Appropriate Mitigation Actions
OECD	Organisation for Economic Co-operation and Development
ONEE	Moroccan National Office for Electricity and Potable Water
PCG	Partial credit guarantees
PFI	Private financing institutions
PGGM	Pension Fund for Care and Well-Being
PPA	Power purchase agreements
PPP	Public-private partnership
PWRF	Philippine Water Revolving Fund
RE	Renewable energy
ROC	Renewables obligation certificate
SHF	Mexican Federal Mortgage Society
SPC	Solar power company
SPV	Special purpose vehicle
STB	Tunisian National Bank
STEG	Tunisian Society for Electricity and Gas
SWH	Solar water heating
UBCI	Tunisian Commercial and Industrial Banking Union
UNDP	UN Development Programme
UNEP	UN Environment Programme
UNFCCC	UN Framework Convention on Climate Change
UNFCCC COP	UNFCCC Conference of Parties
USAID	U.S. Agency for International Development
WD	Water district
WOW	Walney Offshore Windfarms
WSP	Water service provider

Glossary of Financial Terms

Bankability	Attractiveness to investors or lenders based on revenue-generating potential
Collateral	Assets offered by the borrower to secure a loan
Concessional loan	Loan provided on more generous terms compared to market terms—e.g., with grace periods or lower interest rates
Credit enhancement	Improving credit rating with a lender—e.g., through additional collateral or guarantees
Credit rating	Evaluating a borrower's financial health and capacity for loan repayment
Debt	Obligation-based financial arrangement in which the creditor (lender) lends assets to the debtor (borrower) in exchange for a promise to repay, usually with interest
Derivative	Security with value derived from an underlying asset
Equity	Share in a company's profits—e.g., company stocks
Green bond	Fixed-income security facilitating investment in sustainable companies, programs or projects
Impact investment	Investment with social or environmental impact
Market loan	Debt-based funding arrangement on market terms
Mezzanine finance	Hybrid financial arrangement that includes elements of debt and equity thus providing additional flexibility (also referred to as quasi-equity)
Non-recourse debt	Collateralized debt arrangement in which recourse is limited to the borrower's current assets; recourse of collateral is not possible
Partial credit guarantees	Guarantees of partial debt repayment in case of the borrower's default
Partial risk guarantees	Guarantees of partial debt repayment in case of sovereign risk—e.g., government default
Private equity	Equity of a company that is not listed on a public exchange
Public equity	Equity of a company that is listed on a public exchange
Quasi-equity	Debt with some characteristics of equity (also referred to as mezzanine finance)
Risk-adjusted return	Adjusting investment returns for the value of risks involved in the investment
Securitization	Pooling financial assets (e.g., debt obligations) and selling them to investors in exchange for tradable financial instruments (securities)
Seniority	Order of loan repayment in the event of bankruptcy: senior debt is repaid before subordinated debt
Sovereign guarantees	Government guarantees of loan repayment in case of the borrower's default
Tenor	Loan term length or time remaining until loan repayment
Venture capital	Early stage capital for start-up companies or new technologies

1.0 Background

1.1 What are NAMAs?

Nationally Appropriate Mitigation Actions (NAMAs) are an emerging climate mitigation mechanism that may include projects, strategies and policies that contribute to greenhouse gas (GHG) emission reductions in developing countries and facilitate low-carbon development in those countries. A NAMA can be "any mitigation action tailored to the national context, characteristics and capabilities, and embedded in national sustainable development priorities" (Sharma & Desgain, 2013, p. 11). NAMAs have gained significance as part of two key climate governance frameworks—the 2007 Bali Action Plan and the 2010 Cancun Agreements. NAMAs are important for low-carbon development strategies because they help link climate mitigation efforts with social and economic development priorities (Sawyer et al., 2013, p. 5). Another benefit of NAMAs is that their geographic spread is potentially much more ambitious than with existing mitigation instruments such as the projects in the Clean Development Mechanism (CDM) framework that have largely concentrated in Asia and the Pacific and in several emerging economies; thus, NAMAs have allowed more developing countries to implement mitigation projects (Van Tilburg et al., 2013, p. 11). Finally, NAMAs may be divided into opportunistic short-term actions—those without a significant multiplier effect on development—and transformative policy-based actions—those that can potentially lead to significant shifts in a country's development path (Vanamali, 2012, p. 12). Transformative NAMAs have to be aligned with sectoral or national development priorities and, as such, require high-level commitment from particular sectors or national governments (Hänsel et al., 2012, p. 23).

As shown in Figure 1, NAMAs can be divided into three types by funding sources:

1. Unilateral NAMAs rely on domestic public and private finance.
2. Supported NAMAs require international funding in addition to domestic contributions.
3. Credited NAMAs are funded through carbon markets[1] (Sawyer et al., 2013, p. 2).

A very important aspect of NAMA funding is bankability. According to Khalil (2012), a bankable NAMA is one that has committed public and private stakeholders, evidence of economic benefits from implementation, validated economic assumptions regarding the NAMA's inputs and outputs, positive financing indicators, prudent implementation, sufficient funding, contractual structure to mitigate risks at various stages of implementation, and sustainable operations (Khalil, 2012, p. 11).

[1] The concept of credited NAMAs is debatable, and such NAMAs are not yet implemented in practice.

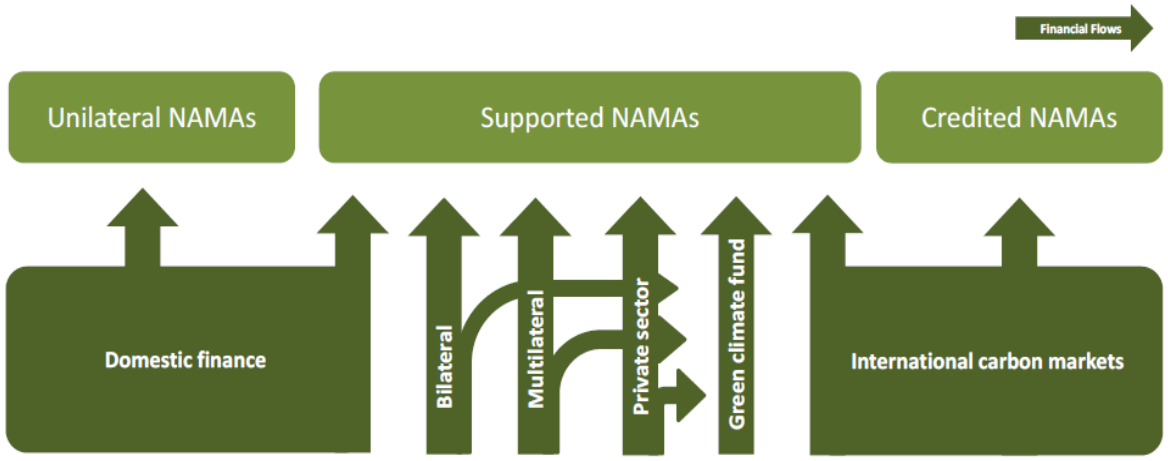

FIGURE 1. NAMA TYPES BY FUNDING SOURCE

Source: Sawyer et al. (2013, p. 2)

Based on the decisions of the United Nations Framework Convention on Climate Change (UNFCCC)'s 16th Conference of Parties (2010), in 2013 UNFCCC set up a registry of NAMAs seeking international support. The scope of this registry is to help NAMA developers obtain financial, technological and capacity-building support for their projects. Participation in the registry is voluntary; as such, the registry is not comprehensive, as some NAMAs are not listed. As of May 2014 the registry lists 45 NAMAs, including 13 NAMAs seeking support for preparation, 28 NAMAs seeking support for implementation and 4 NAMAs seeking recognition. The registry places NAMA submissions into seven mitigation sectors; each submission may include activities in more than one sector. As can be seen in Figure 2, as of May 2014 the majority of the submitted NAMAs were in the energy sector, while NAMAs in transport, forestry and agriculture were the smallest shares of the total.

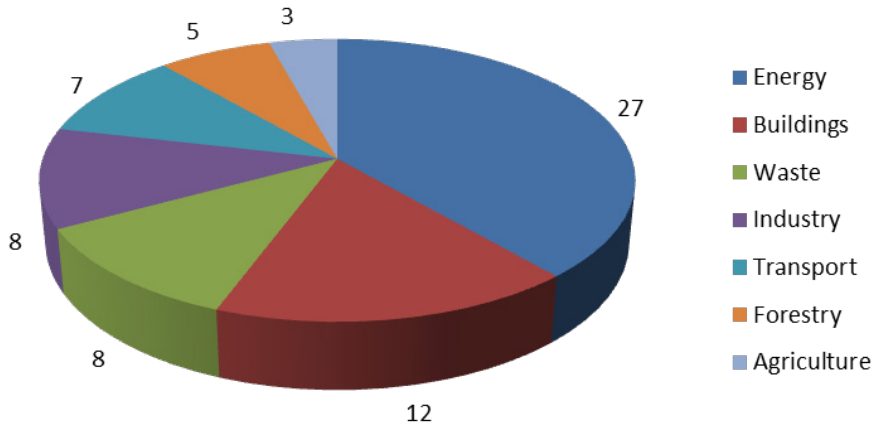

FIGURE 2. NUMBER OF NAMAS BY SECTOR

Source: UNFCCC (2014)

Although NAMA preparation is often done with support from international organizations and experts, it is expected that accumulating best practices should allow countries to develop NAMAs using their own resources—that is, to develop unilateral NAMAs (Hänsel et al., 2012, p. 15).

1.2 Climate Finance and NAMA Funding: Challenges and Opportunities

Currently there is no internationally accepted standard definition of climate finance. According to a definition offered by Brambhatt (2011), climate finance includes "resources that catalyze low-carbon and climate-resilient development by covering the costs and risks of climate action, supporting an enabling environment and capacity for adaptation and mitigation, and encouraging research, development, and deployment of new technologies" (p. 11). In 2012 the total amount of climate funding worldwide was US$359 billion; 68 per cent of that amount came from the private sector and 32 per cent from the public sector (Buchner et al., 2013, p. 6). Public sources include domestic, bilateral and multilateral funding, while private sources include foreign direct investment (FDI), loans and equity investment in technologies and projects enabling climate change mitigation and adaptation. Domestic and international public and private funding is blended together, thus reducing transaction costs and increasing impact (Sawyer et al., 2013, p. 37). Between 30 to 50 per cent of global climate finance (the percentage depends on research methodologies used) is deployed in developing countries (Buchner et al., 2013, p. 3). While emerging economies are beginning to play an active role in climate finance, members of the Organisation for Economic Co-operation and Development (OECD) provide most of the international public funding for climate change mitigation, either directly through bilateral mechanisms or indirectly through multilateral initiatives (Limaye & Zhu, 2012, p. 46).

According to some estimates, under a low-carbon development scenario an average of US$5.7 trillion per annum in green investments globally will be required between 2010 and 2030 (World Economic Forum, 2013, p. 13). Developed countries have pledged to work towards ensuring the availability of US$100 billion per year for developing countries by 2020 (Haites, 2013, p. 1). The funding situation in the interim period between 2014 and 2020 remains unclear (Boyle, 2012, p. 2). As mitigation actions gain speed, funding needs will increase. By 2030 climate change mitigation will require US$175 billion to US$565 billion globally on an annual basis (Haites, 2013, p. 7). Mitigation efforts in developing countries may require up to US$300 billion per year by 2020 (Gagnon-Lebrun & Barrigh, 2013, p. 117). Adaptation needs will also be significant. It is estimated that public bilateral and multilateral efforts combined with carbon markets may help leverage up to an additional US$200 billion to US$400 billion by 2020 in gross private funding relative to current forecasts (Brambhatt, 2011, p. 7). In 2013 about 65 per cent of all adaptation finance was invested in developing countries (Buchner et al., 2013, p. II). Developing countries can be expected to continue to receive a significant share of global adaptation finance. In 2010, at UNFCCC's Conference of Parties (COP) 16 in Cancun, it was decided to establish the Green Climate Fund (GCF), which will be the main operational financial mechanism of the UNFCCC. The GCF is expected to help developing countries obtain funding for their mitigation efforts, but it has not yet become fully operational. Over time, GCF will aim to ensure a 50/50 balance between mitigation and adaptation in its work (GCF, 2014, p. 4).

Access to international climate finance is essential for developers of supported NAMAs. According to the NAMA Registry, as of May 2014 requests for NAMA financial support amounted to over US$4 billion (UNFCCC, 2014). Since not all existing NAMAs have been included in the voluntary registry, the actual requested amounts of financial support may be larger. Figure 3 shows that, for the NAMAs listed in the registry, requests for financial support vary from less than US$1 million (for example, NAMAs from the Cook Islands, Mali and Uruguay) to over US$1 billion (a NAMA from Serbia). This may reflect the size of the economies in question as well as the level of ambition displayed in these NAMAs. One important question in this regard is: what are the chances for stable and long-term financing of NAMAs?

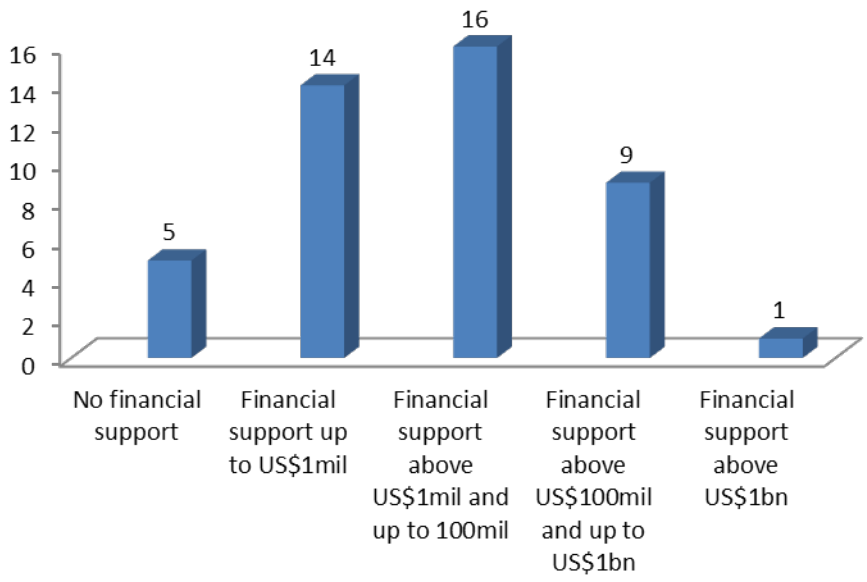

FIGURE 3. REQUESTED FINANCIAL SUPPORT FOR NAMAS

Source: UNFCCC (2014)

The issue of securing sustainable (stable and long-term) sources of finance for climate mitigation and adaptation has been on the global agenda for a few decades. Just in the past decade, this issue was highlighted in the 2007 Bali Action Plan, 2009 Copenhagen Accord and 2010 Cancun decisions. Developing countries face three challenges as they attempt to secure long-term climate finance. First, pledges of international public finance are not the same as actual disbursements: stakeholders may pledge more than what they actually deliver. Second, project-based finance is not sustainable for long-term programs that are intended to transform developing countries' economies and to develop new markets. Third, the future of carbon finance is unclear, as some carbon markets are struggling to sustain a meaningful carbon price. These challenges, however, do not result in a negative outlook for developing countries. In fact, understanding the volatility of international climate finance provides an opportunity by allowing these countries to approach climate finance strategically, cultivating various funding sources rather than relying on the funding that is currently available (Vanamali, 2012, p. 12).

In particular, there is growing understanding of the fact that sustainable financing of NAMAs requires blending funds from public and private sources (Wilkes, Tennigkeit, & Solymosi 2013, p. 41). Both the public and private sectors benefit from the blending process. For example, according to Khalil (2012), it gives domestic private financial companies opportunities to support the national economy in a sustainable way, obtain experience in project funding with domestic and international public partners, and diversify their portfolios (Khalil, 2012, p. 6). Given this, NAMA developers can benefit from existing experience in using public finance to leverage private investments. One definition of leveraging refers to the:

> [A]bility of a public financial commitment to mobilize some larger multiple of private capital for investment in a specific project or undertaking … and to the potential for catalytic or transformational public investments or initiatives to encourage much more widespread climate-friendly changes in behaviour by private firms across the whole economy … by addressing economy-wide market failures or barriers to investment. (Brambhatt, 2011, p. 34)

Based on the experience of multilateral development banks (MDBs), the leverage factor may range from three to six for non-concessional loans and eight to 10 and above for concessional loans and grants (Brambhatt, 2011, p. 39).

Considering the above, NAMA developers should be encouraged to consider leveraging private finance and to familiarize themselves with the specifics of working with the private sector. To succeed in this, governments and international stakeholders should help NAMA developers create conditions for dialogue with the private sector regarding the benefits and modalities of investing in NAMAs (van Tilburg et al., 2013, p. 5). Specifically, NAMA developers should analyze the opportunities for private investments in their countries and, based on that, assess the need for public finance that they will use to leverage private funding (Vanamali, 2012, p. 7). Several practical challenges should be noted in this regard. First, it is not always clear how NAMAs will incorporate private actors, considering that NAMAs are "owned" by national governments. Second, information about the role of the private sector in mitigation efforts is inconsistent, and the UNFCCC process does not always take the private sector into account (Limaye & Zhu, 2012, p. 4). Third, in spite of the overall abundance of data on climate funding, specific information about the incentives and opportunities for the private sector to invest in NAMAs is not always available, which may reduce the private sector's interest in NAMAs.

Figure 4 outlines seven steps in the preparation of NAMAs, from identification to implementation. While financing is mentioned only at step 6, it is advisable to start thinking about ways to finance future NAMAs already at step 1 or 2. For those NAMA developers who are interested in leveraging private finance, this thinking should include the private sector. Specifically, NAMA developers should consult private sector stakeholders during the early stages of NAMA development, obtain their feedback on the design of the draft NAMAs, and involve them in the implementation of NAMAs (World Business Council for Sustainable Development, 2013, p. 5). This is important because early planning allows developers to foresee future opportunities for profit generation, therefore making them attractive to the private sector.

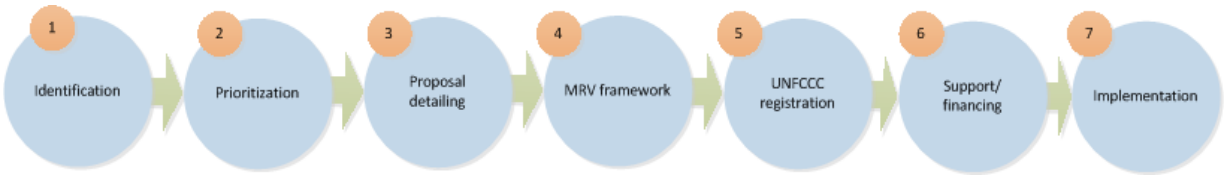

FIGURE 4: SEVEN STAGES OF NAMA PREPARATION

Source: Cameron (2013, p. 2)

So far, only 16 of the 45 NAMAs listed in the UNFCCC registry have explicitly stated their plans to engage private companies as funders and/or implementing parties (UNFCCC, 2014). Information in Appendix I shows that these 16 NAMAs intend to facilitate private sector investment in waste management, solar and geothermal energy generation,

sustainable forestry, energy efficiency in transportation, and to engage companies in clean production agreements. This corresponds with general trends in private sector investment in mitigation efforts. Energy efficiency and renewable energy, waste management and cleantech generally present more examples of private sector interventions compared to agriculture and forestry (Patel, 2011, p. 5). For example, four out of five NAMAs with private sector participation that took part in the Mitigation Momentum project[2] are related to renewable energy, energy efficiency or waste to energy (van Tilburg et al., 2012, p. 18).

Projects in the renewable energy and energy-efficiency sectors are often attractive for private investments because subsidies associated with those sectors help reduce risks for investors (such as deployment risks associated with new technologies). The importance of such subsidies, however, is declining with the costs of deploying the two leading renewable energy technologies—wind and solar (Frankfurt School of Finance & Management and BNEF, 2014, p. 15). Initiatives in the transport sector may also be attractive for private investors, as they are generally funded by governments and development cooperation agencies and so may be associated with less risk compared to initiatives in other sectors (Huizenga and Bakker, 2010, p. 5). As for agriculture, Wilkes et al. (2013) note that, while it is possible to identify 62 agricultural NAMAs from 30 countries, climate projects in agriculture are receiving a small share of overall financing (pp. vii–viii). One of the reasons is that agriculture projects are associated with significant capital expenses and high transaction costs (Bockel, Gentien, Tinloy, & Bromhead, 2010, p. 18).

As noted by Institutional Investors Group on Climate Change et al. (2011), NAMA developers should keep in mind that private investments require the development and implementation of stable and predictable policy frameworks that create incentives for private investment and help address inherent risks related to those investments (p. 2). These issues are beginning to be addressed through international NAMA support facilities that have emerged in the past years. Currently, eight such initiatives are listed in the UNFCCC NAMA registry, including the International Climate Initiative, the NAMA Facility, the Global Environment Facility Trust Fund, the EU-Africa Infrastructure Trust Fund, the Latin American Investment Facility and other initiatives. Most of them have already funded the preparation or implementation of NAMAs and other low-carbon development programs. Appendix II provides information about these initiatives. While some of these initiatives are not NAMA- or climate-specific, all of them have a significant focus on low-carbon development and market transformation, and on facilitating private investments. In addition to these and other efforts, encouraging private investments will be an important part of the GCF's operations. According to GCF (2013) documents, the fund's Private Sector Facility will enable the fund to "directly and indirectly finance private sector mitigation and adaptation activities at the national, regional and international levels" (p. 1). GCF's Investment Framework specifies that the fund will "maximize fund-wide engagement with the private sector, including through significant allocation to the Private Sector Facility" (GCF, 2014, p. 4). Specific aspects of private investment in climate change mitigation projects, and NAMAs in particular, are discussed in the next sections.

[2] Mitigation Momentum project, implemented by ECN Policy Studies and Ecofys Germany, supports NAMA development and related collaboration and knowledge exchange.

2.0 The Roles of Public and Private Actors in NAMA Funding

Climate change mitigation programs and projects can be funded by domestic and international public actors and domestic and international private actors. For NAMA developers, working with each group of actors is associated with specific issues that are discussed below.

2.1 National Governments, Agencies and State Banks

The role of domestic public actors is important in terms of both funding and policy setting. This section is dedicated to funding, and policy-setting is discussed in the section on risk mitigation. Domestic public funding comes primarily from taxes, but governments also use other instruments to collect revenue, including removing or redistributing fossil fuel subsidies and collecting money from domestic carbon markets and offsets (United Nations, 2010, p. 28). This funding is disbursed primarily through grants, balance sheet financing of projects and facilities and concessional finance (Buchner et al., 2012b, p. 23). Concessional finance may include loans with reduced rates, longer tenors, or a lower level of seniority or collateralization. These instruments can be used to address market failures, to ensure equal access to goods or services or to promote investments in innovations (Patel, 2011, pp. 16–17). For example, due to risks for investors in new technologies in energy generation and energy efficiency, the market often fails to finance such technologies, and the public sector plays an important role in correcting that problem (Brambhatt, 2011, p. 12). Figure 5 illustrates the important role of governments in financing early-stage technology development.

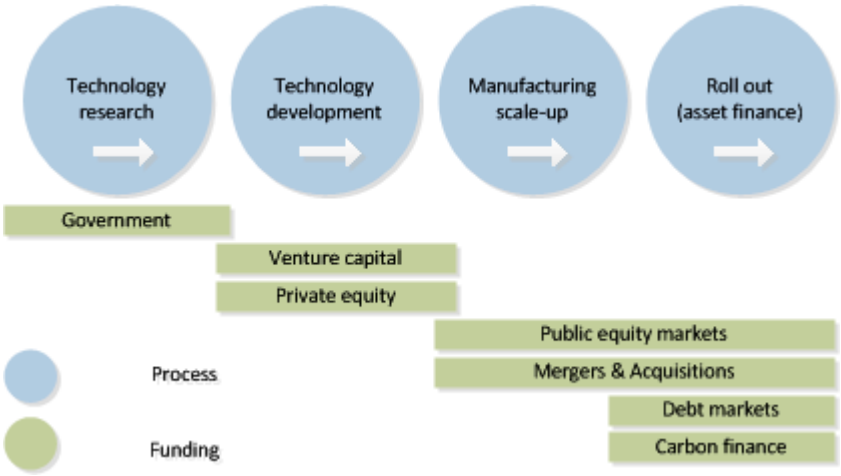

FIGURE 5. SOURCES OF FUNDING AT DIFFERENT STAGES OF TECHNOLOGY DEVELOPMENT AND DIFFUSION

Source: Patel (2011, p. 4)

Overall, a large share of climate mitigation funding globally is provided in the form of concessional finance, often in partnerships between public and private financial institutions. For example, a public bank may provide a concessional loan to a commercial bank on the condition that the commercial bank matches the loan with its own funding so as to provide a concessional loan to the end recipient (Limaye & Zhu, 2012, p. 47).

Governments may provide funds to international (bilateral and multilateral) and domestic initiatives. According to Buchner et al. (2013), in 2011–2012 public sector funding averaged US$135 billion worldwide, or almost 38 per cent

of total climate finance (p. 6). Increasing domestic climate funding may be challenging for many countries that are unwilling or unable to increase their tax bases, especially in the wake of the recent financial crisis (United Nations, 2010, p. 6). Countries are increasingly using national climate funds to coordinate climate funding at the domestic level. According to Flynn (2011), national climate funds perform four useful functions in the context of climate finance: they redirect funds towards activities that help address climate change, they blend finance from several sources to maximize impact, they coordinate climate change activities at the national level and they help countries manage financial resources better (p. 8).

It is important for governments to design comprehensive strategies for attracting climate finance. For example, O'Connor & Chenoweth (2010) recommend several measures for the government of Australia that should form a package to finance domestic clean technologies. Such a package would include utilizing the government's AAA credit rating and available financing and fiscal tools such as credit enhancement, debt, equity, tax concessions and credits to establish and support a clean energy finance corporation; to issue climate bonds to meet the demand for sustainable investment; and to participate in climate projects, including through power purchase agreements" (p. 7). While the situation in Australia may not necessarily be applicable to many developing countries, this example demonstrates the importance of comprehensive approaches and strategic thinking.

To be able to prioritize climate change mitigation spending in the future, governments must demonstrate to society that they are using public finance effectively, with significant positive economic, environmental and social effects (Buchner et al., 2012a, p. 2). Arguably, one of the best uses for public finance is to prepare emerging projects or programs for private investment. Private funders are often risk-averse, and public funding is necessary for leveraging private investments in new mechanisms such as NAMAs. The presence of public funds sends a positive signal to private funders and serves as a guarantee of the project's viability. Moreover, public funding often becomes the only opportunity to finance those aspects of NAMAs that have low potential for private investments (such as operational costs). That is why public finances must be used strategically. For example, investments in renewable energy technologies require public finance to play a key role in enabling those technologies to reach the stage when they can be commercialized.

Realizing the importance of private investments, governments often make a significant effort to leverage private funding for climate change mitigation and infrastructure transformation initiatives. There is no single recipe for leveraging funds. Some of the instruments the public sector may use to leverage private funding for renewable energy NAMAs are loans, investment finance (funding in return for an equity stake), credit guarantees (a tool to mobilize private finance for projects with perceived repayment risk) and public procurement (preferential purchases of generated energy or equipment) (Michaelowa et al., 2012, p. 20). Other instruments may include subsidies and feed-in tariffs or measures to support technology transfer, capacity building and technical assistance. The amount of leverage will depend, among other things, on the market potential, indicating that it is possible to leverage more funding for already well-known technologies (Patel, 2011, p. 16).

2.2 International Bilateral and Multilateral Stakeholders

Considering that many issues around NAMAs have not been formalized yet, it is not surprising that bilateral and multilateral funding has played a key role in the early funding of NAMAs, as demonstrated for example by Norway's support to a renewable energy NAMA in Ethiopia (Hänsel et al., 2012, p. 17). Another example is the Nordic countries' initiative to finance NAMAs in Peru's waste sector and Vietnam's cement manufacturing sector (Buchner et al., 2012b, p. 52). Bilateral and multilateral support of NAMAs will likely be growing, at least until NAMAs are fully institutionalized within the global climate governance framework.

Currently bilateral funding has the largest share of total international public funding of climate initiatives (Vanamali, 2012, p. 6). In 2010, bilateral funding constituted 25 per cent of the total climate funding and 62 per cent of the total public funding (Haites, 2013, p. 3). Bilateral financing institutions (BFIs) and development cooperation agencies (DCAs) act on behalf of developed countries, primarily OECD members, to finance climate projects in developing countries and to provide technical assistance. An important difference between BFIs and DCAs is that BFIs are for-profit institutions that usually provide loans while DCAs care primarily for development and often provide grants (Limaye & Zhu, 2012, p. 31). Table 1 lists some of the leading BFIs and DCAs supporting climate projects. Examples of multilateral initiatives include the NAMA support facilities mentioned in the previous section and in Appendix II.

TABLE 1. EXAMPLES OF BILATERAL FINANCING INSTITUTIONS AND DEVELOPMENT COOPERATION AGENCIES

COUNTRY	FINANCING INSTITUTION	DEVELOPMENT COOPERATION AGENCY
Germany	German Development Bank	German Society for International Cooperation
France	PROPARCO (part of the French Development Agency Group)	French Development Agency
Japan	Japan Bank for International Cooperation	Japan International Cooperation Agency
Netherlands	Netherlands Development Finance Company	Ministry of Development Cooperation
Norway	Norwegian Agency for Development Cooperation	International Development Program at the Ministry of Foreign Affairs
Sweden	Swedfund International AB	Swedish International Development Agency
United States	Overseas Private Investment Corporation	US Agency for International Development

Source: Limaye & Zhu (2012, p. 32)

Bilateral stakeholders are instrumental in designing innovative funding mechanisms. For example, the U.K. Department for International Development (DFID) has pioneered the use of advance market commitments (AMCs), a potentially useful instrument in the design of NAMA funding modalities. An AMC is a market pull mechanism to incentivize the production of innovative products by guaranteeing their purchase at a guaranteed price over a certain period of time, using donor funding (Brambhatt, 2011, p. 45). According to Chatham House & DFID (2010), an essential aspect of AMCs is a financial agreement guaranteeing that once developed, a new product will have a market price to ensure reimbursement of project development costs (p. 4). AMCs may prove useful in the provision of energy for those communities that are connected to a central grid (Chatham House & DFID, 2010, pp. 11–13). In addition to funding, bilateral initiatives also provide technical support and capacity building to NAMA developers (although often through different vehicles). For example, while the German Development Bank (KfW) has provided financial support to NAMAs, the German Society for International Cooperation (GIZ) has published and supported several technical guides and early analyses of NAMAs.

Multilateral stakeholders are also important for global climate finance. These stakeholders include international organizations such as UN agencies, MDBs such as the World Bank, climate funds such as the GCF and special funds. Multilaterals provide financial and technical assistance and have played a significant role in NAMA development and early funding. Multilateral stakeholders provide both concessional and market-rate finance. According to Falconer and Frisari (2012), concessional finance and guarantees provided by multilateral stakeholders help increase investors' confidence in the project. Multilateral stakeholders often provide long-tenor loans (for example, loans with a 15-year maturity compared to commercial loans with a five-year tenor) that are more affordable to borrowers (Patel, 2011, p. 19).

At the same time, multilateral stakeholders often design financial schemes that reduce the use of concessional finance in order to avoid market distortions and to encourage the growth of commercial markets in developing countries (Patel, 2011, p. 20). For example, the International Monetary Fund's blended finance approach combines concessional finance and market-rate finance to support initiatives with market potential (International Finance Corporation, 2012, p. 6). In addition to finance, donors provide technical assistance based on their long-term experience in project design and management and provide international policy support (Falconer & Frisari, 2012, p. 22). Donors may choose to provide technical assistance instead of funding, as it is an important tool for increasing project capacity and sustainability (Patel, 2011, p. 18).

Due to the nature of their funding modalities, multilateral stakeholders often utilize combinations of concessional and market-rate loans and use rigorous reporting and performance evaluation frameworks. Multilaterals help bridge the gap between public and private finance, including building NAMA developers' capacity for sound financial planning and project implementation. For example, the UN Development Programme (UNDP) helps countries attract new finances through the Millennium Development Goals (MDG) Carbon Facility, which links the private sector in developing countries to carbon finance, and through the Capacity Development for Decision-Makers to Address Climate Change, which helps countries perform investment analyses and better prepare for climate change investments (Flynn, 2011, p. 41). Multilateral stakeholders also help mobilize new actors and funding modalities to the field of climate finance. For example, MDBs attract finance from pension funds and institutional investors through green bonds (Patel, 2011, p. 12).

Green bonds are instruments "specifically issued to finance environmental protection, sustainability or specific climate mitigation and adaptation measures" (Kidney & Oliver, 2014, p. 8). These bonds have the following benefits: they help access institutional capital, reduce costs of capital compared to ordinary debt, and enable institutional investors to match returns and liabilities (Brambhatt, 2011, p. 39). For example, the World Bank's green bonds are designed for institutional investors wishing to invest in climate change mitigation and adaptation projects. These green bonds have the same credit quality (Aaa/AAA) as the World Bank's other credit products, and there is no project risk involved since bond repayments are not linked to project performance (World Bank, 2013, p. 2). The International Finance Corporation, a World Bank arm that focuses on private sector investments, has a similar green bonds program. Over 76 per cent of climate-themed bonds in 2013 were issued in the transport sector, and about 12 per cent of them were issued in the energy sector (Oliver & Boulle, 2013, p. 3). In addition to financial due diligence, green bonds have to be certified to ensure that they are indeed contributing to low-carbon development. The bonds are certified through the Climate Bonds Standard and Certification Scheme that involves large-scale institutional investors and investor groups, financial service companies, and environmental non-profit organizations (Climate Bonds Initiative, 2011).

As Figure 6 demonstrates, green bond yields are typically not very high; most of these bonds offer yields in the 0–3 per cent range, and only a small share of green bonds offer yields above 5 per cent. Nevertheless, returns from green bonds are often greater than benchmark Treasury bonds (TD Economics, 2013, p. 4). In addition, there is significant growth potential for green bonds as the number and scale of renewable energy projects increases each year. Emerging economies in particular have a role to play in green bonds. For example, in 2012 Spanish developer Acciona issued a US$300 million bond for its wind project Oaxaca in Mexico, "the first investment-grade project bonds from an emerging market" (Oliver & Boulle, 2013, p. 6).

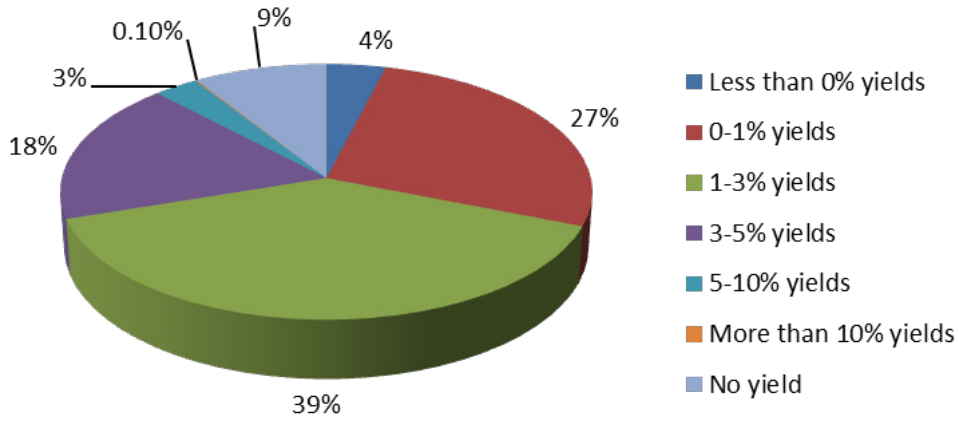

FIGURE 6: YIELDS FROM GREEN BONDS (PER CENT OF GREEN BONDS GLOBALLY[3])

Source: Oliver & Boulle (2013, p. 4)

Similarly to bilateral stakeholders, multilaterals also help pioneer innovative funding mechanisms such as output-based aid, a "results-based financing mechanism that supports the provision of basic public services by delegating the delivery of outputs … to a third party (typically a private operator) in exchange for the payment of a subsidy upon delivery of specific outputs" (International Development Association, 2009, p. 1). According to Kumar & Sadeque (2012), elements of output-based aid were used in a solar energy program in Bangladesh supported by the World Bank and other MDBs; the program uses subsidy payments and long-term credit to households to increase the affordability of energy (Kumar & Sadeque, 2012, p. 1). Aside from cultivating new investors and helping create new funding mechanisms, some multilateral donors have extensive guarantee and insurance programs. For example, the World Bank provides partial risk guarantees covering lenders against state entities' default on their contractual obligations, and partial credit guarantees covering credit risks of public borrowers; in addition, the Multilateral Investment Guarantee Agency, part of the World Bank group, provides political risk insurance (World Bank, 2012, p. 14).

Multilateral stakeholders also collect and disseminate information about investment opportunities that exist in developing countries (Brambhatt, 2011, p. 41). In addition, those stakeholders are experienced in combining finance from different sources. For example, climate funds blend domestic and international funding for project-based finance with a focus on environmental, social and economic sustainability (Buchner et al., 2012b, p. 39), and special funds such as the Africa Enterprise Challenge Fund or the China Environment Fund use public and commercial finance to leverage private finance for innovative business products (Limaye & Zhu, 2012, p. 60). Finally, multilateral stakeholders help develop essential criteria for NAMA fundability. For example, the United Nations Environmental Programme (UNEP) has proposed the following criteria: level of ambition, including both GHG reduction and transformation potential; national ownership, including proactive governments, co-benefits and embeddedness in low-carbon development; bankability, including financial viability and financial capacity; and a measuring, reporting and verification system that has broad data availability and is robust and cost-effective (UNEP, 2012, p. 12).

[3] Based on US$163 billion in green bonds outstanding in 2013, filtered through index-type inclusion rules (Oliver & Boulle, 2013, p. 4).

2.3 Private Actors

It is often believed that, while the public sector will continue to guide the process of addressing climate change, it is the private sector's involvement that will enable large-scale infrastructural transformations (Corfee-Morlot et al., 2012, pp. 4–5). Key climate policy documents such as the Copenhagen Agreement and the Cancun Accord specify that combining public and private capital is essential to addressing climate change mitigation (Vanamali, 2012, p. 15). Private actors may have different motivations for financing climate change mitigation projects. They may be driven by profits or the desire for social impact, by the desire to develop new markets or obtain access to carbon credits. Just in 2010–2011, the private sector invested US$224 billion in global climate finance, over 63 per cent of the global total (Buchner et al., 2013, p. 8). Sources of private funding include private and public equity and debt, and private actors that may be interested in financing climate projects include companies, commercial banks, non-bank financial institutions, private equity and institutional investors (Patel, 2011, p. 11). While banks provide much-needed debt, FDI is the largest source of climate funding; FDI is also important because of the associated knowledge and technology transfer (Limaye & Zhu, 2012, p. 55).

Private investment decisions are based on risk-return analysis—a project is attractive if it has the potential for profit generation and a relatively high reward/risk ratio (Limaye & Zhu, 2012, p. 56; Patel, 2011, p. 6). Table 2 illustrates different rates of return for projects or programs and types of funding that correspond to those returns. For example, a negative rate of return means that the proposed project or program is probably not commercially viable and requires grants to cover operating costs (UNFCCC, 2006, p. 85). Table 3 shows that modalities of private finance are related to the level of maturity of the initiative in question. Private companies are reluctant to pay for research and concentrate on technology development (venture and private equity capital) and commercial deployment (private equity, debt, and project finance) (Patel, 2011, p. 4). The same pattern is to be expected with regard to NAMA funding. For example, there are two broad types of NAMA-related costs: preparation and implementation (De Vit, 2012, p. 28). It is likely that NAMA preparation will be funded primarily from domestic and international public sources as the private sector is generally not willing to fund feasibility studies. Therefore, public money can be used to conduct a high-quality feasibility study that identifies potential NAMAs, including those NAMAs that have a potential to attract private sector investments. That feasibility study would help identify bankable NAMAs that are likely to be funded by the private sector.

TABLE 2. TYPES OF FUNDING CORRESPONDING TO DIFFERENT RATES OF RETURN

ESTIMATED RATE OF RETURN	TYPE OF FUNDING
Negative/0%	Grants/subsidies
0% to 5-7%	Donors or impact investors (those who consider financial, social, and environmental returns)
Over 5-7%	Specialized lender-investor-donors (those who see the blended value potential of investments)
Above 10%	Private investors/lenders

Source: UNFCCC (2006, p. 85)

TABLE 3: CLASSIFICATION OF PRIVATE FUNDING FOR CLEAN ENERGY PROJECTS

LEVEL OF MATURITY	MODALITIES	CHALLENGES
Early funding	Non-financial funders: utility companies, local entrepreneurs, venture capitalists and angel investors	• Utility companies may be wary of developing country risks. • Local entrepreneurs may not have significant experience. • Venture capitalists generally do not fund project development. • Angel capital is not widely used in developing countries.
Mid-term funding	Financial funders: private equity and infrastructure funds; funders that provide mezzanine capital, commercial bank debt and carbon finance	• Private equity funds have low appetite for project development due to high risks. • Infrastructure funds often have no experience with clean-energy projects. • Mezzanine capital is not frequently used in clean-energy projects. • Commercial bank debt is generally not used for project development. • Carbon finance is not widespread due to high financial risks.
Late-stage funding	Capital markets	• Only in countries with mature markets and developed industries.

Source: Ritchie & Usher (2011, p. 13–16)

Commenting on the level of domestic and international investment in climate change mitigation and infrastructure creation or transformation, it should be noted that in many developing countries the private sector is at an early stage of development and is unlikely to have the capacity to participate in such initiatives. However, as the case study analysis in the next section demonstrates, where a growing private sector exists, its appetite for participating in such projects can be developed through targeted action, including the creation of incentives, awareness campaigns, co-financing and other mechanisms. In addition, such initiatives benefit from the emergence and growth of small and medium enterprises such as energy service providers or energy equipment manufacturers, importers and installers. Limited international private investment in these initiatives may be explained by the private sector's lack of awareness of such opportunities (which, if true, may be partially explained by the insufficient international marketing of those opportunities), by a perception that such investments are too risky or by other reasons. The need to provide conventional business investors with risk-adjusted returns is a barrier for many developing country projects seeking private investments (Haites, 2013, p. 97). However, this is changing as the concept of impact investments is becoming increasingly popular.

In terms of their primary motivations, investors may be divided into commercial and impact investors. While commercial investors are only interested in investing if a project has sufficiently high rates of return, impact investors are generally more interested in the triple-bottom line (including larger environmental, social and economic returns beyond the immediate financial returns on their investments). As the importance of environmental, social and corporate governance issues to investors grows, so do the ranks of investors seeking impact, including through climate change mitigation projects. In the past years, initiatives such as the United Nations Principles for Responsible Investment have led to the emergence of impact investment initiatives such as the International Investors Group on Climate Change (Palandjian, 2009, p. 10). This and other investor coalitions may potentially play a significant role in increasing the availability of private finance for NAMAs.

Impact investors are increasingly paying attention to initiatives in developing countries. According to the results of the above mentioned impact investor survey, "34% of respondents focus on investing in Sub-Saharan Africa and 57% focus on food & agriculture" (Saltuk, 2013, p. 5). Considering that many initiatives in developing countries are

associated with significant risks for investors, it is important to note that within the impact investor group "impact first investors" have a higher tolerance for risk than "financial first investors" (Palandjian, 2009). According to Palandjian (2009), financial first investors are mostly commercial investors primarily interested in financial returns, while impact first investors are institutional investors, high-net worth individuals, foundations or social investment-oriented financial institutions primarily looking to achieve social and environmental impact. Impact first investors are more willing to accept risks and lower returns on their investments compared to financial first investors (Palandjian, 2009, p. 7). It is important, however, that investments in climate change mitigation projects do not necessarily limit investors to below-market returns. In fact, climate projects are increasingly bringing market-rate returns to impact investors (Palandjian, 2009, p. 11).

2.4 Public-Private Partnerships

Public-private partnerships (PPPs) have become a key mechanism for cross-sector collaboration. According to Limaye & Zhu (2012), a PPP is a "venture or service that is funded and operated through a partnership of government and one or more private-sector organisations." (p. 69). Such partnerships can have many forms, including concessions, joint ventures, or outsourcing services. Concessions are government contracts that grant private actors special rights to develop and operate projects; joint ventures are entities with shared ownership by public and private actors; and outsourcing services entail subcontracting a private company to provide services that are typically offered by the public sector (Hall, de la Motte, & Davies, 2003, pp. 2–4). In the PPP framework, private companies may provide equity and/or debt financing alongside the goods and services that they generally deliver. Debt financing is generally less risky and less expensive for the private sector than equity financing because, in case of project failure, loan repayments have higher levels of seniority compared to returns from equity; therefore, lenders generally require smaller returns than equity funders (Limaye & Zhu, 2012, p. 57).

In addition to project-based PPPs, governments and development agencies have recently launched large-scale funds and initiatives that aim to mobilize private investment for climate change mitigation and adaptation. A 2013 survey describes 27 such initiatives, focusing on the scope, approaches, policies and mechanisms used to attract private finance, and describing the challenges faced by those initiatives (Polycarp et al., 2013). It should not be assumed that establishing a PPP initiative is a necessary prerequisite to successfully leveraging private funding. While there are many positive sides to PPPs, even in absence of formal PPPs public actors are often capable of attracting private funding or, as demonstrated by case studies in the next section, of addressing market imperfections that lead to end users being unable to attract finance on commercial terms.

3.0 Bankable NAMAs: Stakeholders and Implementation Mechanisms[4]

This section addresses key aspects of climate change mitigation and infrastructure creation or transformation projects that have successfully attracted private investments (or can potentially attract such investments). Results of case study analysis presented in this section demonstrate that developing bankable NAMAs requires attention to the needs and capacities of four types of stakeholders, and to two aspects of their participation in NAMAs. The four types of stakeholders are domestic public actors, international stakeholders, private actors and end users. The two aspects of their participation in NAMAs are the composition and ownership of NAMA-implementing bodies. These six aspects are presented in Figure 7. Implementing bodies are central to the implementation of each initiative since their formats and functions help define the scope of those initiatives. Ownership refers to the "share" of each type of stakeholder in the decision-making structure. National governments and public agencies may contribute revenues, policy and regulatory support, management and technical assistance. Private actors may co-finance and co-manage the programs and projects. International stakeholders also may provide funding, technical assistance and management capacity. Finally, end users employ the products and services generated by the programs or projects, and provide revenues that make those initiatives financially viable. These issues are discussed in more detail below.

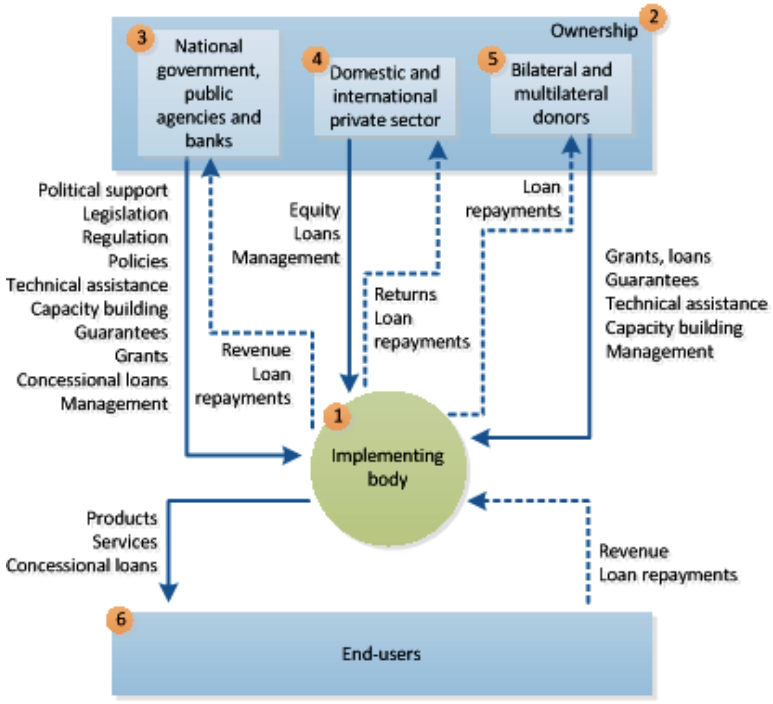

FIGURE 7. STAKEHOLDERS AND IMPLEMENTATION MECHANISMS

Source: Authors

[4] This section presents case study analysis based on the following publications: Africa Finance Corporation (n. d. a, n. d. b); African Development Bank (2012); Ashden (2013); Baccouche (2014); CONAVI & SEMARNAT (2012); Dong Energy (n. d.); Dukov (2009); Ecofys (n. d.); Eleqtra (n. d.); Falconer & Frisari (2012); Green Investment Bank (n. d.); Hervé-Mignucci (2012); Inter-American Development Bank (2012); Mobarek (2014); Paul (2011); Porciuncula (2009); Trabacchi, Micale, & Frisari (2012); USAID (2006); World Bank (2010a); World Bank (2010b), and World Bank (2000).

Although there is no standard practice for judging a specific NAMA "best practice" for engaging the private sector, and although reports on NAMA implementation are not always publicly available, work is underway to identify best practices in securing private funding for NAMAs. For example, the NAMA Partnership's finance working group is working to identify potential funding sources for NAMAs and related best practices (van Tilburg et al., 2012, p. 17). In the meantime, NAMA developers can use existing analysis to identify best practices that may help them design bankable NAMAs. For instance, the San Giorgio Group coordinated by the Climate Policy Initiative has done pioneering work studying how public funding is used to leverage private investment. In addition, the World Bank and GEF have provided Internet access to their project reports. Finally, relevant academic publications and presentations by government officials, project descriptions and reports by international organizations are also available online and by request.

Based on these publicly available sources of information, this section discusses eight successful climate change mitigation and infrastructure transformation initiatives. Table 4 contains a brief description of those case studies, and their detailed descriptions can be found in Appendix III. The criteria for selecting the case studies for analysis included:

- *Transformative capacity:* The case studies describe transformative projects in three sectors: renewable energy generation, energy efficiency and water management. The objectives in three of the case studies (Bulgaria, Croatia and Mexico) are related to energy efficiency in buildings and infrastructure. Four case studies (Cape Verde, Morocco, Tunisia and the U.K.) focus on addressing barriers to the development of renewable energy markets. One case study (the Philippines) focuses on transforming water services.[5] While the case studies do not focus on other sectors such as agriculture, forestry, transportation or waste, they can be used to access the potential of private investment in those sectors as well, considering that funding mechanisms used in programs and projects in different sectors have many similarities.
- *Geographic diversity:* The case studies present initiatives implemented in Africa, Asia, Eastern and Western Europe, and Latin America.
- Different levels of economic development: The case studies represent both developing and developed countries. While examples from developing countries may be the most relevant to issues that NAMA developers are facing, the U.K. case is an illustration of how these issues are addressed in developed capital markets with established roles for public and private stakeholders.
- *Programmatic success:* These initiatives are reaching their intended goals in a cost-efficient way and in many cases will continue their operations with support from donors and investors.
- *Success in building cross-sector partnerships:* Most of the case studies are examples of partnerships that engage domestic and international public and private actors. One case study, the Mexican Sustainable Housing NAMA, has a strong potential for creating successful cross-sector partnerships.
- *Success in attracting private finance:* Seven initiatives have successfully leveraged private funding and the Mexican Sustainable Housing NAMA is currently not funded from private sources, but is designed so as to potentially attract private investments. This NAMA has "modularity," that is to say, the ability to adjust funding packages according to investors' needs (KfW, 2012, p. 8).

[5] The case study of the Philippine Water Revolving Fund is not directly related to climate change mitigation. However, this case study was chosen because it illustrates important concepts that are relevant to NAMA development and offers insights into mechanisms used to leverage private finance.

TABLE 4: CASE STUDIES: CLIMATE CHANGE MITIGATION AND INFRASTRUCTURE TRANSFORMATION INITIATIVES THAT HAVE MOBILIZED (OR CAN POTENTIALLY MOBILIZE) PRIVATE INVESTMENTS

COUNTRY/ PROJECT NAME/ START AND END DATES	SECTOR/TYPE	ACTORS	CONTRIBUTION	SCALE	FUNDING ARRANGEMENTS/PRIVATE SECTOR ROLE
1. Bulgaria Bulgarian Energy Efficiency Fund 2004-present	Energy efficiency/ buildings	Assembly of Donors: Governments of Bulgaria and Austria, GEF, DZI Bank, Lukoil Bulgaria, Brunata Bulgaria, and Enemona.	Helping public organizations and small and medium enterprises overcome barriers to funding energy-efficiency (EE) projects.	In five years, the project helped fund 112 projects totalling US$39 million and helped organize three energy service companies (ESCOs).	Funding from the government, donors (Austrian government, GEF, and private donors and investors). Over 66 per cent of fund capitalization leveraged through equity, lending and guarantees. Private companies participate in fund management.
2. Cape Verde Cabeólica Wind Farm Project 2009–present	Renewable energy	PPP: Ministries of Tourism and Finance, InfraCo Ltd, Electra SARL, Africa Finance Corporation (AFC), Finnish Fund for Industrial Cooperation Ltd.	Expanding the domestic electricity grid by adding renewable energy (RE) capacity. Awarded as the best RE project in Africa.	The project produces 25 per cent of wind power in Cape Verde annually.	Approximate cost: US$84 million. Equity finance from the PPP participants, debt from the European Investment Bank (EIB) and the African Development Bank (AfDB), political risk insurance from the Multilateral Investment Guarantee Agency. Private stakeholders act both as equity investors/lenders and as energy offtakers.
3. Croatia Croatian Energy Efficiency Project 2003–2010	Energy efficiency/ buildings	National energy utility: Hrvatska Elektroprivreda (HEP) Funders: International Bank for Reconstruction and Development (IBRD), GEF, the Croatian Bank for Reconstruction and Development (HBOR), commercial banks.	Encouraging a private EE services market.	As a result of the project, 31 EE projects were implemented with a total value of almost US$30 million.	Estimated cost: US$33.3 million. Seed funding from the government and international stakeholders, co-funding from private investors. Leverage factor for seed funding: 1.8, mostly in private funding.
4. Mexico Sustainable Housing NAMA 2011–present	Energy efficiency/ buildings	Government: NAMA Fund, Mexico's National Housing Commission (CONAVI) International stakeholders: GIZ Funders of the EcoCasa pilot program: the Mexican Federal Mortgage Society (SHF), Clean Technology Fund (CTF), Inter-American Development Bank (IDB), KfW, Latin America Investment Facility (LAIF), NAMA facility.	Building EE housing units using three different eco-standards thus expanding the green housing market.	The SHF EcoCasa pilot program alone will develop over 27,000 EE homes by 2020. Overall, the NAMA will potentially build up to 7 million EE housing units by 2020.	The total cost of the NAMA will depend on the variable costs of construction. Estimated cost of the SHF-EcoCasa pilot project is about US$230 million (including construction, green mortgages and technical assistance funded by the government and international stakeholders). Private investment potential exists through investor-tailored packages.
5. Morocco Ouarzazate Concentrated Solar Power Project 2012–present	Renewable energy	Government, the Moroccan Solar Energy Agency (MASEN), the Moroccan Office National de l'Eau et de l'Electricité (ONEE) Developer: ACWA Power Funders: IBRD, EIB, AFD, KfW, AfDB.	Addressing financial and technical barriers to scaling up solar energy deployment.	The project can potentially contribute 1.5 per cent to Morocco's energy mix by 2020.	Project cost: US$1,370 million. Equity finance from the government and the private developer, concessional loans from international stakeholders, market-rate loans from commercial banks.

COUNTRY/ PROJECT NAME/ START AND END DATES	SECTOR/TYPE	ACTORS	CONTRIBUTION	SCALE	FUNDING ARRANGEMENTS/PRIVATE SECTOR ROLE
6. Philippines Philippine Water Revolving Fund 2008–present	Infrastructure transformation	Philippines government, Development Bank of the Philippines (DBP) Donors: U.S. Agency for International Development (USAID), Japan Bank for International Cooperation (JBIC), private financial institutions.	Creating a market for water services and improving the quality of management of water services and infrastructure.	The fund has supported 22 projects with a total loan value of US$102 million.	Funding from JBIC and private financial institutions. Guarantees are provided by USAID and the Philippine government. Of all funded projects, 64 per cent were funded entirely from private finance.
7. Tunisia Prosol Program 2005–present	Renewable energy	Ministry of Industry, National Agency for Energy Conservation Funders: Italian Ministry for the Environment, UNEP, the Mediterranean Renewable Energy Centre (MEDREC), Amen Bank, Tunisian Commercial and Industrial Banking Union (UBCI), Attijari Bank, Tunisian National Bank.	Overcoming insufficient demand for solar energy in a comprehensive manner through measures aimed at consumers, lenders and suppliers.	In five years, Prosol attracted US$134 million in investments and helped install about 119,000 solar water heating systems ensuring a net gain for the public budget.	Estimated cost: US$134 million. Funders included the government, bilateral and multilateral stakeholders, and commercial banks. Of the estimated investment, 82 per cent came from private sources.
8. U.K. Walney Offshore Windfarms (WOW) Project 2011–present	Renewable energy	DONG Energy, Scottish Southern Energy Investors: OPW HoldCo, Blue Transmission Walney I.	Addressing policy and financial barriers to investment in offshore wind.	Currently the largest offshore wind farm in the world with potential generation of up to 1,326 gigawatt hours annually.	Estimated cost: US$1.98 billion. Co-owned by utilities investors (over 75 per cent) and a financial investor. Transmission lines are owned by an energy transmission company. The government awards leases and issues permits and carbon credits.

3.1 Implementing Entities

As Table 5 demonstrates, all eight case studies have central entities that manage the initiatives and/or accumulate relevant finances. In most cases such entities had to be established for the purpose of those initiatives, while in some cases this role is played by existing public entities. Generally, establishing a separate body for implementation of a program or project can be justified from several standpoints. An entity such as the Mexican NAMA Fund may allow collecting and disbursing project funds in a centralized fashion rather than through multiple agencies, while a special purpose vehicle (SPV) such as Cape Verde's Cabeólica SA may help project investors limit their liability; and in case of an ESCO, it may allow investors to accumulate energy service provision and relevant expertise. At the same time, the experience of Tunisia's Prosol demonstrates that a complex program can be implemented through existing entities to ensure efficiency and facilitate revenue collection.

TABLE 5: IMPLEMENTING ENTITIES

PROJECT	IMPLEMENTING ENTITY	COMMENTS
Bulgarian Energy Efficiency Fund (BEEF)	The fund can accumulate and disburse funds, provide guarantees and consultations.	Coordinated by a multisectoral Assembly of Donors.
Cabeólica Wind Farm Project, Cape Verde	SPV Cabeólica SA is a project-oriented company that facilitates funding arrangements.	Co-owned by public and private stakeholders.
Croatian Energy Efficiency Project	HEP ESCO financed and implemented EE projects.	Managed by a state energy company.
Sustainable Housing NAMA, Mexico	The NAMA fund will create the technical guidelines, financial structures, and reporting infrastructure needed to attract and leverage additional funding. SHF will channel funds to developers and financial intermediaries to finance EE homes in the NAMA framework.	Initially coordinated by Mexico's National Housing Commission.
Ouarzazate Concentrated Solar Power Project, Morocco	SPV Solar Power Company provides the government with revenues from energy sale and infrastructure utilization.	Co-owned by the state and the project's private developer.
Philippine Water Revolving Fund (PWRF)	PWRF accumulates funds and acts as a lender, creditor and credit enhancer.	Administered by the country's development bank.
Prosol Program, Tunisia	The program is an instrument channelling funds from donors and lenders to end users through existing vehicles.	The program is directly implemented by the state utility company.
WOW Project, U.K.	WOW Ltd. is an SPV that generates and trades power and carbon credits.	The SPV is co-owned by several utilities and financial investors.

Overall, the case studies demonstrate that national energy utilities, state banks and other relevant agencies in developing countries actively participate in climate change mitigation and infrastructure creation or transformation initiatives, accumulating experience in the process. In many countries where such initiatives have been implemented, these facilities already possess significant experience working with the private sector and leveraging private sector funding. Sometimes, as in the case of Prosol, state facilities may be uniquely positioned to facilitate project implementation because they are able to collect loan repayments alongside other payments that they receive from end users as part of their routine work.

3.2 Ownership

For the purposes of this report, ownership refers to the role that various stakeholders, in particular the private sector, play in establishing and implementing each of the eight initiatives. Table 6 shows that five of the eight cases are PPPs; in addition, in three of the eight cases, the private sector is not among the "owners," and its role is generally less significant compared to the public sector.

TABLE 6: OWNERSHIP

PROJECT	OWNERSHIP
BEEF	Directed by an Assembly of Donors that includes representatives of the major funders: the Governments of Bulgaria and Austria, GEF, and domestic private investors (DZI Bank, Lukoil Bulgaria, Brunata Bulgaria, and Enemona).
Cabeólica Wind Farm Project, Cape Verde	Established by five major shareholders: the Government of Cape Verde (Ministries of Tourism, Industry and Energy, and of Finance), InfraCo Limited (an infrastructure development company), Electra SARL (the national power utility), AFC and the Finnish Fund for Industrial Cooperation Ltd.
Croatian Energy Efficiency Project	Established as a partnership between an ESCO run by the national energy utility HEP, HBOR, the end users (users of electricity and heat, including owners and occupants of buildings of different types) and commercial banks.
Sustainable Housing NAMA, Mexico	Established by the national government with technical assistance from a bilateral stakeholder (GIZ) and with no private ownership.
Ouarzazate Concentrated Solar Power Project, Morocco	Co-owned by the MASEN (25 per cent) and a private developer, Saudi Arabia's ACWA Power (75 per cent).
Philippine Water Revolving Fund	Trilateral effort of the Philippine Government, the USAID Philippine Mission and the JBIC.
Prosol Program, Tunisia	Organized by the Tunisian Ministry of Industry, Energy and Small and Middle Size Enterprises, the National Agency for Energy Conservation of Tunisia (ANME), and UNEP.
WOW Project, U.K.	Co-owned by private utilities and investor groups: DONG Energy, a Danish energy group, has a 50.1 per cent stake, and Scottish Southern Energy's subsidiary holds 25.1 per cent. OPW HoldCo U.K. Ltd., a joint venture of the Ampère Equity Fund (managed by Triodos Bank) and PGGM, a Dutch pension fund administrator, has 24.8 per cent.

Initiatives like Ouarzazate Concentrated Solar Power (CSP) demonstrate the advantages of a PPP in the conditions of a developing market with its high capital costs: the public sector is responsible for the quality and quantity of the project's output, while the private sector provides management, finances and technologies (Falconer & Frisari, 2012, p. 21). At the same time, Mexico's NAMA or the Philippine Water Revolving Fund were designed by the government with support from international stakeholders. The experience of these initiatives demonstrates that even in the absence of formal PPPs governments may benefit from the knowledge and skills of international organizations and development cooperation agencies that already have significant experience in working with the private sector.

3.3 National Governments, Agencies and State Banks

Table 7 demonstrates that the role of government funding and/or policy support, especially in countries with developing capital markets, is important for a project or program's success. Case study analysis shows that governments may fund projects or programs, provide regulatory and policy support (for example, by adopting renewable energy targets or carbon credits), help secure revenues and attract investments through power purchase agreements or sovereign credit guarantees, or participate in project or program management. While government funding sends an important signal to potential investors, it may be argued that a combination of funding and guarantees creates an even stronger effect and improves a project's attractiveness. For example, the Moroccan government's financial support to the Ouarzazate CSP, and its commitment to purchasing power generated by the CSP, helped convince investors of the project's viability. In countries with mature capital markets, however, the government does not necessarily fund projects or programs directly and may instead combine regulatory and policy support, or provide subsidies or offset credits, as demonstrated by the case of WOW. It is useful to note that in addition to benefiting from government intervention,

most of the eight initiatives have received direct support from relevant national agencies, including energy agencies, national utility companies, state banks and others. This corresponds with the growing role of agencies such as national development banks that provide domestic public finance, helping attract private investments in developing countries (Buchner et al., 2012b, p. 6).

TABLE 7: NATIONAL PUBLIC ACTORS

PROJECT	NATIONAL PUBLIC INSTITUTIONS
BEEF	The government contributed US$1.8 million to BEEF and takes part in the project's decision making.
Cabeólica Wind Farm Project, Cape Verde	The government, through its ministries, has stakes in the project. The national power utility Electra SARL co-owns Cabeólica Wind Farm and also guarantees energy offtake.
Croatian Energy Efficiency Project	The government's role in organizing the project was instrumental. The national energy utility HEP managed the EE project, and the national development bank HBOR provided credit guarantees and incentives to commercial banks lending to end users.
Sustainable Housing NAMA, Mexico	The government initiated the NAMA. It already provides grants to homeowners in the amount of 20 per cent, 30 per cent or 50 per cent of the investment costs (depending on the eco-standard). CONAVI coordinates the Sustainable Housing NAMA. In the EcoCasa framework, the SHF will lend to developers and fund financial intermediaries to provide green mortgages.
Ouarzazate Concentrated Solar Power Project, Morocco	The government is involved in Ouarzazate CSP and provides US$60 million annually. MASEN co-owns and manages the CSP and has a power sale agreement with ONEE, guaranteeing project revenue.
Philippine Water Revolving Fund	The national development bank (DBP) administers the Water Revolving Fund, accepts donor finance, loans money to water service providers (WSPs) and collects loan repayments.
Prosol Program, Tunisia	The government, through the Ministry of Tourism, co-organized the program and has contributed US$21.8 million to it. ANME and the public utility company Tunisian Society for Electricity and Gas (STEG) receive and distribute money as loans and subsidies, with STEG also serving as guarantor and loan repayment collector; the Tunisian National Bank (STB) also managed the trust fund in the first phase of Prosol.
WOW Project, U.K.	The government contributes energy revenue incentives in the amount of GBP1.3 billion to GBP1.5 billion (equalling the private investment in the project). The government's Crown Estate awards seabed leases for the project, the U.K. Department of Energy and Climate Change and the Office of Gas and Electricity Markets (Ofgem) issue permits for construction and Renewables Obligation Certificates (ROCs), the Treasury is responsible for carbon taxes, and U.K. Revenue & Customs is responsible for overall taxes.

3.4 Domestic and International Private Sector

As shown in Table 8, the case study analysis demonstrates a significant level of domestic private sector participation in climate change mitigation and infrastructure development initiatives. Domestic companies provide finance as lenders or equity investors and often take part in project operations by supplying or underwriting loans to end users. For example, in the case of the Croatian Energy Efficiency Project, domestic banks saw opportunities for revenue generation from loans to public facilities and businesses implementing energy-efficiency projects. International private investment, however, is not as prominent in those initiatives as domestic investments. Case study analysis demonstrates that only four of the eight case studies have attracted, or are hoping to attract, international private lenders or investors. For example, Cabeólica Wind attracted foreign investments because Cape Verde is seen as an attractive country for revenues from wind power generation. Similarly, WOW attracted foreign investment because of the revenue-generating potential from offshore wind in the U.K.

TABLE 8: PRIVATE SECTOR

PROJECT	PRIVATE SECTOR PARTICIPATION
BEEF	Four domestic private investors: DZI Bank, Lukoil Bulgaria, Brunata Bulgaria and Enemona pledged significant financial support but have only delivered part of the promised funding. Nevertheless, the fund has leveraged significant private funding from other domestic funders and from its own commercial operations.
Cabeólica Wind Farm Project, Cape Verde	Co-owned by InfraCo Limited, an international infrastructure development company.
Croatian Energy Efficiency Project	Domestic commercial banks participated in the financing of energy-efficiency projects, generating additional investments of US$1.8 million.
Sustainable Housing NAMA, Mexico	Investment packages for the NAMA are designed to attract private sector funders, including international companies. Envisions domestic companies as investors in the project's funding packages or recipients of emission reductions generated through the project in exchange for soft loans or other input in the NAMA; currently the NAMA does not have private funders.
Ouarzazate Concentrated Solar Power Project, Morocco	Saudi Arabian private developer ACWA Power, selected through a tender process, has a 75 per cent stake in Ouarzazate CSP.
Philippine Water Revolving Fund	Attracted US$58 million in investments from local banks.
Prosol Program, Tunisia	Commercial banks (Amen Bank, UBCI, and Attijari Bank) have acted as loan providers and underwriters. Specifically, Attijari Bank has provided over US$52.5 million.
WOW Project, U.K.	Co-owned by Scottish Southern Energy's renewables subsidiary Scottish Southern Energy Renewables. In addition, Barclays Integrated Infrastructure Fund is investing in the project's transmission lines. Investors include OPW HoldCo UK Ltd., a joint venture of the Ampère Equity Fund (managed by Triodos Bank) and PGGM, a Dutch pension fund administrator.

3.5 Bilateral and Multilateral Stakeholders

Table 9 illustrates that in most cases there is significant funding and expertise from both bilateral and multilateral stakeholders. Sources of multilateral assistance include development banks, climate funds and international organizations. These stakeholders have provided grants (as in the case of BEEF), concessional loans (as in the case of the Croatian Energy Efficiency Project) and loan guarantees (as in the case of the Philippine Water Revolving Fund). Two initiatives, the U.K.'s WOW and Cabeólica Wind Farm Projects, illustrate equity investments by foreign public donors. The case studies demonstrate that the role of bilateral and multilateral stakeholders such as GEF, AFC, USAID and others in securing private investments is very important.

TABLE 9: BILATERAL AND MULTILATERAL STAKEHOLDERS

PROJECT	BILATERAL AND MULTILATERAL STAKEHOLDERS
BEEF	Supported by the Austrian government (US$2 million), which also takes part in managing the fund in the framework of the Assembly of Donors. GEF provided close to US$10 million, including US$4.5 million to establish a Partial Credit Guarantees (PCG) facility, US$4 million to establish an investment financing facility and US$1.5 million for technical assistance.
Cabeólica Wind Farm Project, Cape Verde	The AFC owns equity in Cabeólica Wind Farm. The Finnish government owns 92 per cent of another shareholder, the Finnish Fund for Industrial Cooperation Ltd.
Croatian Energy Efficiency Project	IBRD's loan (US$5.8 million) helped catalyze significant private investment, and GEF's contingent grants (a total of US$7 million) were used for project development, for setting up a commercial loan facility and a partial credit guarantee program, as well as for technical assistance.
Sustainable Housing NAMA, Mexico	GIZ has provided significant support to help the Mexican government develop the NAMA, and it is expected that the German government will help fund those elements of the NAMA that do not provide revenue-generation opportunities. International donors such as the CTF, IDB, KfW, and LAIF will provide over US$230 million through the EcoCasa program. The government is considering the use of certified emission reductions (CERs)—this will likely require cooperation with multilateral agencies.
Ouarzazate Concentrated Solar Power Project, Morocco	Bilateral stakeholders have provided US$230 million to Ouarzazate CSP, including EU's Neighbourhood Investment Facility (US$30 million), AFD (US$100 million) and KfW (US$100 million). International financial institutions provide concessional funding in the amount of US$547 million at a blended rate of 3.1 per cent (almost three times lower than the commercial rate), including the World Bank (a US$140 million loan and US$68 million through the CTF), AfDB (a US$168 million loan and US$70 million through the CTF) and EIB (US$100 million). All these funders have agreed to use common World Bank procedures.
Philippine Water Revolving Fund	The fund received a concessional loan from JBIC and loan guarantees from USAID.
Prosol Program, Tunisia	Supported by a US$2.2 million seed grant from the Italian Ministry of the Environment for the Protection of Land and Sea. The money was used for a temporary interest rate subsidy and program support, and the ministry has since provided another grant of US$210,000. UNEP has channelled donor funding and UNFCCC has managed the CER component.
WOW Project, U.K.	Majority shareholder and main implementer of DONG Energy, the Government of Denmark, owns 81 per cent.

3.6 End Users

Table 10 shows that end users provide revenue that is vital to a specific initiative's financial viability and sustainability. End-users of renewable energy projects may include consumers (as in the case of Morocco's Ouarzazate), energy companies (as in the case of the U.K.'s WOW) or renewable energy equipment importers and installers (as in Morocco's Prosol). End users of energy-efficiency projects may include public facilities (as in Croatia's Energy Efficiency Project), industrial facilities (as in Bulgaria's Energy Efficiency Fund), or housing developers and homeowners (as in Mexico's Sustainable Housing NAMA). The Philippine Water Revolving Fund illustrates the case of public service providers acting as end users for an infrastructure transformation project.

Overall, the case study analysis demonstrates that the revenue-generation potential of a NAMA largely depends upon its ability to take into account the demand of end users and the situation in relevant markets. More specifically, initiatives that identify challenges faced by end users and offer solutions are more likely to attract revenue from the end users.

For example, in the case of Tunisia's Prosol, it was clear that not all end users could afford market-rate loans or new equipment at market prices; therefore, subsidies were important for the program's success. Often, a new market for products and services has to be created. For instance, in the case of Mexico's NAMA, the government has to stimulate developers' interest in energy-efficient housing by developing a system of incentives. Understanding the challenges and opportunities that exist for end users is important not just in terms of funding or implementing the initiatives, but also for identifying what specific policies or regulations can be adopted, adjusted or repealed with small costs involved. The case of Morocco's Ouarzazate CSP demonstrates the importance of policies in stimulating demand. Overall, as a result of "cultivating" end users, countries may build sustainable markets and boost consumption in specific sectors, which in itself will increase project sustainability.

TABLE 10: END USERS

PROJECT	END-USERS
BEEF	EE projects in buildings and industrial facilities, including building refurbishment, fuel replacement, thermal insulation, reconstruction of heating, ventilation, and air conditioning systems, industrial EE and similar projects.
Cabeólica Wind Farm Project, Cape Verde	95 per cent of residents of Cape Verde whose electricity needs will be met.
Croatian Energy Efficiency Project	Users of electricity and heat, including owners and occupants of buildings of different types, such as housing cooperatives, commercial enterprises, schools and hospitals—generally low-risk borrowers that require longer-term loan repayment periods.
Sustainable Housing NAMA, Mexico	Housing developers who will be able to receive soft loans and home buyers who will be able to purchase EE homes at no additional cost. The NAMA will work towards ensuring that households' savings due to EE lead to offsetting the costs of installed equipment.
Ouarzazate Concentrated Solar Power Project, Morocco	Residents who use solar energy.
Philippine Water Revolving Fund	Credit-worthy water service providers (WSPs): local government units (LGUs) and water districts (WDs)—generally low-risk borrowers. They often cannot provide suitable collateral to obtain commercial loans and need longer loan repayment periods, and the fund enables them to obtain longer-tenor loans.
Prosol Program, Tunisia	Homeowners, manufacturers, importers and installers of solar water heating (SWH) equipment. The first phase of the program encouraged supply through subsidies, and the second phase encouraged demand through long-term soft loans. As a result, the number of local SWH system producers increased from nine to 45.
WOW Project, U.K.	RE companies and market participants interested in purchasing power and obtaining ROCs.

4.0 Risk Mitigation Mechanisms: Case Studies

Green investments are commonly associated with risks to political and macroeconomic stability, as well as with risks related to the regulatory environment, development and operation of new technologies, and developing countries' capacity to utilize investments (World Economic Forum, 2013). To attract investment in climate projects, it is necessary to address both policy barriers to project viability and financial barriers to project commercialization (Patel, 2011, p. 11). Investors may see new low-carbon technologies and equipment as unreliable, especially if it is deployed in a developing country; they may think demand for these technologies and equipment will be insufficient; or they may be concerned with risks of contract breach by other parties, or with risks of non-performance due to political changes (Würtenberger, 2012, p. 24). Financial barriers may include insufficient equity, unavailability of long-term debt and early-stage financing (Ritchie & Usher, 2011, p. 16). Political risks may be related to changes and instability of state institutions, wars, terrorism and similar risks; and policy risks may be related to changes in agreed policies, tariffs or contracts (Corfee-Morlot, 2012, p. 20).

To minimize risks, it is important to learn from the experiences of existing initiatives. Sarkar and Singh (2010, p. 5,568) offer the following five lessons learned by energy-efficiency project developers:

1. Thoroughly assess market potential and relevant barriers
2. Tailor international experience to local conditions
3. Design commercially oriented interventions
4. Balance policy and programmatic elements
5. Focus on achieving early positive results within 1–2 years to enhance the initiative's credibility.

These five lessons demonstrate the importance of learning, assessing risks and designing policy interventions to create or strengthen markets. Figure 8 describes mitigation instruments and actions that respond to different risks.

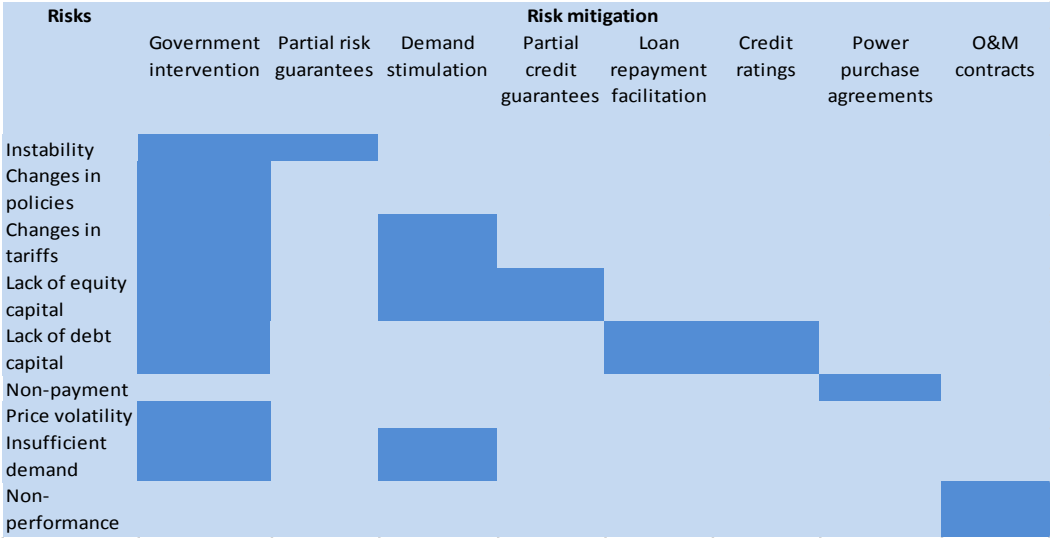

FIGURE 8: RISKS AND THEIR MITIGATION

Source: Authors

According to Patel (2011), governments need a strong policy and regulatory framework and capital markets in order to use instruments that encourage commercialization of new technologies and products, such as feed-in-tariffs. It is easier for developed countries to mobilize various types of private finance—including private equity, long-tenor debt and non-recourse funding—that may not be accessible in countries where capital markets are still developing (Patel, 2011, p. 12). Nevertheless, even in the absence of developed capital markets and strong governance frameworks, many of these risks can be mitigated using specific financial instruments to encourage investments. These instruments include concessional finance (loans at below-market rates and long-tenor loans), risk and performance guarantees, implementing projects through SPVs and creating special funds (Center for Clean Air Policy, 2012, p. 2). Vanamali (2012) provides examples of financial risk mitigation through interest rate, currency and credit derivatives, and explains how government policies reduce the costs of innovations through feed-in-tariffs, subsidies, carbon credits and green commodity purchases (p. 16). Risk mitigation instruments must be chosen carefully, based on the market assessment and other relevant considerations. Case studies demonstrate the importance of establishing frameworks for building risk-management capacity. Using the eight case studies as an illustration, this section outlines important aspects of risk mitigation, including risk mitigation frameworks and government leadership; markets, economies of scale, and facilitated loan repayment; and concessional loans, guarantees, and other financial mechanisms.

4.1 Risk Mitigation Frameworks and Government Leadership

Strategic approach to risk mitigation helps allocate risks to those actors that have the capacity to handle them.

Proactive and strategic planning of initiatives, including relevant management and funding modalities, helps developers avoid allocating risks to actors that do not have sufficient capacity to handle those risks. Instead, developers allocate those risks to stakeholders that are capable of mitigating those risks successfully. Case study analysis demonstrates that it is important for the development team to include a risk management specialist. For example, Bulgaria's Energy Efficiency Fund Board includes a member with the financial background and capacity to apply professional risk evaluation and management methods (World Bank, 2010b, p. 8). The case studies also demonstrate that the public sector plays an important role in risk mitigation. For example, in Tunisia's Prosol program, development risks are handled by the government, its agencies and international public stakeholders; ANME and private suppliers and installers of equipment are exposed to procurement and technology risks; and STEG is exposed to the loan non-repayment risks, thus relieving commercial investors from those risks (Trabacchi et al., p. 17). According to Falconer and Frisari (2012), Morocco's Ouarzazate project illustrates the differences between two models: one in which a private energy producer develops and implements an energy project, and another, in which public and private actors develop and implement projects together. Specifically, since the public sector is better capable to handle policy and financial risks, MASEN's participation in the project helps mitigate the developer's policy risks; the project's price risks are reduced through provisions included in power purchase agreements (PPAs) (Falconer & Frisari, 2012, p. 19-21).

While it is likely that in developing countries the public sector will lead the process of establishing risk mitigation frameworks, this can also be done by private companies with significant experience in project development or technology deployment. An example from the U.K., a developed country, demonstrates that stakeholders in the WOW project shared their risks in the following way: as the majority shareholder and project developer and manager, and energy offtaker, DONG Energy has handled technology-related risks; Siemens is exposed to wind turbine management risks; the U.K. government is exposed to the risks of underperformance, high energy costs and not achieving co-benefits; finally, non-utility minority shareholder OPW is shielded from risk by a PPA (Hervé-Mignucci, 2012, p. 15).

Government intervention is crucial to mitigating risks for investors.

Investors often encounter the risk of generated energy being more expensive compared to conventional energy. For example, solar energy generated by Morocco's Ouarzazate project is sold to MASEN at a higher price than the grid price at which it will then be sold to ONEE, the project's offtaker. The risk is that this price differential will make the project unsustainable. Government support was necessary for price risk mitigation (AfDB, 2012, p. 17). In other words, government intervention helps address market imperfections: solar energy is not fully compatible with private investors' short-term goals, while the Moroccan government has a long-term energy strategy where solar energy plays an important role.

Government intervention manifests itself through creating legislative, regulatory, financial and other environments conducive to transformations, and as such is crucial to developing bankable NAMAs. Political predictability and regulatory clarity help mitigate investment risks, especially when capital costs are high and even in spite of rigorous cost-benefit analyses (Bowen, Zenghelis, & Romani, 2009, p. 6). Initial risk mitigation may include creating an investment-friendly environment and removing barriers to market activities, including addressing monopolies and corruption, fossil fuel subsidies, and a lack of knowledge, technical capacity and finances (Lacy et al., 2013, p. 65). Analysis of the eight cases demonstrates that governments act as enablers by adjusting national legislation and regulations to facilitate energy-efficiency initiatives, renewable energy generation or other measures that correspond with low-carbon development. Similarly, governments facilitate investments by adopting low-carbon development plans and investor-friendly legislation, by providing sovereign guarantees and by publicly endorsing climate mitigation and infrastructure creation or transformation projects. For example, the Moroccan Solar Plan was established by the country's government; to implement Ouarzazate CSP, the government created MASEN and provided financial support to the project (Falconer & Frisari, 2012, p. ii). Similarly, the energy law and strategy adopted by the Government of Croatia laid the groundwork for energy efficiency and renewable energy development in the country (World Bank, 2010a, p. 1). Government leadership encourages the private sector, helps mitigate risks and contributes to sustainability.

Even considering the multiple benefits of government intervention, overall reliance on the government may nevertheless be detrimental to a project's sustainability. For example, private investors in BEEF saw excessive government influence on the fund's decision making as a potential risk. To mitigate this risk, the fund was set up as a PPP, and government representatives on the management board were in the minority, which led to the fund's rapid commercialization and helped it operate with minimal government interference (World Bank, 2010b, pp. 4–5).

4.2 Markets, Economies of Scale and Facilitated Loan Repayment

Expanding markets through encouraging consumer demand helps create economies of scale.

Investors in new technologies or equipment, such as renewable energy equipment, realize that stable demand and the existence of a commercial market are necessary for sufficient returns on investment. Such investments may present significant risks in those economies that are predominantly based on cash transactions that limit consumer demand. Developers of Tunisia's Prosol program have mitigated that risk by creating a cash and credit system and stimulating consumer demand for solar water heating equipment, and the development of an associated market. Using local bank capital in the process has enabled the project to leverage US$5 of private money for each public dollar (Trabacchi et al., p. 22).

The logic of creating or expanding markets applies not only to products but also to services. According to the World Bank (2010b), BEEF was able to create a market impact by utilizing its early success in project development, and support from the government and international stakeholders, to mobilize commercial funding; this enabled it to build its capacity in the financial and energy sectors, and resulted in increased commercial funding of energy efficiency in Bulgaria. Specifically, the fund cultivated its client base by identifying bankable projects early, marketing the fund to potential clients, providing technical assistance to help clients develop their projects and building a project pipeline at an early stage. These steps led to the fund being able to provide loans to a sufficient number of projects. Flexible service provision was "the most important factor for risk mitigation," as BEEF was able to decide whether to allocate available funding for loans or guarantees; to lend to energy-efficiency projects directly or jointly with commercial banks (thus creating incentives for banks to fund energy-efficiency projects); and to provide guarantees as project PCGs or portfolio guarantees (World Bank, 2010b, pp. 4–5).

In a situation with limited resources, developers may use existing fiscal mechanisms creatively to help build a sustainable market for innovative products. According to CONAVI and SEMARNAT (2012), potential investors in Mexico's Sustainable Housing NAMA face the risk of low returns due to insufficient demand for energy-efficient housing. The NAMA developers plan to mitigate this risk by utilizing the government's borrowing and fiscal capacities in order to obtain financing for the project. Specifically, the NAMA developers are considering using one or more of the following models (CONAVI & SEMARNAT, 2012, pp. 49–53):

- The underwriter model: The government uses money borrowed at low cost to provide higher-rate loans or loss protection instruments to financial institutions that work with buyers and developers in order to stimulate housing supply and demand. The NAMA fund thus becomes independent from the government, and loan guarantees are achieved, making the model sustainable.
- Energy subsidy-driven model: The NAMA fund may receive 1 per cent annually from the government's residential energy subsidies or a portion of savings from avoided subsidies. This would allow the fund to reinvest the subsidy funding to partially cover the project's incremental costs.
- The loss protection model: A portion of energy subsidies is held in an insurance fund to provide loss protection guarantees to private investors or used to purchase insurance from the market.
- The corporate social responsibility model: Emission reductions generated by the NAMA will be used by companies inside the country in exchange for concessional loans or other benefits. The companies would be able to use those credits toward their corporate social responsibility or emission reduction goals.

Increasing the convenience of loan repayment and establishing credit rating mechanisms help mitigate loan default or non-repayment risks.

High rates of loan default or non-repayment by end users is a significant risk for investors in climate change mitigation projects. Robust risk mitigation frameworks must be created to ensure that loan default risks are handled by actors that can manage them. Case studies demonstrate two approaches to this risk mitigation. The first approach is making it easier and more convenient for end users to repay loans. According to Trabacchi et al (2012), for Tunisia's Prosol to be sustainable, annual loan default rates have to be below 5 per cent. To achieve low default rates, program developers provide end users with cheaper, longer-term credit to facilitate repayments, and simultaneously to address debt collection. In Prosol phase I, the task of debt collection was handled by SWH equipment suppliers (small businesses with a limited capacity for debt accumulation and enforcement); in phase II this responsibility, as well as the role of the third-party loan guarantor, was given to the state-owned utility company STEG. It is well positioned to collect since it has the capacity to suspend electricity supply in case of repayment delays. STEG collects repayments through

electricity bills, which is convenient for end users. Tasking STEG with collecting repayments was a wise decision that helped minimize non-repayment of loans (Trabacchi et al., 2012, p. 16-17).

The second approach demonstrated in the case studies is to create a robust credit rating system for end users. To convince commercial lenders in the Philippines Water Revolving Fund that it was safe to invest in the state-run water utilities, project developers had to provide guarantees against loan defaults by end users (Porciuncula, 2009, p. 375). Those risks were addressed when PWRF and the Philippines LGU Guarantee Corporation created a credit rating system that combined analysis of economic, political, management, technical and financial risks. This system enabled the project to establish a transparent lending mechanism and to better understand the market, and helped borrowers understand their credit scores and how those could be improved (Paul, 2011, pp. 3–5). In addition, the credit risk guarantee from the Philippines LGU Guarantee Corporation, reinsured by USAID, covers up to 85 per cent of the loans, so if a borrower defaults the lender is exposed to only 15 per cent of the risk (Porciuncula, 2009, p. 376). To stimulate demands for loans, the PWRF had to lengthen the repayment schedule compared to commercial loans (but not at the expense of commercial lenders whose lending terms are not compromised), to provide technical assistance for project preparation and to implement a marketing strategy to promote the opportunities provided by the Fund (Porciuncula, 2009, p. 376–77).

4.3 Concessional Loans, Guarantees and Other Financial Mechanisms

Concessional finance helps mitigate the risk of capital shortages.

Investing in climate change mitigation projects may present the risk that projects will not be finalized due to capital shortages. In general, climate change mitigation and infrastructure projects may require a long-term commitment to concessional finance. For example, analysis of agricultural mitigation options in Ethiopia revealed the presence of positive costs over a 20-year period, which indicates the need for subsidized finance, grants or performance-based payments (Wilkes et al., 2013, p. 35). It is possible that many initiatives cannot be funded entirely by the private sector; however, it is still necessary to take all possible risk-mitigation measures in order to utilize available public funding to achieve maximum leverage (Patel, 2011, p. 7). The example of Morocco's Ouarzazate project demonstrates an understanding of this principle. Project developers worked to ensure the availability of concessional finance at the project development stage to mitigate the risk of capital shortages, which has helped further reduce overall financial risks and increase investors' confidence (Falconer & Frisari, 2012, p. 20).

Partial credit and risk guarantees are used as a risk-mitigation tool to encourage private investments.

Partial credit and risk guarantees are widely used in climate finance to encourage private investments. For example, the World Bank's Partial Risk Guarantee, seen in Figure 9, protects private lenders from political risks associated with their participation in public sector projects, while the PCG protects them from credit risks (World Bank, 2012, p. 14). The importance of guarantees also applies to first-loss protection instruments "designed to insure the amount of capital which is exposed first should there be a financial loss on a security" (Hervé-Mignucci et al., 2013, p. 5). Given that financing climate projects in developing countries is a relatively new field for private investors, it is generally assumed that mitigating risks of loan default or non-repayment will increase a project's chances of obtaining private funding, help reduce interest rates and increase tenors of commercial loans. Case studies demonstrate widespread use of guarantee instruments. According to the World Bank (2010b), BEEF established a PCG facility and a Guarantee Account with a commercial bank. The purpose of the Guarantee Account was to use accumulated interest from the reserve account balance and loan guarantee fees to cover guarantee losses up to a certain limit (World Bank, 2010b, p. 3).

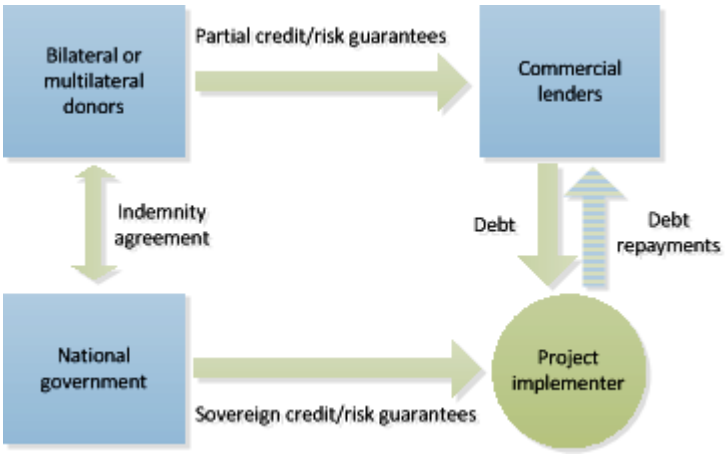

FIGURE 9. PARTIAL RISK OR CREDIT GUARANTEES

Source: World Bank (2012)

Case studies demonstrate the complex and creative use of guarantee instruments in climate change mitigation initiatives. For example, Croatia's Energy Efficiency Project embedded PCG in its framework addressing perceived risks of investing in energy efficiency. However, the need for PCGs depends on the credit market, and in Croatia's case, banks perceived their risks not in funding energy efficiency, but rather in lending to borrowers without sufficient collateral (World Bank, 2010a, p. 18). To address this risk, the project introduced a Guarantee Facility that replaced the collateral with a partial credit guarantee by HBOR, the Croatian development bank, and developed a technical assistance program to help borrowers develop financial plans for investors (World Bank, 2010a, p. 35). That helped the project mitigate existing risks.

Operations and maintenance contracts help mitigate the risks of investing in new technologies and equipment.

Due to the fact that climate change mitigation initiatives often utilize relatively new technologies and equipment (for example, solar systems or wind farms), the use of such technologies and equipment may present risks to investors. For example, equity investors may not be convinced that the construction of a wind farm will be completed according to schedule and with appropriate quality, and as a result are unwilling to invest in the wind farm. According to Hervé-Mignucci (2012), WOW mitigated such risks through ensuring that investors paid their equity stakes in several instalments, contingent upon the instalment and deployment of the wind farms, and using an operations and maintenance contract and a construction management agreement to shift risks from investors to the project manager (Hervé-Mignucci, 2012, p. 17).

Power purchase agreements help mitigate risks related to energy price volatility.

Considering the high capital costs of renewable energy initiatives, investors may be especially vulnerable to the price of energy generated by those initiatives, and to the market price of associated benefits such as carbon certificates or renewable certificates currently used in the U.K. Those prices have to be sufficiently high for a period of time necessary for adequate returns on investments, but the market prices cannot be predicted with certainty. According to Hervé-Mignucci (2012), investors in WOW are aware of the risks presented by the volatility of the price of generated energy and associated ROCs. Specifically, the ROC price has to be above GBP35 for the project to be sustainable, and the

energy price volatility has to be taken into account as well. To address the price risk, the project uses two sets of PPAs: fixed-price PPAs and investor PPAs. Fixed-price PPAs ensure that shareholders purchase their shares of power and associated benefits, and investor PPAs confirm to the investors that the majority shareholder has sufficient expertise to market the energy and associated benefits (Hervé-Mignucci, 2012, pp. 13–14). In general, PPAs are a popular and widely used tool for risk mitigation, but it should be noted that they might not be seen as reliable instruments in some developing countries. When the level of trust in commercial agreements and guarantees is not sufficiently high, PPAs should be supplemented by sovereign guarantees or those provided by international financial institutions.

In addition to PPAs, other types of risk mitigation tools may be used, for example a Resource Risk Guarantee or price stabilization mechanism. A Resource Risk Guarantee helps renewable energy projects cover operating expenses and ensure that they can afford loan payments when energy generation temporarily falls below revenue-generating levels (Vanamali, 2012, p. 18). Price stabilization is also an important mechanism that NAMA developers can use to address risks related to price volatility. For example, Chile's Price Stabilization Fund is designed to accumulate funds through the difference between the energy price specified in the contract with a clean energy developer and the spot market prices at different points in time, and to use those funds to provide guarantees for commercial lenders (Hänsel et al., 2012, p. 27).

5.0 Conclusions and Recommendations

NAMAs have the potential to become a key mechanism for climate change mitigation in developing countries. NAMAs may include policies, strategies, programs or projects. Since this is a relatively new mechanism, NAMA development is a learning experience for national governments, their international partners and the private sector. Among issues faced by NAMA developers, funding availability presents a challenge. Considering the many uncertainties associated with public climate finance, NAMA developers are encouraged to seek funding from the private sector both domestically and internationally to make NAMAs more sustainable and enhance the potential for NAMAs to have a transformational impact. Considering that NAMAs are new for the private sector, private funders should also be encouraged to invest in them.

This paper discusses the opportunities and challenges that NAMA developers may face when seeking private funding. To illustrate these opportunities and challenges, as well as related problem-solving mechanisms, the paper used a literature review and case studies of eight climate change mitigation and infrastructure creation or transformation initiatives from different parts of the world. Seven of these initiatives have successfully leveraged private funding, and one has potential for attracting private finance. Using these initiatives as illustrations, the key finding is that NAMA developers should aim to develop bankable NAMAs based on thorough market analysis and consultations with stakeholders, including domestic and international private sector companies to build viable financing mechanisms and to design replicable projects (Hänsel et al., 2012, pp. 26–27).

This paper addresses six aspects of programs and projects that have successfully attracted private investments, including implementing entities, ownership, and the roles of national governments, domestic public agencies and banks, domestic and international private sector, bilateral and multilateral stakeholders, and end users. By paying attention to those six aspects, NAMA developers may increase the chances of creating bankable NAMAs. In addition, the paper addresses political, financial, technological and other risks that may present obstacles to private investments in NAMAs. Using the eight case studies as illustrations, the paper provides an overview of risk mitigation mechanisms, including relevant policy frameworks and government intervention; stimulating demand and creating economies of scale; creating easy loan repayment mechanisms; and using concessional finance and other mechanisms to encourage private investments. Finally, the paper provides several recommendations to NAMA developers and international organizations and donors.

5.1 Recommendations for NAMA Developers

Strengthen coordination between relevant government agencies, bilateral and multilateral stakeholders, and private funders.

The case studies in this paper demonstrate the importance of coordinating activities implemented by various stakeholders. Complex transformative initiatives such as Morocco's Ouarzazate concentrated solar power project or Croatia's Energy Efficiency Project require sophisticated management and financial frameworks that can only be designed in cooperation with stakeholders. While existing government agencies or private companies have led coordination efforts in these and other cases reviewed in this paper, it may be feasible to establish special coordination mechanisms for NAMA development and implementation. For example, national climate funds help stakeholders make concerted decisions, accumulate and disburse funds, and implement initiatives.

Understand the global NAMA financial landscape to identify as many domestic and international funding sources as possible.

Global climate funding is complex and diverse. It is important to understand the benefits and limitations of domestic, bilateral and multilateral, and private funding. Initiatives reviewed in this paper demonstrate good understanding of the climate finance landscape, as their developers are able to blend funding from various sources to maximize impact. It is also important to clearly understand the potential of new and promising financial modalities and stakeholder groups, including output-based assistance, climate bonds, advance market commitments, institutional investors and others that may help develop effective and bankable NAMAs.

Take steps to attract private investments early in the NAMA-development process.

Existing literature and case study analysis demonstrate the importance of focusing on private investments as early as possible in the NAMA-development process. A strong side of many initiatives described in this paper is that they have contributed to commercializing new products and services, creating markets and building demand. Figure 10 describes four stages of engaging private investors in a NAMA, beginning with analysis of the market and needs and opportunities, and ending with an investment pitch. When working with private investors and lenders, it is important to take into account existing gaps and possibilities with regard to products and services, and to ensure a joint public-private planning process.

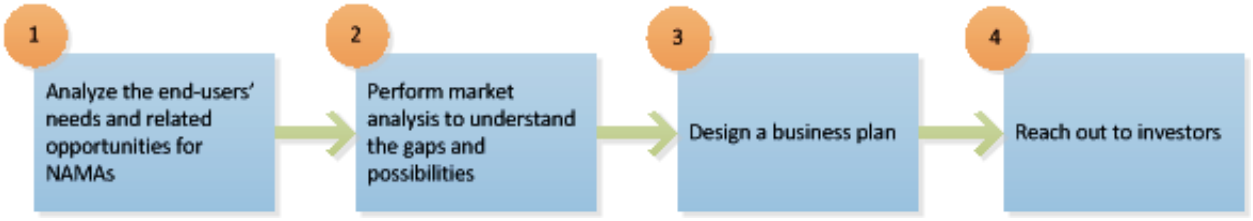

FIGURE 10: FOUR STEPS TO HELP ATTRACT PRIVATE FINANCE FOR NAMAS

Source: Authors

It is also important to develop a robust business plan with a strong financial component. Business plans should provide investors with details on the following four areas of the proposed initiative (Sahlman, 1997, p. 99):

1. People: project developers and other stakeholders
2. Profile: the financial and economic aspects and related opportunities provided by the proposed project
3. Context: policies, regulations and the country's background
4. Discussion: risks and rewards

Business plans should include detailed explanations of investment benefits (Blodgett et al., 2012, p. 73). This means that in addition to describing the situation in the specific sectors or areas that a NAMA focuses on, it is important to describe the overall market situation and the NAMA's potential for commercialization. Market and industry analysis should include information about competitiveness and profitability, current trends and threats (Ehmke & Akridge, n. d., p. 3). Thorough analysis of costs and expected revenues is also important. For bankable NAMAs, describing the

revenue generation potential of proposed products and services may be as important as quantifying the expected GHG emission reductions.

When developing a business plan, it is important to understand the modalities of work of financial institutions. For example, banks interested in funding PPP projects prefer higher rates of co-funding by public donors and their long-term commitment to co-funding, as well as shorter-tenor loans, maximum credit enhancement and loan seniority (Khalil, 2012, p. 21). Understanding this, public actors can take steps to find a compromise that will help their private counterparts reach an optimum balance between risks and rewards. Coordinating bodies such as national climate funds can help public sector actors align their projects with market conditions, regulations and infrastructure in a specific country, and use the power of the markets for the national benefit (Flynn, 2011, p. 20).

Use public finance to leverage maximum possible amounts of private finance.

Private funding should not be expected to cover the full cost of a NAMA. It is, however, possible to leverage a significant amount of private funds by using public finance strategically. Therefore, business plans should include strategies for using public funding to catalyze and leverage private investment (Lacy et al., 2013, p. 17). Some areas of NAMAs have a higher potential for attracting private funding than others, as demonstrated by the example of Mexico's Sustainable Housing NAMA. Specifically, operation costs will likely be funded by the public sector, while elements with significant potential for commercialization are more likely to attract the private sector.

Design risk mitigation mechanisms to encourage private investment.

Private funders are often reluctant to invest in climate change-related initiatives because of perceived risks. Consequently, private funding may be encouraged through various risk-mitigation mechanisms. Some of these mechanisms are discussed above and illustrated in the case studies. These include robust risk-assessment and mitigation frameworks, government leadership, facilitating market creation and building demand, creating convenient debt repayment systems, and using risk mitigation tools such as concessional finance and credit and risk guarantees. Understanding the investment environment, NAMA revenue generation potential and risk mitigation mechanisms may help leverage maximum amounts of private finance.

5.2 Recommendations for International Stakeholders

Help NAMA developers attract private investment.

NAMA developers need information about opportunities for attracting private funding. International organizations and donors can help by collecting and disseminating information about possible funding sources and best practices in private funding of NAMAs. By compiling and disseminating best practices, international organizations and donors can motivate NAMA developers to work with the private sector. Preparing case studies such as those published by the San Giorgio group (Falconer & Frisari, 2012; Hervé-Mignucci, 2012; Trabacchi et al., 2012) is useful; however, NAMA developers would benefit not only from detailed descriptions of funding modalities, risks and successes in specific countries, projects or programs, but also from aggregated case studies that would compare specific initiatives with regard to opportunities and challenges. It is important to focus such case studies on barriers to private investments and on PPPs in climate change mitigation.

It is also important to provide information about the assistance that international organizations and donors can provide to NAMA developers—for example, information about concessional finance and risk mitigation options. International organizations and donors can also help countries design bankable NAMAs, including assistance in developing business plans, in quantifying expected results, and in calculating returns. Finally, these stakeholders can help NAMA developers by disseminating information on contacting potential sources of private funding and on the assistance they can expect for negotiating with private funders.

Proactively engage the private sector in supporting NAMAs.

Potential private funders often have insufficient information about NAMAs and about the opportunities and benefits associated with investing in NAMAs. International agencies and donors can help bridge that gap by targeting the private sector with information and training related to NAMAs. This can be done through engaging the private sector in NAMA-related activities such as conferences, workshops and study tours. Potential NAMA funders would benefit from learning about best practices in NAMA private funding and from meeting NAMA developers face-to-face.

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Appendix I: NAMAs in the Public Registry[6]

COUNTRY	TITLE	SECTOR	TYPE	COST (US$ MIL)	FIN SUPPORT REQUESTED (US$ MIL)	TECH SUPPORT REQUESTED (US$ MIL)	CAPACITY BUILDING SUPPORT REQUESTED (US$ MIL)	PRIVATE SECTOR FOCUS
Azerbaijan	Nationally Appropriate Mitigation Actions for Low-Carbon End-Use Sectors in Azerbaijan	Energy, Buildings, Transport	Policy	0.10	0.10	0	0	
Chile	Implementation of a National Forestry and Climate Change Strategy, including the Development and Implementation of a Platform for the Generation and Trading of Forest Carbon Credits	Forestry	Policy		7.80	0.00	0.00	Facilitating access to the sustainable forestry market for landowners in Chile
Chile	Expanding Self-Supply Renewable Energy Systems (SSRES) in Chile	Energy	Policy		13.50	0.00	1.50	Expanding the renewable energy market in Chile and facilitating its co-funding by the private sector
Chile	National Program for Catalyzing Industrial and Commercial Organic Waste Management in Chile	Waste	Policy		30.00	0.00	0.00	Catalyzing the private sector's involvement in organic waste management
Chile	Clean Production Agreements in Chile	Energy, buildings, agriculture, waste, transport, industry, forestry	Policy	36.50				Engaging Chilean businesses in sustainability through CPAs; 30 per cent of the costs of this policy is funded by the private sector
Cook Islands	Supporting Implementation of 100% Renewable Electricity by 2020	Energy	Project		0.44	0.00	0.00	Creating a legal and regulatory framework for private sector investment in renewable energy in the Cook Islands
Dominica	Low Carbon Climate Resilient Development Strategy	Energy, buildings, agriculture, waste, transport, industry, forestry	Goal, strategy, policy, project		500.00	25.00	0.00	Creating opportunities for foreign direct investments (FDI) in Dominica's renewable energy generation
Dominican Republic	Tourism and Waste in the Dominican Republic	Energy, waste	Goal, policy		310.00	0.00	0.00	Creating incentives for the tourism industry in the Dominican Republic to participate in waste management
Dominican Republic	NAMA in Cement/Co-Processing and Waste Sector	Waste, industry	Goal, policy		5.82	0.00	0.00	Establishing public-private schemes for processing waste and reducing energy costs in cement production in the Dominican Republic

[6] Source: UNFCCC (2014).

COUNTRY	TITLE	SECTOR	TYPE	COST (US$ MIL)	FIN SUPPORT REQUESTED (US$ MIL)	TECH SUPPORT REQUESTED (US$ MIL)	CAPACITY BUILDING SUPPORT REQUESTED (US$ MIL)	PRIVATE SECTOR FOCUS
Georgia	Adaptive Sustainable Forest Management in Borjomi-Bakuriani Forest District	Forestry	Policy, project	2.59	1.94	0.00	0.00	
Indonesia	Smart Street Lighting Initiative	Transport	Policy	294.00	11.50	7.50	0.00	Facilitating energy services companies' entry into the energy-efficiency market, and engaging commercial financial institutions in financing energy-efficiency projects
Indonesia	Sustainable Urban Transport Initiative	Transport	Policy, project	400-800	300.00	20.00	0.00	
Jordan	Rehabilitation Of Al-Akaider Landfill	Waste	Project	0.75	0.75	0.00	0.00	
Jordan	Fuels and Emissions Savings	Energy, Industry	Goal, strategy, policy		0.50	0.50	0.00	
Jordan	Fuels and Emissions Savings	Energy, Industry	Goal, strategy, policy		1.00	0.50	0.00	
Jordan	Improvement of Energy Efficiency in the Jordanian Water Sector (IEE)	Energy	Project	0.21	0.00	0.21	0.00	Technical assistance to develop investment opportunities in Jordan's water sector
Jordan	Nationally Appropriate Mitigation Action (NAMA) for Industrial Sector	Industry	Goal	1.00	0.85	0.00	0.00	
Jordan	Nationally appropriate Mitigation Action (NAMA) for National Domestic Waste Management	Waste	Strategy	0.30	0.30	0.00	0.00	
Jordan	Improvement of Energy Efficiency in the Jordanian Water Sector (IEE)	Energy	Project		56.50	0.00	0.00	Partnership with private companies to facilitate sustainable water management in Jordan
Jordan	Samra Thermal Power Station – Phase-III Add-On Combined Cycle	Energy	Goal		23.80	0.00	0.00	
Jordan	The Zarqa River Basin Industrial Waste Water Treatment Plant and Energy Plant (ZIWWTEP)	Energy, agriculture, industry	Project		0.00	0.00	0.00	Potential for sustainable private sector investment in waste water treatment in Jordan
Kenya	NAMA for Accelerated Geothermal Electricity Development in Kenya	Energy	Goal	4250.00	288.30	0.00	0.00	Facilitating private investment in geothermal power generation in Kenya
Mali	NAMA in Renewable Energy and Energy Efficiency	Energy	Goal	0.84	0.04	0.2	0	
Mali	NAMA in the Forestry Sector	Forestry	Goal	0.2	0.04	0.06	0	
Mexico	Emission Reduction Actions Program (NAMA) in Natural Gas Processing, Transport and Distribution System, Through Fugitive Emission Reduction	Energy	Policy		47.80	0.00	0.00	

COUNTRY	TITLE	SECTOR	TYPE	COST (US$ MIL)	FIN SUPPORT REQUESTED (US$ MIL)	TECH SUPPORT REQUESTED (US$ MIL)	CAPACITY BUILDING SUPPORT REQUESTED (US$ MIL)	PRIVATE SECTOR FOCUS
Pakistan	Energy Efficient Lighting in Residential, Commercial, Industrial, and Outdoor Sectors of Pakistan	Buildings	Strategy, policy	9.10	9.10	0.00	0.00	Facilitating private investment in energy-efficient lighting in Pakistan
Serbia	Expansion of Existing Heating Network in Valjevo	Energy, buildings	Project		7.80	0.00	0.00	
Serbia	Introduction of Metering System and Billing on the Basis of Measured Consumption in District Heating Systems in Serbia	Buildings	Project		274.30	0.00	0.00	
Serbia	Use of Solar Energy for Domestic Hot Water Production in Heat Plant "Cerak" in Belgrade	Energy, buildings	Project		1.40	0.00	0.00	
Serbia	Thermal Power Project with Capacity and Efficiency Increase II - TTP Nikola Tesla – Unit A3	Energy	Goal, strategy, policy		60.80	0.00	0.00	
Serbia	Introduction of 1000 MW of Small Biomass Boilers in Serbia	Energy	Policy		323.40	0.00	0.00	
Serbia	Rehabilitation of Arterial Roads in Serbia	Transport	Project		180.20	0.00	0.00	
Serbia	Revitalization of the Existing Small Hydropower Plants and Construction of New Small Hydropower Plants	Energy	Goal, strategy, policy		71.20	0.00	0.00	
Serbia	Thermal Power Project with Capacity and Efficiency Increase I - TTP Nikola Tesla – Unit B2	Energy	Goal, strategy, policy		143.60	0.00	0.00	
Serbia	Construction of a Super-Critical Lignite Power Plant TTP Kostolac B	Energy	Goal, strategy, project		1200.00	TBD	0.00	
Serbia	Energy Efficiency Improvements in Public Buildings: 23 Schools and 26 Hospitals – the Serbian Energy Efficiency Project	Buildings	Policy		16.20	0.00	0.00	
Serbia	Improvement of Old Residential Buildings Envelope (Exterior Doors, Windows and Thermal Insulation) in Serbia	Buildings	Policy, project		0.70	0.00	0.00	
Serbia	Replacement and Construction of a New Natural Gas Cogeneration Plant CHP Novi Sad	Energy	Goal, strategy, policy, project		164.90	127.50	0.00	
Serbia	Construction of New Energy Efficient Buildings Based on Energy Efficiency Regulation in Serbia	Buildings	Policy, project	1.30				
Uruguay	Sustainable Production with Low-Emission Technologies in Agriculture and Agroindustry Production Chains	Energy, waste	Project	0.63	0.63	0.00	0.00	

COUNTRY	TITLE	SECTOR	TYPE	COST (US$ MIL)	FIN SUPPORT REQUESTED (US$ MIL)	TECH SUPPORT REQUESTED (US$ MIL)	CAPACITY BUILDING SUPPORT REQUESTED (US$ MIL)	PRIVATE SECTOR FOCUS
Uruguay	Sustainable Housing Programme	Buildings	Policy	0.35	0.30	0.00	0.00	
Uruguay	High Integration Program of Wind Energy	Energy	Policy	1.25	0.75	0.00	0.00	
Uruguay	First Introduction of Photovoltaic Solar Energy in the National Electrical Grid	Energy	Policy		2.00	0.00	0.00	Creating conditions for private investments in solar energy generation
Uruguay	LNG Terminal with Regasification Capacity of 10.000.000m3/d of Natural Gas with Possible Expansion to 15.000.000m3/d	Energy, buildings, transport, industry	Policy, project	5.00				
Uruguay	Promotion of Renewable Energy Participation in the Uruguayan Primary Energy Mix	World Bank	Goal, policy, project					Attracting private companies to Uruguay's solar energy market

Appendix II: NAMA Support Facilities[7]

NAME	COUNTRY	WHAT IS SUPPORTED	SUPPORT AVAILABLE	PROCESSES FOR PROVISION OF SUPPORT	ADDITIONAL INFORMATION
Austrian NAMA Initiative	Austria	NAMA preparation in energy and buildings in in Africa and Small Island Developing States	Financial support	Grants, carbon finance	This funding serves to mobilize additional funding, including in particular private investment
Support for Activities Related to Sustainable Management of Forests	Austria	Implementation of NAMAs in forestry in Georgia (the Caucasus region)	Financial support	Grants	The funding builds on earlier cooperation between Georgia and Austria, and aims to help further develop climate change adaptation and mitigation in the forestry sector in that country.
Climate-related official development assistance funding	Germany	NAMA preparation of all types and in all mitigation sectors	Financing, technical assistance, training	Grants, concessional loans	
EU-Africa Infrastructure Trust Fund	EC/AC	NAMA implementation in Africa, in energy and transport projects	Financial support	Grants, guarantees, equity	Not climate-specific, but 10 out of 17 approved grants in 2012 contributed to climate change projects
Global Environment Facility (GEF) Trust Fund		NAMA preparation and implementation in all sectors and all types	Financial support	Grants	Has supported 4 NAMAs (Azerbaijan, Kazakhstan, Peru, and Tunisia). Works with the private sector
International Climate Initiative (ICI)	Germany	NAMA preparation of all types and in all mitigation sectors	Financing, technical assistance	Grants, concessional loans	
Latin American Investment Facility	EC	NAMA implementation in Latin America and the Caribbean in energy and transport	Financial support	Grants, loans in support of public infrastructure projects, the provision of loan guarantees, interest rate subsidies, technical assistance and risk capital operations	Not climate-specific, but 19 out of 20 approved operations in the Latin America Region have an impact on the environment
NAMA Facility	Germany/ U.K.	NAMA implementation in all sectors, projects only	Financial and technical support for implementation of NAMAs	Grants, concessional loans that serve to mobilise additional funding, including private investments	Eligibility criteria include co-funding from other sources and planning for phase-out of support
Neighbourhood Investment Facility	EC	NAMA preparation in energy efficiency in the Middle East and North Africa in all sectors except buildings and agriculture	Financial and technical support		Not climate-specific, but 41 out of 66 supported projects were low-carbon and climate-resilience projects

[7] Source: UNFCCC (2014).

Appendix III: Case Studies

Bulgarian Energy Efficiency Fund (BEEF) (Bulgaria)

Based on Dukov (2009) and World Bank (2010b)

Website: http://www.bgeef.com

Launched in: 2004

Total budget: N/A

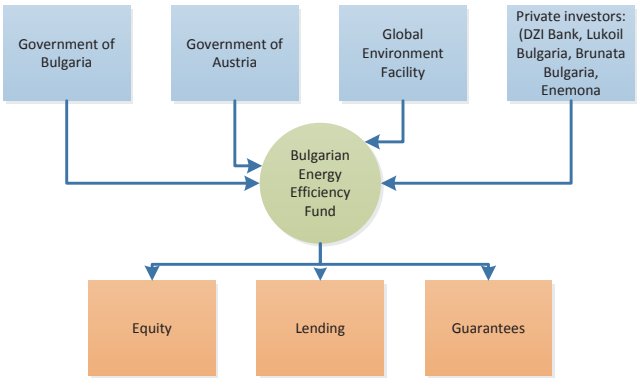

FIGURE A1. BULGARIAN ENERGY EFFICIENCY FUND

Background:

The fund is a public-private partnership that serves as a financing and guarantee institution and consultancy centre. It finances energy-efficiency projects in buildings and industrial facilities and provides related risk guarantees. Types of funded projects include building refurbishment; fuel replacement; thermal insulation; reconstruction of heating, ventilation and air conditioning systems; industrial energy efficiency; and similar projects. The fund helped launch three energy service companies (ESCOs) through default and liquidity guarantees. As a result of the project, BEEF has funded 112 projects (US$39 million in total) and reached financial self-sustainability.

Implementing mechanism:

Fund governance includes:

- Assembly of Donors: representatives of major funders, the Governments of Bulgaria and Austria, Global Environment Facility (GEF), and private stakeholders: DZI Bank, Lukoil Bulgaria, Brunata Bulgaria, Enemona
- Management board
- Fund manager: selected through a public competitive tender

Financing arrangements:

- BEEF's initial capital was about US$14 million, including grants from the Bulgarian and Austrian governments (US$2 million each), GEF (US$10 million) and private stakeholders (US$300,000). By 2010, BEEF had leveraged over US$26 million in equity, loans and guarantees.
- GEF's seed capital included: US$4.5 million to establish a Partial Credit Guarantees (PCG) facility; US$4 million to establish an Investment Financing Facility financing energy-efficiency projects; and US$1.5 million for technical assistance.
- BEEF provides PCGs. Due to a low demand for guarantees, US$2 million from the PCG facility was later transferred from the Guarantee Account to the Loan Account for investing in projects.
- The fund's client portfolio includes: municipalities (49 per cent) and universities and hospitals (21 per cent) with loans at 6–9 per cent annually, small and medium enterprises (30 per cent) with loans at 7–10 per cent annually. Eligible projects include: costs in the range of US$20,000–$2 million, 10 per cent of the total cost if co-funded with a bank or 25 per cent if no bank co-funding, a project's equity contribution, presence of energy saving technologies, payback period of up to 5 years.

Success factors:

- The fund was created based on lessons learned from other energy-efficiency programs in Central and Eastern Europe, namely from earlier Hungarian, Romanian and Bulgarian projects.
- High-quality baseline data was obtained during project preparation.
- Pipeline projects were identified early on.
- Comprehensive consultations were held with various stakeholders.
- A stable macroeconomic situation and a predictable investment climate in Bulgaria helped implement the project.
- Government intervention at the initial stage was instrumental, including with regard to energy-efficiency-friendly policies (mandatory energy audits and standards, as well as facilitation of direct cooperation between municipal authorities and the fund, bypassing procurement procedures).
- The project's value added is in:
  - Its capacity as a finance provider of last resort for those clients who have tried unsuccessfully to borrow from commercial banks
  - Its capacity as an ESCO funder
  - Its efforts to advocate for energy-efficiency funding as an "honest broker" have helped ESCOs obtain funding
- The fund has a strong financial capacity, which was further improved through two fundraising campaigns.
- The fund has a robust risk mitigation framework (for example, flexible loan provision, directly or as co-financing with commercial lenders, was an important risk mitigation factor).
- A high-quality fund manager was able to adjust the project to the changing market situation.

Challenges:

- Closer to the end of the project, the government limited its involvement, specifically with regard to helping the fund increase its capital base or obtain additional grant or equity funding.
- Costs of energy-efficiency investments have increased.
- Government policies to facilitate an energy-efficiency market in multi-apartment buildings are lacking.
- Payback increased from the projected 3 years to 4–5 due to a significant increase in construction costs.
- The fund's limits prevented it from co-financing large-scale projects with commercial banks.

Lessons learned:

- There is a need to carefully analyze financial instruments and how they will be used.
- There is a need for mid-term project reviews to adjust to market changes.
- It is important to estimate correctly the prospective clients' ability to pay.
- It was understood early on that PCG would not be in high demand. Reasons for this included the fact that many commercial banks were willing to lend without guarantees for small projects, thus helping clients reduce costs, and the fact that small-scale energy-efficiency projects in emerging economies rarely require sophisticated guarantee instruments. Similarly, demand for co-financing (with commercial banks) was lower than expected due to the maturity of Bulgaria's energy-efficiency market and availability of energy-efficiency expertise, and to the insufficient amount of per-project funding that in many cases failed to interest commercial banks.

Cabeólica Wind Farm Project (Cape Verde)

Based on Africa Finance Corporation (n. d. a; n. d. b); Ashden (2013); Eleqtra (n. d.)

Website: www.cabeolica.com

Launched in: 2009

Total budget: US$84 million

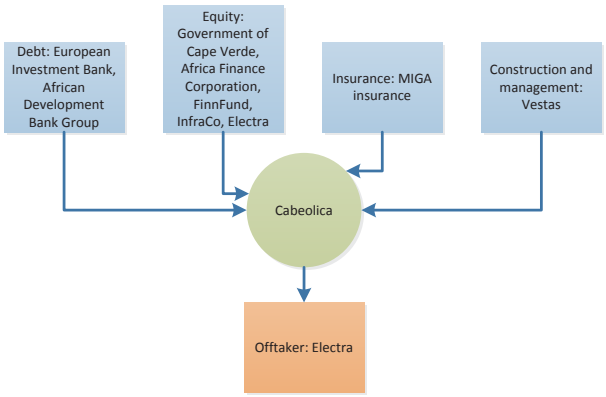

FIGURE A2. CBEÓLICA WIND FARM PROJECT

Background:

Cabeólica was set up to address the need to develop Cape Verde's wind energy potential. It responded to the government's taget of 25 per cent electricity from renewables by 2012. Operating at capacity, the project will add over 100 gigawatt hours of electricity annually to the grid. In addition to typical economic benefits of renewable energy projects, Cabeólica helped reduce pressure on public funds due to private investments. Cabeólica was a 2011 Africa Energy Award Winner and a 2013 Africa Ashden Award winner and its model is replicable in other African countries.

Implementing mechanism:

- Cabeólica SA is a Special Purpose Vehicle (SPV) established in the framework of a public-private partnership with five major shareholders: the Government of Cape Verde (Ministries of Tourism, Industry and Energy, and of Finance), InfraCo Limited (an infrastructure development company), Electra SARL (the national power utility), the Africa Finance Corporation and the Finnish Fund for Industrial Cooperation Ltd.
- Cabeólica has a 20-year Power Purchase Agreement (PPA) with the Cape Verde national power utility. Engineering, procurement and construction nd operations and maintenance are done by Vistas, the leading manufacturer of wind turbines.

Financing arrangements:

- Equity is provided by the five shareholders (above), and debt is provided by the European Investment Bank (US$42 million) and the African Development Bank (US$21 million).
- Political risk insurance was obtained from the Multilateral Investment Guarantee Agency.

Success factors:

- Consultations with diverse stakeholders enabled the project to design a successful project finance scheme and to find sponsors.
- The African Development Bank's (AfDB) role as an "honest broker" was important for the project's success.

Challenges:

- Lenders' due diligence (AfDB) involved complex technical, legal, environmental, financial, economic and insurance analysis.

Lessons learned:

- Due to Cape Verde's geography, the islands have their own vertically integrated mini-utilities owned by Electra SARL. Therefore, coordination has been key to the project's success.

Croatian Energy Efficiency Project (Croatia)

Based on World Bank (2010a) and World Bank (2000)

Launched in: 2003, finished in 2010

Total budget: US$33.3 million

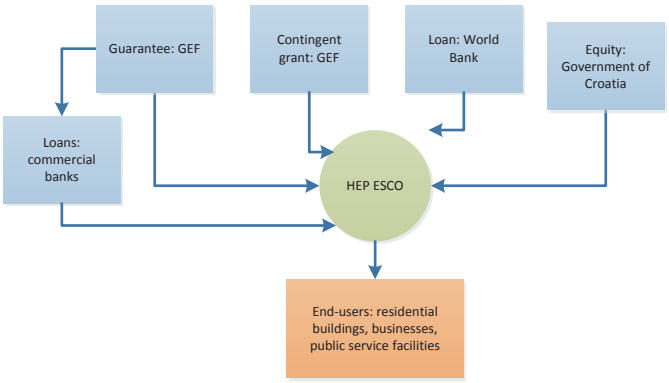

FIGURE A3. CROATIAN ENERGY EFFICIENCY PROJECT

Background:

The project responded to the lack of energy-efficiency development and project financing; lack of capacity and know-how among key stakeholders; and lack of consumer demand for energy-efficiency products in Croatia. Project objectives were to increase the demand for and supply of energy-efficiency projects and services in Croatia by creating a core developer of energy-efficiency projects within Hrvatska Elektroprivreda d.d. (HEP, the national power utility) and providing a framework for other emerging service providers to tap into new energy-efficiency business opportunities. The project had a direct transformational effect in terms of increased availability and price of energy-efficiency products and services. It was profitable and had an economic rate of return of over 10 per cent. Following project closure, HEP ESCO continued its activities on a for-profit basis, and initial investment triggered the implementation of 31 energy-efficiency projects. The project's impact included engaging 22 engineering/consultancy firms and research institutions, and over 100 small companies, in energy-efficiency projects. Commercial banks also became more engaged in the financing of energy-efficiency projects—several banks got involved in energy efficiency and additional investments of US$1.8 million were leveraged.

Implementing mechanism:

The project was implemented as a partnership between an ESCO run by HEP; the end users (users of electricity and heat), including owners and occupants of buildings of different types (e.g., housing cooperatives, commercial enterprises, public service facilities such as schools and hospitals), and banks. HEP has easy access to the end users who are its customers. The Croatian Bank for Reconstruction and Development (HBOR) provided credit guarantees and incentives to commercial banks interested in lending to end users, thus boosting investment in energy-efficiency projects.

Financing arrangements:

- International Bank for Reconstruction (IBRD) loan (US$5.8 million) and HEP equity (US$3 million) helped trigger a total of US$24.5 million in investments from local banks and end users.
- GEF contingent grant (US$3.6 million) included project development (US$0.6 million) and early project financing (US$3 million).
- GEF grant to HBOR included a commercial loan facility (US$0.8 million) and a PCG program (US$1.2 million).
- GEF grant included US$1.4 million for technical assistance to HEP ESCO, partners and stakeholders including training, information dissemination, outreach, and monitoring and verification.

Success factors:

- Government leadership in energy-efficiency policies and relevant regulations was crucial to success.
- National regulation facilitated the project, including the national Energy Sector Development Strategy and relevant regulations highlighting energy-efficiency benefits and creating relevant obligations for electricity suppliers.
- Technical assistance was important for providing banks, end users and the private sector with energy-efficiency knowledge and skills.

Challenges:

- Changes to the Budgetary Law (2009) created obstacles for new municipal ESCO projects.
- Longer payback time and lower energy savings resulted in lower-than-expected GHG emissions savings (30 per cent of the target).
- PCG did not work as planned: most borrowers were low-risk public facilities and commercial banks did not become significantly interested in financing energy-efficiency projects (they based their decisions on the borrowers' balance sheets and collateral rather than on projects).

Lessons learned:

- Innovative instruments such as ESCOs must be introduced gradually: from simple to complex models.
- PCG success depends on the state of the credit market, and PCGs in emerging economies are not always successful. Grants that enable subsidies to energy-efficiency projects may be a better alternative in those countries.

Sustainable Housing (Mexico)

Based on CONAVI & SEMARNAT (2012); Ecofys (n. d.); Inter-American Development Bank (2012, 2013)

Website: http://www.conavi.gob.mx/viviendasustentable

Launched in: 2011

Total budget: approximately US$200 million

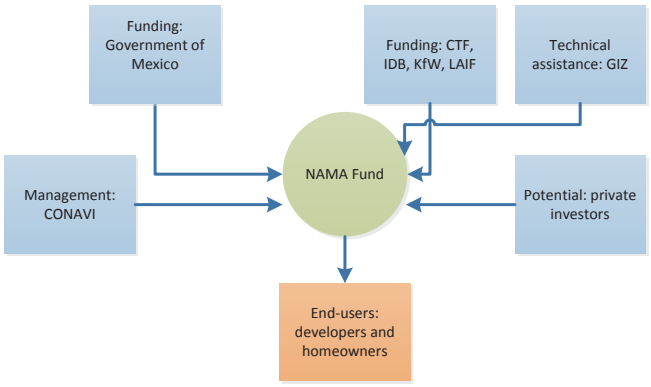

FIGURE A4. SUSTAINABLE HOUSING NAMA

Background:

The project is aimed at extending and expanding the scope of earlier steps towards greening Mexico's residential sector through building energy-efficient homes according to three standards: EcoCasa 1, EcoCasa 2, and EcoCasa Max. The EcoCasa program includes financial and technical assistance to housing developers. In perspective, households' cost savings on electricity, gas and water should lead to offsetting the costs of installed equipment. In 2013, EcoCasa was showcased by the UNFCCC as a lighthouse activity that inspires action on climate change.

Implementing mechanism:

The NAMA Fund functions as the financial vehicle to receive money from the Mexican government and donors. Mexico's National Housing Commission (CONAVI) has provided initial coordination. Technical support is provided by the German Society for International Cooperation (GIZ). The EcoCasa program is a key component of the NAMA. In its framework, the Federal Mortgage Society (SHF) coordinates loans to developers and funds to financial intermediaries for green mortgages.

Financing arrangements:

- There will be several funding streams within this NAMA: support for housing supply (developers); support for housing demand in the EcoCasa pilot program framework (mortgages); support for measuring, reporting and verification /capacity building.
- The EcoCasa program is funded by the German Development Bank (KfW): US$105.5 million in concessional loans; the Clean Technology Fund (CTF): US$51 million in concessional loans; the Inter-American Development Bank (IDB): US$50 million; the Latin America Investment Facility (LAIF): US$9 million; and the NAMA Facility: US$13 million. In addition, the Mexican government subsidizes energy efficient housing through grants for households (20 per cent, 30 per cent and 50 per cent, depending on the eco standard).
- NAMA costs will depend on the number of housing units delivered and will include:
  - 12 types of housing units; the full cost of 1,000 units of each type is $40.9 million
  - Supportive action: $11.7 million
- The NAMA uses three scenarios for channelling technical assistance: funds are collected in the international NAMA Fund and used by a specific agency; funding is implemented within a bilateral technical assistance program; funding is implemented by GIZ on behalf of the donors, as part of the existing GIZ Technical Assistance program. In the EcoCasa program in the NAMA framework, SHF collects and disburses funds from international stakeholders.

- Five packages were created for donors/investors: large scale (27,000 homes), midsize (13,800 homes), small scale (5,200 homes), multi-family (14,940 apartments), and EcoCasa Max Pilot (890 homes). These packages can be further adjusted based on demand.
- For the loan component, it is expected that SHF will be able to reinvest the interest and principal in the course of the EcoCasa program. This is based on the fact that the maturity of Mexican construction loans is 2–3 years.
- Other potential sources of funding include carbon finance, international stakeholders and private investors.
- The following models for financing the NAMA are considered:
  - The Underwriter model: The government uses its ability to borrow at low cost to provide guarantees to investors in the NAMA Fund; these loans are then disbursed through banks/mortgage providers as subsidies to developers and/or subsidies to buyers.
  - Subsidies-Driven models: A portion of subsidies avoided because reduced energy use is channelled into the NAMA Fund to reduce risk for investors, to pay back investors or to reinvest in the NAMA. Private investors purchase shares in the NAMA Fund.
  - The Loss Protection model: The government does not channel the energy subsidy savings into the NAMA Fund, but rather places them into an insurance fund to guarantee loss protection to private investors or uses it to purchase such insurance on the market.
  - The Corporate Social Responsibility Model: Portions of emission reductions generated through the NAMA are claimed by private sector companies operating in Mexico towards their CSR or emission reduction goals in exchange for soft loans to the NAMA Fund or for other financial or in-kind input in the NAMA.

Success factors:

- The quality mortgage provision scheme is seen as a key element of this NAMA's success because it will stimulate demand—and sufficient demand will reduce the amount of assistance to suppliers.

Challenges:

- Energy-efficient housing is more expensive than conventional housing, but it has the same target group of consumers with the same ability to pay.
- Demand for energy-efficient homes is still unclear, although research has shown that energy-efficient homes have a 50 per cent more rapid acceptance compared to traditional homes without a green mortgage component.

Lessons learned:

- Analysis of this NAMA's options shows that savings from energy-efficiency measures are higher for terraced houses and multi-storey buildings compared to freestanding family homes.

Ouarzazate Concentrated Solar Power (Morocco)

Based on AfDB (2012); Falconer & Frisari (2012); Mobarek (2014)

Launched in: initiated in 2009, launched in 2012

Total budget: US$1,370 million

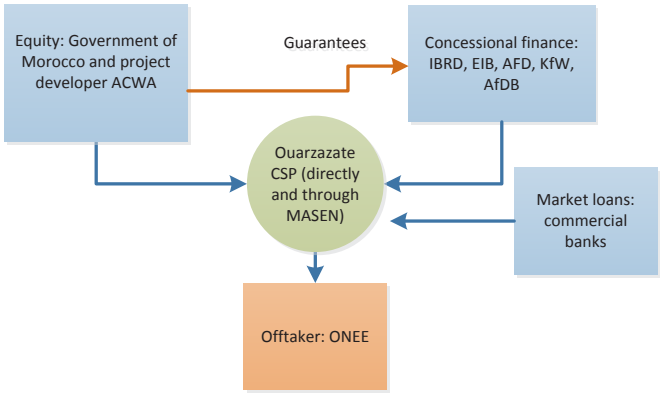

FIGURE A5. OUARZAZATE CSP

Background:

The project is part of Morocco's solar plan, adopted in 2009 to increase the country's solar power capacity through five concentrated solar power (CSP) projects. The project has established a 160MW CSP facility in Morocco. It is aimed to address barriers to commercial viability of solar energy in MENA, such as high costs of CSP and complexity of infrastructure investments, through facilitating solar power generation scale-up and related cost reduction, and developing a public-private partnership to engage the private sector in funding renewable energy projects.

Implementing mechanism:

The project is a public-private partnership with three groups of stakeholders:

- The Government of Morocco, the Moroccan Solar Energy Agency (MASEN) and Office National de l'Eau et de l'Electricité (ONEE): the government subsidizes the project; MASEN (25 per cent ownership of the Solar Power Company [SPC]) provides the link between the SPC, a SPV and the government.
- Private developer (75 per cent ownership): Saudi Arabia's ACWA was selected through a tender process.
- International financial institutions (IBRD, EIB, AFD, KfW, AfDB and others) provide concessional funding to MASEN, negotiated individually by each international financial institution (IFI).

Financing arrangements:

- Total net project cost is US$1,370 million. The target is to leverage US$120 million in private capital.
- The Moroccan government and MASEN signed a convention to financially support MASEN. The government provides an annual subsidy of $60 million through MASEN. As a shareholder, the government expects to share the project's revenue; however, the costs will outweigh the revenue until the project is significantly scaled up.
- MASEN has a power sale agreement with ONEE and expects to receive guaranteed revenue from energy sale, from infrastructure/facility-use fees from SPC, from managing IFI grants and loans, from its share in the SPC, and from sale of emission credits under the CDM.
- ACWA Power will obtain revenue from the PPA.
- IFIs (World Bank, AfDB, AFD and others) are impact investors, primarily interested in recouping their investments with a small margin and facilitating low-carbon, sustainable development.
- IFIs provide concessional finance at a blended rate of 3.1 per cent (compared to an average commercial rate of 9 per cent).

- Revenues are expected from the sale of energy to MASEN through a 25-year PPA fixed or indexed to the grid price.
- The project's pre-tax internal rate of return is 9 per cent.

Success factors:

- The government provides supportive regulatory and policy frameworks, as well as organizational, legal and financial support.
- Concessional finance prior to project initiation helped mitigate the risk of capital shortages, and overall financial risk of the project, which has allowed the project to reduce the cost of energy by 30 per cent, making it more competitive.
- All IFI lenders agreed to use the World Bank's standard procedures for all loans and common procedures. To address the potential risk of different loan terms, EIB, KfW and AFD developed a joint synchronized loan package.
- A public-private partnership facilitated careful risk distribution between the public and private partners and transparent tender processes to select project developer ACWA Power.
- MASEN acts on both the supply and demand sides of the public-private partnership (as a purchaser of energy and a shareholder of the project), which possibly contributes to risk mitigation and helps the government have more control over the project.

Challenges:

- Significant scale-up is necessary to make Morocco's solar program sustainable. This will require not only capital cost reduction and revenue increase, but also measures to achieve grid parity through further policy improvements (such as standardizing policies for feed-in tariffs or removing fossil fuel subsidies) and additional measures such as exporting renewable energy to the European Union.

Lessons learned:

- PPAs help reduce revenue risks for the private sector by shifting them to the public sector, thus making the project more attractive to private lenders.

Philippine Water Revolving Fund (the Philippines)

Based on Paul (2011); Porciuncula (2009); USAID (2006)

Launched in: 2008

Total budget: N/A

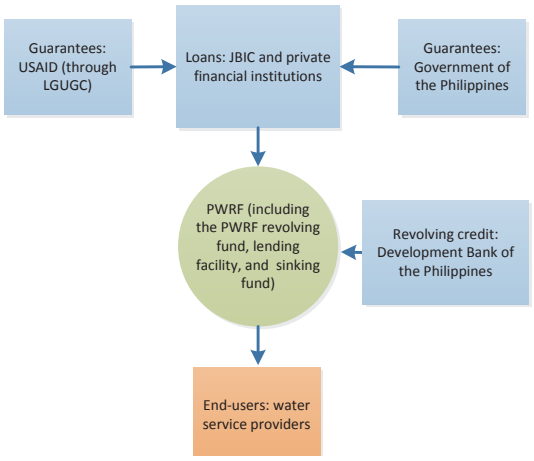

FIGURE A6. PHILIPPINE WATER REVOLVING FUND

Background:

The fund was created as an alternative to the traditional official development assistance. Engaging domestic finance from the private sector and expanding the private sector's participation in water service provision is a key feature of the fund. It has addressed the following barriers: mismatch between commercial loan tenor (7–10 years) and utilities' loan repayment terms (up to 20 years to repay their loans); water utilities' inability to provide a suitable collateral and their lack of experience with business planning; lack of objective information about risks associated with lending to water projects. As a result, the fund has increased financial institutions' awareness of water projects, designed a credit rating system for borrowers and strengthened the ability of water utilities to engage in business planning. As of October 2011, 21 projects reached financial closure. One private financing institution (PFI) agreed to extend its loan tenor from 10 to 15 years, indicating a growing comfort with funding water projects.

Implementing mechanism:

PWRF is a trilateral effort of the Philippine government and private sector partners, USAID Philippine Mission and the Japanese Bank for International Cooperation (JBIC). The Development Bank of the Philippines (DBP) administers the PWRF. The clients are water service providers (WSPs): local government units (LGUs) and water districts (WDs).

Financing arrangements:

- PWRF provides loans to credible WSPs. The loans blend JBIC funds with a fixed interest rate, channelled through the DBP (50–75 per cent of the total loan amount), and funds from private financing institutions (PFI) with a floating rate (25–50 per cent of the total loan amount).
- To reduce the burden of debt payment to WSPs, the DBP loan tenor is 20 years with a 2-year grace period. The private share of the loans has a 7–10 year tenor with possible extension. If PFIs choose not to extend the loan tenor, they are guaranteed a balloon payment by the government and DBP, and then, after 7–10 years, WSP will only have to repay the DBP portion of the loan.
- The Philippine government provides sovereign guarantee to JBIC. Loan guarantees to private lenders are provided by the LGU Guarantee Corporation (a government service) and USAID (up to 85 per cent of the loans). To mitigate risk of default on the remaining 15 per cent, borrowers are required to establish a reserve fund, finance it through their revenue and other sources, and maintain a balance of 15 per cent of outstanding loan amounts.
- To address liquidity risk for balloon payments to PFI after 7–10 years, a trust fund will be set up and provisions of 1/7 or 1/10 of the balloon payment will be made annually by DBP.

- A PWRF Special Fund earns interest and serves the purpose of capturing re-flows of principal payments on the loan and refinancing existing or issuing new loans. The interest is collected into a sinking fund for future amortization of the JBIC loan.
- Further risk mitigation is achieved through a credit rating system to assess economic, political, management, technical and financial status of the borrowers and to help them improve their credit scores.
- To increase lenders' awareness of water projects, a Water Project Appraisal Training program was designed and organized throughout the country enabling financial institutions to evaluate technical, institutional and financial aspects of water projects. As a result, a Water Supply Project Appraisal Guidebook for Investors and Decision Makers was released.

Success factors:

- The LGU portion of the PWRF loans satisfies the Agri-Agra Reform Credit Act of 2009 provision that PFI must lend 25 per cent of their loan portfolio to participants in agrarian reforms, making the PFI portion of the laws eligible as well. This will increase the private sector's motivation to lend to water projects.

Challenges:

- Full financing of water projects by the private sector is currently not feasible in the Philippines (commercial loans are provided at 12–13 per cent with 7–10 year tenure), that is why PWRF utilized the blended finance option.
- The fund has the potential for introducing asset-backed securitization to increase its capital (through engaging insurance and mutual funds and debt issuance), but this would require a more mature market.

Lessons learned:

- Frameworks to blend public/private money reduce debt burden for borrowers and risks for lenders.

Prosol (Tunisia)

Based on Baccouche (2014) and Trabacchi et al. (2012)

Launched in: 2005

Total budget: US$134 million

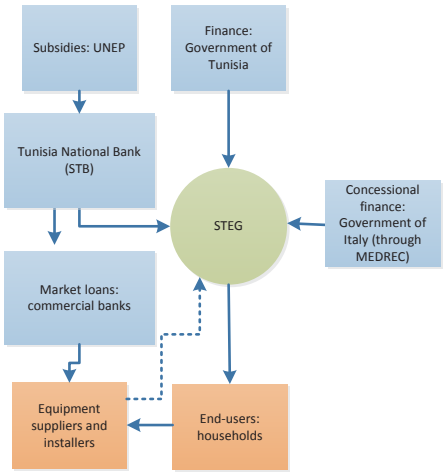

FIGURE A7. PROSOL PROGRAM

Background:

The program is a financing facility aimed at addressing barriers to increased demand for sustainable solar water heating (SWH) products. The barriers include high capital costs and long payback periods. The program addresses them through subsidies to lower-end users, facilitating consumer credit, organizing awareness campaigns about the benefits of SWH, building the capacity of financial institutions and technology providers, providing accreditations for SWH product suppliers and installers to ensure quality, and developing CDM credits to support future funding. During 2005–2010, the program facilitated the installation of over 119,000 SWH systems, representing a 500 per cent increase in annual deployment. The number of local SWH system producers has increased from nine to 45 in the course of the program. Three commercial banks have provided US$60 million in loans in the course of the project, earning US$7.4 million in the process. Estimated lifetime savings from SWH amount to US$101 million, and the government expects to receive full payback on its investment in 7 years.

Implementing mechanism:

Prosol was organized by the Tunisian Ministry of Industry, Energy and Small and Middle Size Enterprises; the National Agency for Energy Conservation of Tunisia (ANME); and UNEP. A broad range of public and private stakeholders have participated in the program, including: the Italian Ministry for the Environment and Protection of Land and Sea (MATTM); UNEP Division of Technology, Industry and Economics; Regional Centre for training, knowledge sharing and the development of renewable energy pilot projects in the Mediterranean Region (MEDREC); Tunisian National Bank (STB); commercial banks that acted as loan underwriters (Amen Bank, Union Bancaire pour le Commerce et l'Industrie and Attijari Bank); as well as homeowners and SWH manufacturers, importers and installers.

Financing arrangements:

- The program is split into a supplier-lending phase (encouraging supply) and a consumer-lending phase (encouraging demand).
- In the supplier-lending phase Prosol received a seed grant of US$2.2 million from MATTM. The grant consisted of a US$1 million subsidy (20 per cent) for SWH capital costs channelled through the Mediterranean Renewable Energy Centre; a US$1 million temporary interest rate subsidy channelled through UNEP to boost credit demand; and a US$200,000 for program support. Two commercial banks, Amen Bank and Union Bancaire pour le Commerce et l'Industrie, provided US$7.3 million worth of loans. In the consumer-lending phase, the government introduced direct lending to consumers through the public utility STEG (both a loan guarantor and a loan collector through electricity bills) and replaced the 20 per cent subsidy with US$150–$200 bonuses to encourage demand by lower-end households. The government financed these measures from its own budget and a US$210,000 MATTM grant. A commercial bank, Attijari Bank, provided US$52.5 million worth of loans.
- Public-private funding leverage amounts to 1:5.

Success factors:

- To boost the market for renewable energy in Tunisia, in 2006 the government provided a value-added tax exemption and reduced custom duties for SWH systems, and has created an ad hoc National Fund for Energy Conservation channelling government funding to energy initiatives.
- A strong risk-allocation framework included handling policy risks by the government agencies and public international partners; handling procurement and technology risks by relevant public (standards) and private (installation and maintenance) stakeholders; handling financial risks by STEG; and handling Certified Emission Reductions-related risks by the public sector through an Emissions Reduction Purchase Agreement with the buyer.
- Incentives for participating banks included the program's near zero default rate facilitated through risk mitigation measures that included working with the banks to mitigate their risk, which resulted in cheaper and longer-term credit for consumers that facilitated market development, and reducing the burden on banks by involving STEG with its high capacity to perform loan checks, do all necessary paperwork and collect repayments as the national utility service.
- Affordable credit was provided to consumers through soft interest rates (6.3 per cent compared to 9.7 per cent for generic consumer loans) and longer-term loans.
- By reducing the costs of SWH energy to consumers, Prosol influenced their investment behaviour.

Challenges:

- The Tunisian government's recent (2006) banking regulations have tightened loan provision rules, which has likely increased banks' aversion to risk.
- Engaging suppliers as loan guarantors in phase 1 of Prosol proved risky—as small and medium enterprises, these companies have limited debt absorption capacity.
- Excessive reliance on one bank (Attijari Bank) for loan provision in phase two may have decreased the program's sustainability.
- Planned scale-up of Prosol would lead to an increase in loans to US$92.5 million, and the banks will be able to generate up to US$1.5 million to $1.7 million in interest payments annually. These prospects, however, may not be financially attractive to commercial banks, and the issue of scalability will need to be addressed.

Lessons learned:

- A comprehensive program like Prosol can have the following benefits for different stakeholders:
  - For the government: savings on energy subsidies
  - For financial institutions: creation of a large, high-quality credit market
  - For suppliers: increased visibility and large market
  - For consumers: obtaining access to inexpensive hot water services, which is reflected in an 87 per cent consumer satisfaction rate for SWH installments.

Walney Offshore Windfarms (WOW) (U.K.)

Based on Dong Energy (n. d.); Green Investment Bank (n. d.);Hervé-Mignucci (2012)

Launched in: 2011

Total budget: US$1.98 billion

Objectives:

WOW is a 367.2 MW offshore wind park in the U.K. that includes two farms, Walney 1 and Walney 2, with possibility of extension. The project's offshore location was associated with a number of risks, therefore financial institutions were initially reluctant to finance it. It uses a combination of policy and financial incentives to address barriers to investment in renewable energy.

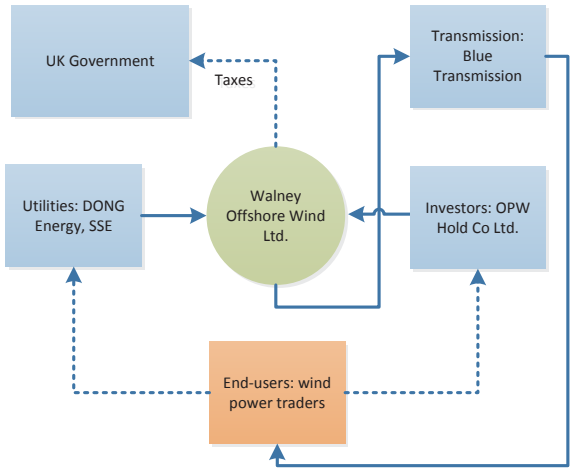

FIGURE A8. WALNEY OFFSHORE WINDFARMS

Implementing mechanism:

WOW involves six groups of stakeholders, including:

- Utilities investors: the DONG Energy group, a Danish energy group, has a 50.1 per cent stake in the project through its U.K. subsidiary DONG Energy Power (DEPUK), and Scottish Southern Energy whose renewables subsidiary, Scottish Southern Energy Renewables, holds 25.1 per cent of the project.
- Financial investors: the OPW HoldCo UK Ltd. joint venture (Ampère Equity Fund, managed by Triodos Bank, and PGGM, a Dutch pension fund administrator) has a 24.8 per cent share in the project.
- Investors in the transmission lines: Blue Transmission Walney I (Barclays Integrated Infrastructure Fund and Macquarie Capital Group) purchased the project's transmission lines through a competitive bidding process, after which Macquarie's share was purchased by Mitsubishi Corp.
- U.K. public structures: the Crown Estate awards seabed leases, the U.K. Department of Energy and Climate Change and the Office of Gas and Electricity Markets (Ofgem) issue permits for constructions and Renewable Obligation Certificates (ROCs), the Treasury is responsible for carbon taxes, and U.K. Revenue & Customs is responsible for overall taxes.
- Technology and services providers: DONG Energy's network of contractors, including Siemens, a turbine equipment provider.
- Beneficiaries: the project may trade power and ROCs through PPAs, through the marketplace, over-the-counter brokers and regional energy companies.

Financing arrangements:

- The investors financed WOW Ltd. on their balance sheets. Equity contribution amounted to GBP1,235 million, which corresponds to the investment costs of the project. This investment included:
  - development costs: GBP5.8 million
  - construction costs: almost equal to the total investment
  - operating costs: GBP23.8/MWh
  - decommissioning costs: GBP23.7 million after 20 years of operation

- In addition to private funding, the U.K. government contributed energy revenue incentives in the range of GBP1.3 billion to GBP1.5 billion.
- As a result, the share of public/private investment in the project is approximately 1:1.
- Project revenue comes from generated power (an expected GBP69 million annually) and from clean energy generation benefits. These benefits include ROCs (an expected GBP104 million to GBP127 million annually) and Climate Change Levy Exemption Certificates and Renewable Energy Guarantees of Origin—an expected GBP 5 million to GBP7 million annually. Considering price volatility, the 15-year fixed-price PPAs between the SPV and its three shareholders mitigate price risk.
- Expected internal rate of return is 7.7–10.0 per cent.

Success factors:

- Risk mitigation frameworks are important to the project's success. Overall risk allocation is as follows:
  - DONG Energy is exposed to the risks related to technical expertise and energy commodity trading.
  - Scottish Southern Energy is exposed to power and benefit-price-related risks.
  - OPW is exposed to cash-flow related risks.
  - The U.K. government is exposed to three main risks: insufficient wind turbine deployment capacity, excessive wind power prices and insufficient emission reductions in the course of the project.
- Given that project revenue largely depends on ROC prices (over 60 per cent of the expected revenue), price risks for ROC were addressed through the following measures: when DONG Energy was the sole shareholder, it mitigated risk by using a mix of forward transactions, derivatives contracts, and PPAs with third-party offtakers; later, two sets of PPAs were developed: the fixed-price PPA, which regulates each shareholder's purchase of their share of power generation and benefits, and the investor PPA between DONG Energy and OPW HoldCo Ltd.

Challenges:

- Scalability of the project may be conditional upon the level of complexity of its financial model, policy sustainability, and liquidity and other financial risks identified.

Lessons learned:

- Investors that may be interested in offshore wind projects include insurance companies, high-net-worth individuals and institutional investors. WOW financing schemes were innovative for the U.K. offshore wind sector and will help increase financial institutions' appetite for providing equity and debt to wind projects.
- The opportunity of utilizing ROCs (green tradable certificates) over 20 years is crucial for revenue generation (as ROCs are expected to provide 60 per cent of the revenue).

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International Institute for Sustainable Development
Head Office
161 Portage Avenue East, 6th Floor, Winnipeg, Manitoba, Canada R3B 0Y4
Tel: +1 (204) 958-7700 | Fax: +1 (204) 958-7710 | Website: www.iisd.org