

Financing Nationally Appropriate Mitigation Actions

A primer on the financial engineering of NAMAs



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Author:

Søren E. Lütken, UNEP DTU Partnership

Reviewers:

Eric Usher, UNEP DTIE

Sudhir Sharma, UNEP DTU Partnership

Miriam Hinostroza, UNEP DTU Partnership

Denis Desgain, UNEP DTU Partnership

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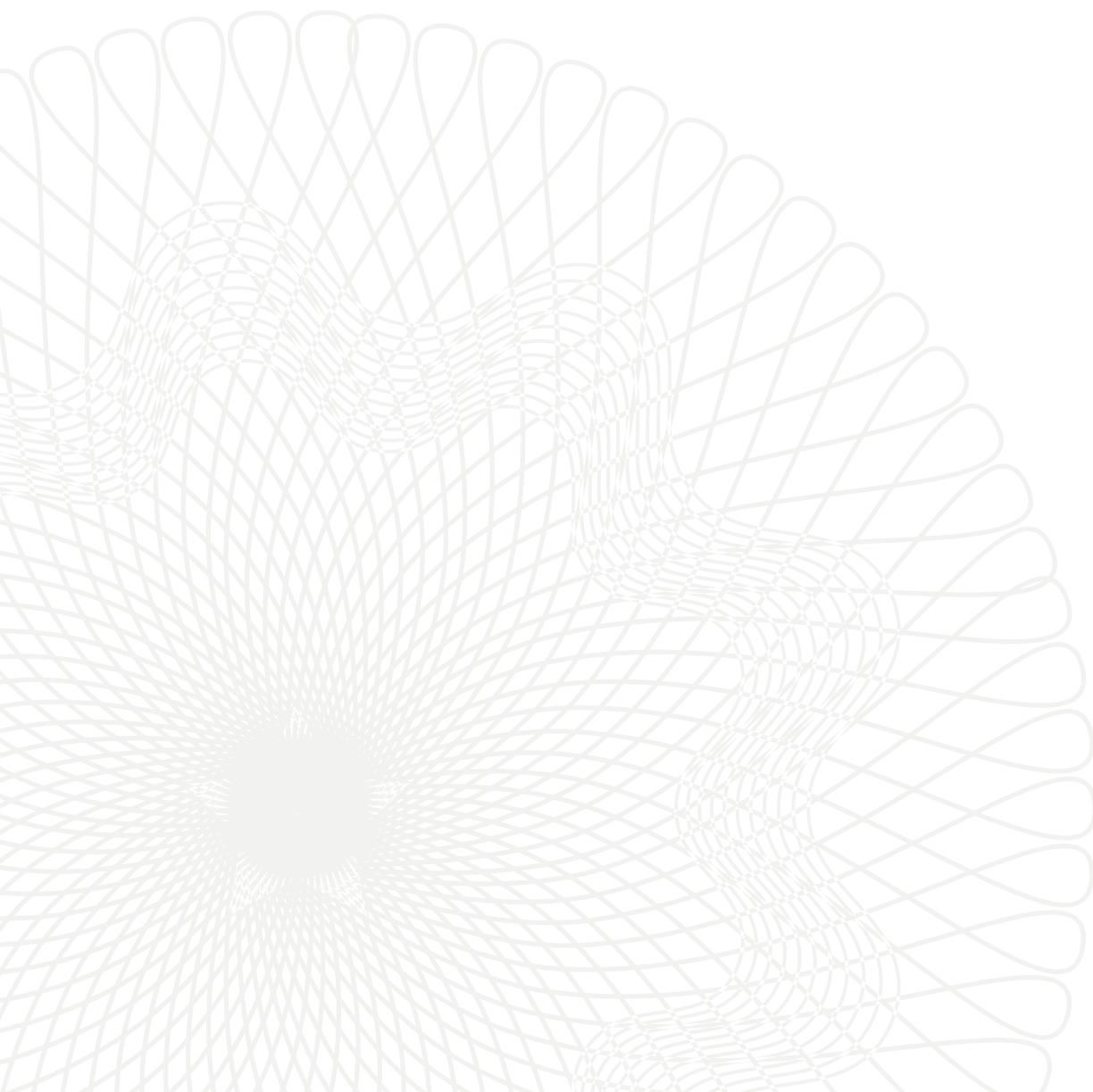
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List of Abbreviations

BAU	Business as Usual
CDM	Clean Development Mechanism
CER	Certified Emission Reductions
COP	Conference of the Parties
ECA	Export Credit Agency
ETS	Emission Trading Systems
IPCC	Intergovernmental Panel on Climate Change
MRV	Measurement, Reporting and Verification
NAMA	Nationally Appropriate Mitigation Action
PoA	Program of Activity (under the CDM)
TNA	Technology Need Assessment
Unilateral	No (financial) support from other countries
UNFCCC	United Nations Framework Convention on Climate Change



Introduction

May 2013 saw the reaching of an important milestone. On May 9, 2013 the daily mean concentration of carbon dioxide in the atmosphere measured at Mauna Loa, Hawaii, surpassed 400 parts per million (ppm) for the first time since measurements began in 1958. This figure was treated as an option for a desirable stabilization level during initial climate change negotiations, but was later raised to the '450 ppm scenario', which is still compatible with the internationally agreed ambition of keeping the average global temperature increase below 2 degrees centigrade.

The rising concentration levels stem from still increasing emissions, and increasingly these emissions stem from economic growth in developing and transitional economies. The data supporting the Emissions Gap Report 2012 (UNEP 2012) show that Annex I GHG emissions fell from 19.2 Gt in 1990 to 17.7 Gt in 2010, while non-Annex I GHG emissions grew from 16.6 Gt in 1990 to 30.2 Gt in 2010. The common but differentiated responsibilities principle requires developed countries to take the lead in reducing emissions, but the problem of the growing emissions in developing countries from development intended to address socio-economic challenges, including the outsourcing of emissions from developed economies into the emissions accounts in less developed manufacturing bases, must be addressed if the 2 degree goal is to be met.

The notion of 'Nationally Appropriate Mitigation Action' (NAMA), which first appeared at the 13th conference of the Parties to the UNFCCC in Bali, Indonesia, does precisely that. The Bali Action Plan (UNFCCC, 2007) launched a new process to enhance implementation of the Convention. It stated that, in order to “*enhance national/international action on mitigation of climate change...*” developing countries will take “*nationally appropriate mitigation actions ... in the context*

of sustainable development, supported and enabled by technology, financing and capacity-building, in a measurable, reportable and verifiable manner...”. Since then the concept has evolved further. By 2010, differentiation between internationally supported actions and unilateral actions stipulated that, in the context of their social and economic development priorities, 'developing country Parties will take nationally appropriate mitigation actions ... aimed at achieving a deviation in emissions relative to “business as usual” emissions in 2020', emphasizing in the Cancun Agreements that '...in accordance with Article 4, paragraph 3, of the Convention, developed country Parties shall provide enhanced financial, technological and capacity building support for the preparation and implementation of nationally appropriate mitigation actions of developing country Parties' (UNFCCC, 2010). Further details of the background and legal basis for NAMAs can be found in UNEP Risø's 'Understanding the Concept of Nationally Appropriate Mitigation Action' (UNEP Risø 2013). NAMAs are voluntary activities to mitigate greenhouse gas (GHG) emissions in developing countries that are not subject to mitigation commitments under the UNFCCC. The determination of actions captured under a NAMA is each country's sovereign right, the definition of 'appropriate mitigation action' being relative to each Party's particular national circumstances' (UNDP/UNFCCC/UNEP, 2013). Among these circumstances, national financial capacity also plays an important role.

This Primer is devoted to the financing of NAMAs and presents essential principles and models of financing. It highlights challenges in the financing of the policies and programmes that make up the NAMAs, as well as possible ways to overcome these challenges. Most importantly, it does not concur with the notion that the best way to cover any extra costs of reducing emissions is a grant.

There are many issues embedded in the financing of actions with lower emission profiles. One is the cost efficiency of emissions reductions, which was the main driver and motivation of the Clean Development Mechanism (CDM). Another is leveraging sufficient capital to meet the demand for funding. A third topic is the financial involvement of the private sector, which is thought to be crucial for the mobilization of the USD 100 billion per year needed by 2020 to finance mitigation and adaptation actions in developing countries. The sources of finance are, of course, central, but even more central is the way in which they collaborate and cooperate – or ought to do so – in order to bring about the most efficient financing models. If bending the emissions trajectory is crucial, bending the rules that govern traditional development financing is one place to start.

The Primer focuses on financing the NAMA, *not* financing its *preparation*. Technical assistance in this regard has been omitted, partly because it is already happening and rapidly increasing (with the UNEP DTU Partnership, formerly the UNEP Risø Centre, as one of the main players in implementation), and partly because there is not much financial engineering in the provision of a grant. Instead, the Primer focuses on the instruments available for public and private economic interaction. It therefore has an implicit focus on leveraging, as this is currently the preferred term with which to illustrate this public-private interaction. Ultimately, however, it will be a matter of engineering the financing model as economically efficiently as possible within the confines of national priorities, realizing that, no matter how efficiently structured it is, financial engineering will not make the costs disappear. At best it may bolster the will to accommodate them.

The roles of different stakeholders are significantly influenced by the mode of implementation, which itself is directly linked to the financing model. Designing a NAMA as a theoretical exercise and only in the final phase considering whether there is any chance to attract the financing is ill-advised. The considerations of the financing model belong at the beginning of the NAMA design process, not at the end.

Defining NAMA Finance

Although widely used as a term, climate finance does not have any definition. Intuitively, it would be finance motivated by a concern for the changing climate, but current practice seems to include all financing going towards low emission technology (and climate resilience), regardless of the motivation. Climate finance for mitigation purposes addresses a traditional externality, i.e. a normally negative and thus unwanted effect of another prime activity, in this case greenhouse gas emissions, whether from energy production, transportation or food production, to mention just the three prime sources of emissions.

The reduction of emissions is only rarely a separate purpose of investments, and climate finance therefore does not constitute a separate type of financing. Rather, it is an objective that countries and policy-makers take into consideration for national development alongside a number of other development parameters and priorities. In health and education, agriculture and industrial development, transportation and energy supply other primary concerns drive development, and emissions reduction only becomes an additional consideration to the extent that it is 'nationally appropriate'.

Nationally appropriate mitigation action is establishing itself as a new motivation for investment. But as a mere concept it requires concrete policy proposals before it can serve as a real driver of investment. It is increasingly expected that NAMAs must lead to 'transformational' changes. Although 'transformational' also lacks any official definition, it may nevertheless be helpful in establishing a definition of NAMA finance. A common interpretation of transformation is to change one state of affairs into another, such change not being temporary, but rather permanent. Such changes therefore relate to permanent operational activities rather than to fixed assets, i.e. it is not the asset alone, but its usage that is significant. It is therefore natural for NAMAs to be mostly thought of as policies and less as projects. In between there may be temporary programmes. If the permanent transformation relates to the operation rather than the asset, then it is also the case that the crucial financing relates to the operation and not to the asset investment, i.e. it is about the financing of the permanent operation of policy instruments.

Policies implemented by governments in attaining national sustainable development objectives are common-

ly accompanied by government funding. Here, investment motivation exists at at least four levels: 1) the NAMA as a motivation factor for assessing the impact of existing policy on GHG emissions; 2) policy correction to address both national sustainable development goals and climate change, as well as to assess the financial implications of supporting the policy; 3) motivating the public sector to devote additional finance for a given policy; and 4) this particular policy's ability to motivate private or other public entities to invest. It must be emphasized at the outset, however, that (part of) such government funding may ultimately originate from international support, although this should not be the starting point. This point will be dealt with later.

Government motives

NAMAs are generally defined within the context of general development planning or, ideally, Low Emission Development Strategies.¹ Many elements of general development planning inherently include initiatives that in themselves have emissions reduction effects or whose implementation modalities may be shifted towards a lower level of emissions. Emissions reduction, therefore, will commonly be regarded a co-benefit related to other prime objectives like reducing traffic congestion, reducing health hazards in landfills, preventing hazardous emissions from old power plants, improving security of supply, providing energy access, substituting imports, reducing subsidies, pursuing targeted industrial development and a host of other motivations. Emissions reduction integrated with such motivations may come at no cost – in which case host countries for such policies may refrain from labelling them 'NAMAs' or neglect to do so. It is, however, advisable to report such unilateral actions from the simple reason that, when emissions reduction options do come with extra costs and a NAMA host country wishes to attract international financing to overcome these costs, the national effort in other areas may be recognized by those financiers that may consider contributing.

International support for NAMAs should essentially be additional to resources raised within the national borders (government allocations and private investment imposed through government regulation) as a result of the motivation to meet national sustainable devel-

¹ See Low Carbon Development Strategies: A Primer on Framing Nationally Appropriate Mitigation Actions (NAMAs) in Developing Countries, UNEP *Rise* 2011.

opment goals. Arriving at a figure for the shortfall of finance is not straightforward, and it may therefore be necessary to assume that the government allocations are already being made in the most efficient manner in meeting its sustainable development goals. Of course, should this not be the case, or should the investment result in significant savings in other parts of the economy, it may become subject to discussions about the financing shortfall.

Although NAMAs are supposed to establish a deviation from a baseline or business as usual, the integration with general development policies may complicate such differentiation. Some NAMAs may therefore in a sense represent business as usual scenarios – or rather, 'development as planned' scenarios. In terms of NAMA financing, this is fundamentally an issue between the NAMA proponent and the financiers, including international financiers, of the action. A deviation from (a defined) baseline may be essential for (international) funding motivated by emissions reduction, but it is not essential for other sources of finance. National public financing will be motivated by immediate public good objectives, private-sector financing by profit motives. For example, investment in wind energy, even if part of a general energy policy, may be framed as a NAMA, the financing possibly consisting of national public, international donor and private financing, with the entire financial package ultimately being labelled 'climate finance'.

Private investment motives

When the Clean Development Mechanism was devised in 1997, it was with the explicit intention to activate low-cost emissions reduction options in developing countries, substantiated by calculations of the marginal costs of abatement that showed the relatively higher abatement costs in developed countries compared to developing countries. However, the CDM experience seems not to confirm the assumptions that developed country investors would shift their investment strategies for the sake of emissions reductions or that investments with the aim of emissions reductions are motivated by the lowest cost of reduction.

More than 90% of investment capital bound up in CDM projects is local capital (see text box), and at least 75% of the investment capital has gone into projects that do not represent cost-efficient emissions reductions.² Experience from developed countries is similar: initiatives supported by national policies often disregard marginal abatement cost curves and move ahead with other more expensive alternatives (see Figure 1). Even though cost

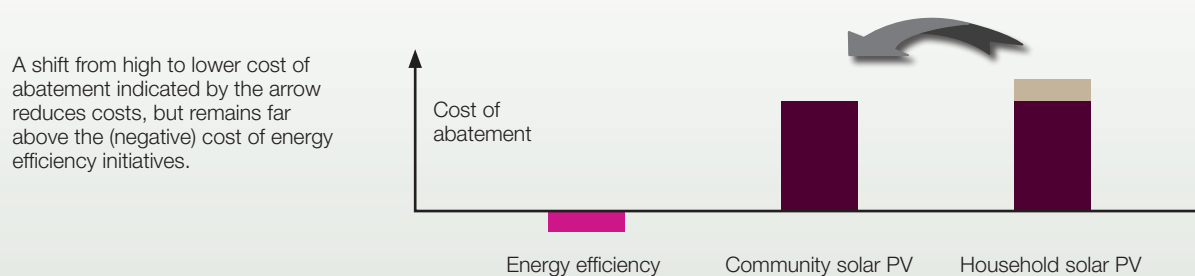
Box 1: CDM investment

The origin of investment in CDM projects has been estimated by the UNFCCC Secretariat during the 2012 review of the CDM. As this information is not publicly disclosed by CDM project developers, the estimate is based on a project-by-project evaluation, as well as general market conditions in some of the largest CDM host countries. The UNFCCC Secretariat arrives at an interval of USD 21.5-43.0 billion foreign direct investment (FDI) in CDM projects over the lifetime of the mechanism. UNEP Risø's CD-Mpipeline.org contains information about capital investment in about 8,000 out of more than 12,000 recorded projects. Accumulated investment in the 8,000 projects is USD 495 billion. Bringing these figures together reveals that FDI in CDM projects may stand as low as 3-6%, indicating that well above 90% of the finance is being generated domestically. When compared to the value of issued CERs by mid-2013 – approximately USD 13 billion if issued CERs are set at an average value of USD 10 – current carbon value represents less than 2% of the invested capital (estimated at USD 750 billion).

efficiency is not the prime motivator, the projects are not reckless reduction adventures. A number of other motivations were mentioned above. This does not prevent the activity from being listed as a NAMA. Prevention of investment in 'high-hanging fruits' activities in the traditional 'mitigation' understanding of the term is therefore not an objective in itself, nor are high costs of abatement a hindrance to the financial engineering of a NAMA.

2 S.E. Lütken, 'Penny Wise, Pound Foolish', UNEP Risø Working Paper No. 1.

Figure 1. Relative costs of abatement



NAMAs and the CDM

NAMAs could be seen as the rising replacement for the CDM, but there are fundamental differences, most importantly that the CDM is a mechanism with detailed rules, while the NAMA is a concept practically without rules. Although current carbon market players have pro-

moted the inclusion of a crediting approach in NAMAs as well, the international climate negotiations have so far excluded this option. While NAMAs are expected to involve significant private-sector investment, not least in their financing, it does not foresee the emergence of a new or revitalized international carbon market.

Table 1. Summary of institutions created to enable implementation of the Convention

	CDM	NAMA
Definition	One of the flexible mechanisms of the Kyoto Protocol. It provides 'where-flexibility' of emissions reductions, thus allowing emissions reductions undertaken in a developing country to offset emissions in a developed country, typically through a trading agreement.	Voluntary activities of Greenhouse Gas (GHG) emissions mitigation in developing countries that are not subject to mitigation commitments under the UNFCCC.
Actions	Projects and programmes of activities	Policies, programmes and projects
Initiator	Private sector or public sector	Typically public sector
Investment driver	Normal returns from the market that the project activity addresses with the addition of returns from Certified Emission Reductions (CERs). CERs are issued by the CDM Executive Board based on project verification reports. CERs can be traded on carbon markets.	The sustainable development priorities of the host country, with possible added benefits from including emissions reductions in the policy planning. The NAMA may attract international financial participation and may include the generation of business opportunities for the private sector, which will invest from profit motives supported by the NAMA.
Requirement	Reductions in emissions must be additional to any that would occur in the absence of the certified project activity. CDM to assist developing countries in achieving sustainable development.	A NAMA, framed in the context of sustainable development, aims at achieving a deviation in emissions relative to 'business as usual' emissions in 2020.
Financing	Upfront financing, generally through the private sector. Certificates are issued ex-post based on regular verification reports. CERs are sold on a carbon market.	Domestic resources and/or international support (e.g. through bilateral/multilateral agreements, development banks) for the preparation and implementation of NAMAs.
Rulebook	Marrakech Accords and subsequent body of CDM Executive Board decisions.	Limited guidance being developed under the Convention.

Source: UNDP/UNEP/UNFCCC (2013)

NAMAs focus on the fundamental drivers of investments in a country or sector, instead of isolating emissions reductions on a project-by-project basis. What are sought are financing models that can support this shift in focus. These models will call on the private sector to put its financial means to work for the sake of the climate, and on the public sector to devote its financial resources in ways that maximize the interests of the private sector to become involved. This is where the NAMA and the CDM come together, that is, in the objective to activate the private sector and its significant financial capacity.

Most actions encompassed by NAMAs will ultimately materialize in much the same form as CDM projects: physical assets that have a lower emissions profile than the business as usual alternative, and which are financed by the private sector. The two important lessons extracted above from the CDM are therefore very relevant, especially when financing models for NAMA implementation are being devised:

1. The carbon asset is generally not sufficient to attract FDI (about 95% of the investment capital in CDM projects is local)
2. Investment drivers are many, and CDM generally does not exploit the cheapest emissions reduction options

Defining NAMA finance

A definition of NAMA finance would be useful. In a traditional private-sector terminology like that illustrated in Figure 2, 'feasible' refers to projects that are technically and politically doable, basically disregarding the cost or making assumptions about the cost that justifies undertaking a study of the project's feasibility. 'Viable' projects are feasible projects that, under realistic assumptions, produce acceptable returns on investment as determined by the investor. But a project is 'bankable' only if such returns are produced with a sufficient level of certainty as *perceived* by third-party financiers, typically banks, and if they are convinced that the project can service the debt. Therefore, most financial engineering is about comforting the banks.

That, too, will be true for the financial engineering of NAMAs, although to arrive at that juncture, the NAMA financing chain may be longer than in isolated private project finance. This is not as unfair as it may sound. Banks traditionally provide by far the largest share of total project financing, including in climate-related investment, and they do so at start up, when the risk is highest and all forecasts are put to the test. Banks depend on future cash flows to repay the loans, and unless cash flows as expected there is a risk of default. On the other hand, if cash flows more willingly than expected, banks do not have an upside, i.e. they only receive interest on the loan, not a share of the profits.

Figure 2. Feasibility, viability and bankability

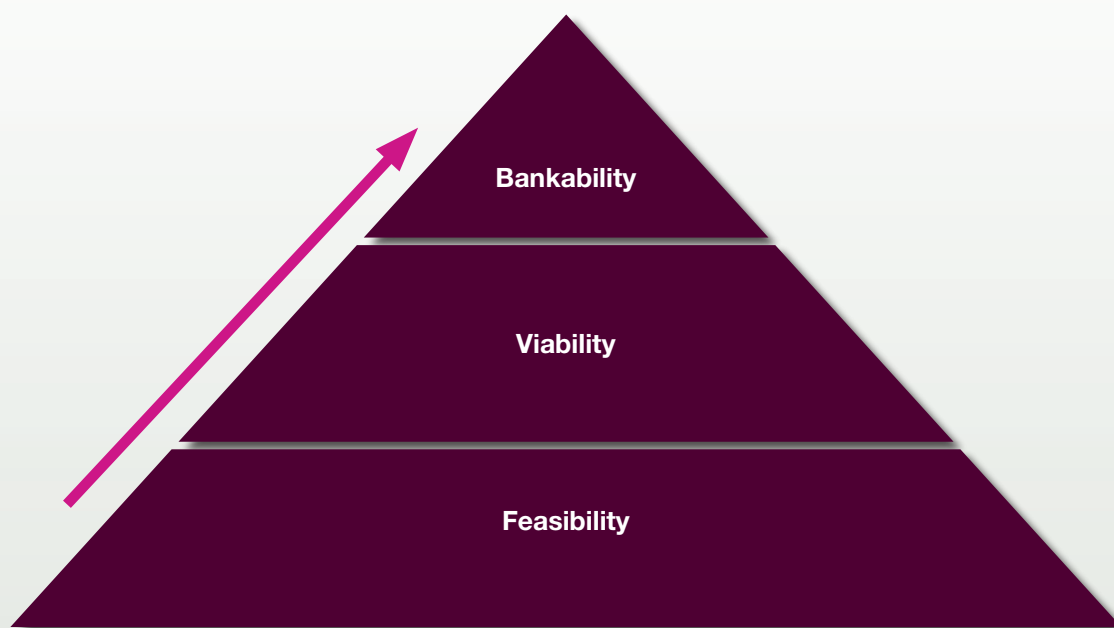
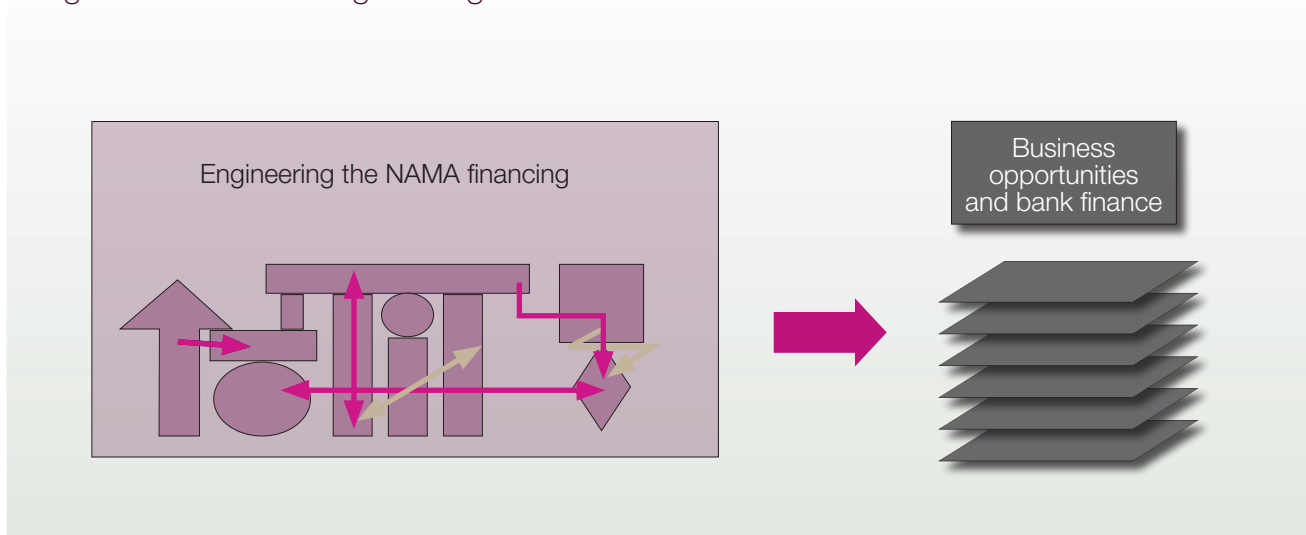


Figure 3. Financial engineering of NAMAs



The banks are the private sector's closest ally. If the private sector's financial involvement in NAMAs is crucial (which it is in most NAMAs one way or the other), the financial engineering is about providing such conditions that allow the private sector and its banking partners to engage together. The financial engineering of NAMAs is not about convincing the banks to invest in sustainability, nor is it about replacing the banks with other financiers. It can therefore be argued that

NAMA finance is the financing that has to be engineered to allow the private sector and their banking partners to do their business as usual

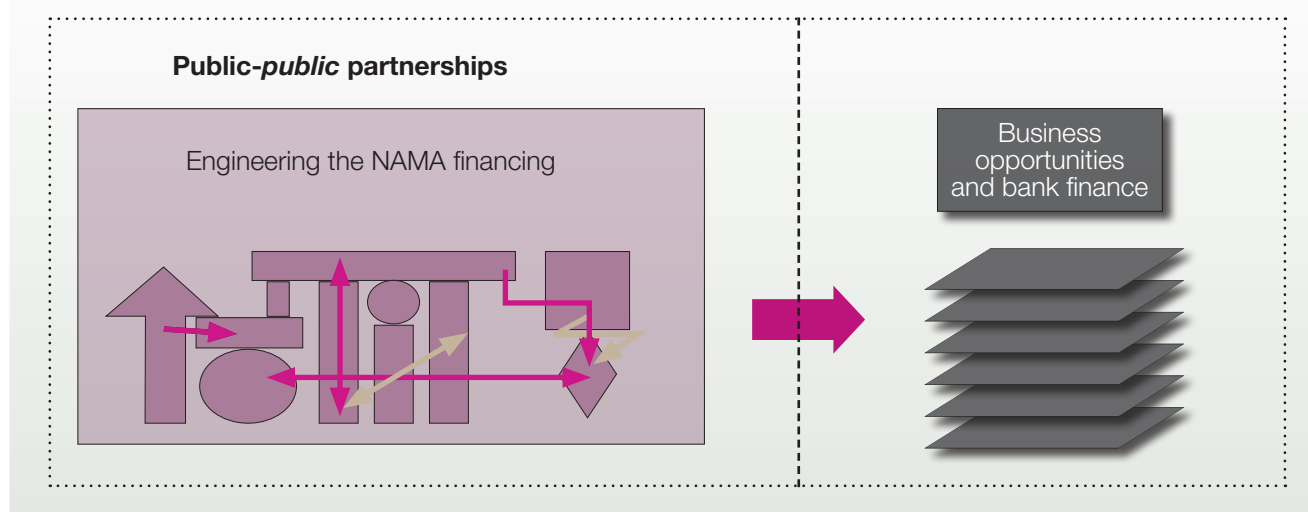
i.e. investing in profitable business propositions, albeit in this context these investments must have emissions reduction benefits. This differentiates NAMA finance

from climate finance, which normally seems to encompass the entire investment in emission-friendly assets.

It also pre-empts debate about what to finance. Some advocate budgeting on the basis of incremental costs, while others adopt a total cost approach. Incremental costs have been defined by the GEF as the differential between the costs of a baseline development and the costs incurred in a project or policy scenario, or the 'additional costs associated with transforming a project with national benefits into one with global environmental benefits' (GEF 2011).³ The choice could be solar energy instead of conventional fossil fuel technologies. The lifetime cost difference between the two options is the incremental cost. Unfortunately such calcula-

3 GEF, 2011, http://www.thegef.org/gef/policy/incremental_costs

Figure 3a. Financial engineering of NAMAs



tions are never that simple, and a number of decisions about what to include in the calculation and what not to include may obscure the picture. A third approach, which is the one adopted here, would be to structure the available national finance and the financing model and financial instruments as efficiently as possible, respecting national principal constraints (e.g. ownership structures in the energy sector) and devising a structure for the lowest cost option for filling the financing gap from international sources. This may or may not be the incremental cost.

The approach has profound consequences for the definition of what is 'inside' the NAMA financing structure and what is outside. If the private sector is neither likely nor presumed to revise its 'for profit' investment motivation, only the public sector will be actively engaged in engineering the NAMA financing. The innovative capacity for NAMA *financing* is therefore to be rooted in public-public partnerships (see Figure 3a) and less so in public-private partnerships (PPP). PPP is instead a very important model for NAMA *implementation*.

Essentially, however, while the illustration indicates that the financial engineering of the NAMA succeeds in the public-public realm, it does not mean that the instruments devised should not target private-sector actors. On the contrary, most instruments do.

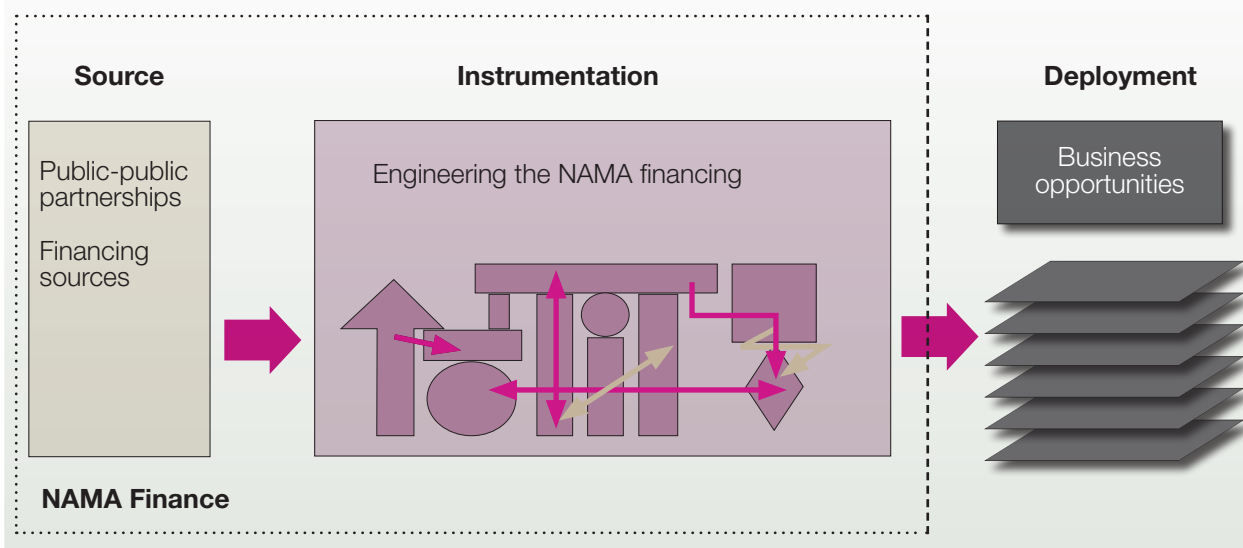
The structuring of the following chapters follow the logic of Figure 3b, initially describing the sources of financing with a focus on public-public partnerships, but including other relevant sources of financing for the

Box 2: Incremental costs?

A city needs new city buses. The standard is a diesel bus seating seventy passengers. Such a bus can be bought for USD 50,000. Raising the standard to highly efficient hybrid buses instead will raise the price significantly (by a factor of three or four). These are incremental *investment* costs. The actual incremental costs include the costs of operation as well. It might well be that the hybrid bus will save half or even all of the incremental investment costs over its lifetime so that in the end this high capital cost solution comes out less disadvantageous. But lower operational costs do not easily convert into investment capital, which is why the world is full of low-cost, low-quality, low-efficiency equipment that is expensive to run during its often limited operational life. Meeting this challenge would be a major achievement of NAMA finance.

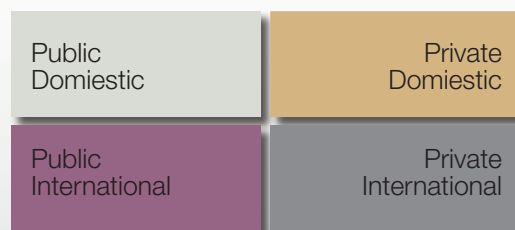
public sector-led financial engineering of a NAMA. The following chapter presents the instruments commonly used by the public sector (national or international) to promote a desirable development leading to the final discussion of activating the private sector and its financing capacity.

Figure 3b. Financial engineering of NAMAs – and distinguishing NAMA finance from climate finance



Main sources of NAMA Finance

The financing sources related to NAMAs fall into four categories:

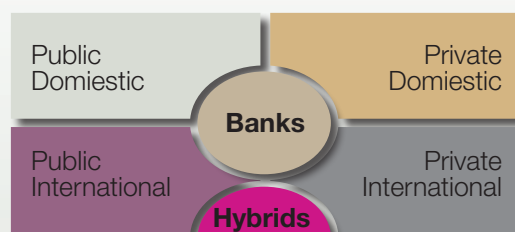


These can further be divided into an array of financial sources and financial instruments and, in terms of NAMAs, a number of typical interventions through which sources and instruments are deployed. The division on domestic and foreign sources of finance reflects the international negotiating texts on NAMAs, such as FCCC/AWGLCA/2010/8.

The Green Climate Fund (GCF) is probably the source for NAMA financing one immediately thinks of, although it is still in its early inception stage. The eventual aim is to mobilize up to US\$100 billion annually for investments in developing country mitigation and adaptation actions. The emphasis is on 'mobilize'. Even when

operational, the GCF will be only one of a multitude of financial sources and institutions that the NAMA developer may engage. In addition to the four sources of finance just mentioned, there are institutions and instruments in between, which are also described in this chapter. They are added in Figure 4. At the national level these are first and foremost the banks – the private sector's closest allies, which provide investment and operational finance for local business and business development. In addition, at the international level there are 'hybrids' that operate in the intersection between public and private. These may become increasingly important actors in the financial engineering of NAMAs and are described at the end of this chapter.

Figure 4. Linking the four sources of finance through banks and hybrid financing institutions



Domestic public funding

In accordance with the relationship between transformational NAMAs and operational budgets as established in the previous chapter, the first obvious source of funds for the financing of NAMAs is the NAMA host country's current national budget. NAMAs are implemented in the context of sustainable development in a NAMA host country, thus the starting point is to look at the budgetary allocation for plans to achieve sustainable development goals that are ultimately also to be delivered by the NAMA. The reason for this is twofold: 1) most activities or public-sector services with emissions reductions potentials already enjoy public-sector budgetary allocations; and 2) there are very few alternative sources for operational budgets.

Budgets consist of investment and operational expenses, the latter resulting in cash flows. While it may be relatively straightforward to redirect one-time investments towards less emission-intensive alternatives if sufficient investment budget can be made available, cash flows may be more difficult to change, as they are expressions of current (old) habits and 'business-as-usual' operations. The flexibility with which budgets can be spent or revised is therefore essential. This flexibility is determined by the ministries of finance or their equivalents, as well as local government institutions and the administrative mandates delegated to sector ministries and sub-national levels.

The current use of funds allocated within such sectors of activity is the obvious first option for identifying financial resources for NAMA implementation. Because of the lack of investment budgets, financially constrained public sectors have increasingly sought to turn investment budgets into cash flow through models that involve the private sector's financial capacities. This happened through the BOT (Build, Own/Operate, Transfer) model in the 1990s, and today it happens through the PPP (Public-Private Partnership), the difference between the two mainly semantic. This model is probably one of the most important vehicles to bring the private sector on board in NAMA development and implementation, and will be discussed further later.

If sufficient budget is available within the targeted sector of activity, but current prioritization does not encourage low-emission alternatives, a first step would be to establish to what extent such prioritization can be changed. For instance, if a waste collection system is in place and waste is disposed of as landfill, increased recycling would require a change of collection schedules and possibly alternative means of collection (i.e. a possible change of contractor). In theory the same

amount of waste will have to be collected, and thus the collection budget would remain grossly unchanged, as opposed to a situation in which no collection system is in place.

If net cost increases are necessary to achieve a proposed reduction of emissions, other line ministries' budgets could be explored. NAMA initiatives in one sector may result in sustainable development benefits in another. These are what are normally referred to as 'co-benefits'. Such co-benefits may be the true drivers of initiatives, or they may be real positive externalities, such as the obvious health benefits from environmental improvements, although such benefits would probably only occur with a sizeable time lag and be overshadowed by other expense increases in the health sector. Cross-subsidizing, which would be the term for such models, would therefore normally need to have costs and benefits occur at about the same time and to have a clear linkage between cause and effect. This also would occur if the reallocation from one sector to another would not affect the sustainable development benefits for which the original allocation was made. A solar PV programme rolled out in a rural area with no grid connection could induce savings on subsidies for fuel (diesel or kerosene), and such savings would occur at about the same time as the investments in solar PV sets (with possible additional investment financing by households).

The domestic private sector

Private business, households and the private financial sector are the three distinct private-sector agents. In most countries there will also be a number of state-controlled privatized entities. The banks are regarded as the implicit financing partner for the private sector, as described in Chapter 2, and they play a central role in activating (or deactivating) the private businesses' and the households' financing capacity. Banks do not act on their own.

Private-sector agents are equally unlikely to act on their own to reduce emissions in any decisive manner, but they may be prompted to act if they are made aware of options that have tangible benefits for themselves. In most cases immediately tangible benefits are of an economic nature through savings mainly of energy and water, and sometimes in relation to transportation. Trade-offs are usually related to convenience, although in many instances investment barriers prevent the choice of high efficiency-high cost technology alternatives. Even if such barriers can be overcome through the involvement of the banks, the efficient alternatives may lose out when different priorities are competing for

scarce resources. For instance, in business, the consolidation or expansion of market positions will typically be preferred over cost savings. In households, particularly in transition economies, a multitude of wishes stand in line, and long-term cost considerations may not be at the top of the list.

The private sector operates in a regulatory environment established by the public sector. It is used to a steady flow of regulatory changes and normally prefers to comply, although circumventions may be more or less prevalent. Regulation is discussed as part of the instruments available for climate finance in the following chapter. At this juncture it suffices to stress that activation of the private sector's financing capacity is likely to require regulation that either incentivises or imposes action.

Incentives schemes mean that action is voluntary. CDM is the obvious example of a voluntary scheme, the carbon asset being the intended incentive for investment. The drawback is that the ability of incentives to inspire action is difficult to predict. They may or may not influence the prioritization process in households, and they may or may not move, for example, efficiency investments higher up the agenda for private business. For the public sector they are therefore difficult to budget. Incentives may be economic or may consist of purely inspirational information campaigns. Economic incentives may be positive as well as negative (disincentives): for example, a reduction in a fuel subsidy is a disincentive for fuel consumption, while a financing scheme for the exchange of electric water heaters is an incentive to use solar water heating. Common to both is the fact that they exploit the private sector's financing and payment capacity and willingness provided they are designed in a sufficiently robust manner to make the banks play along when required.

International public funds

Public international financing stems from a diverse group of institutions, including the World Bank, the regional development banks, the UN system, and a multitude of national and supra-national bilateral funding agencies like the GEF, EU Development, GIZ, DFID and USAid. A complete overview can be found in UNEP Risø Centre/GEF's guide *Accessing International Financing for Climate Change Mitigation: A Guidebook for Developing Countries*.⁴

The international public funding institutions have different mandates and funding platforms, which influence

their priorities and modes of operation. Traditional development assistance programmes, and now also climate change-related assistance, mainly provide grants. The budgets for these grant programmes stem from donor countries' annual finance bills. Therefore, budgets fluctuate and are subject to changing priorities in the political foundations of these programmes. Grant programmes, therefore, are generally short-term financing options that only last as long as the implementation period of the programme, which is rarely longer than five years. This is why, so far, most developed-country NAMA financing has been for the *preparation* of NAMAs, technical assistance, capacity-building, sector strategies and other activities that are not related to physical assets. Donors may also occasionally engage in pilot projects, but due to their funding platforms they are generally unable to engage in permanent transformational changes that require permanent alterations of cash flows in a targeted sector. Grants in their traditional application mode are therefore less relevant for the financial engineering of NAMAs.

This is a significant gap in the current financial landscape for NAMAs, one that needs to be addressed through product development among donors. A number of options exist, particularly in expanding the array of guarantee products, including guarantees for governments and local investors, increasing the reach of mixed credit schemes into green mixed credits, increasing the use of green bonds to lower financing costs, and a number of other options that urgently need to be developed and deployed, rather than allocating funds to private-sector investment vehicles where finance is plentiful (see S. E. Lütken 2014 for an expanded overview of potential financial products).

The resulting investments in physical assets require longer term financing. Loan-financing, potentially concessional, is available from bank-type institutions (World Bank, regional development banks, European Investment Bank, KfW etc.) either to NAMA host-country governments, or to the private sector if policies and regulations encourage such private-sector engagement. In that case the financing is available through hybrid financiers, development finance institutions that operate with private-sector conditions (see later).

International private finance: Foreign Direct Investment (FDI)

When the CDM was created, it was thought it would eventually divert billions of investment dollars from developed to developing countries. However, a number of factors keep foreign investors from investing in politically sensitive services like energy and water. Such invest-

⁴ UNEP Risø Centre on Energy, Climate and Sustainable Development, 2012, Roskilde, Denmark.

ments are normally long-term, low-yield investments that, among many other risks, face one in particular: commonly there is only one off-taker of the service, a typical monopsony, be it a grid company, a ministry of transport, a municipal waste-collection department or another public entity that has the political responsibility for organizing the public service in their respective jurisdiction. The fact that the CDM has been unable to mobilize any noteworthy investment capital from developed countries (see text box in chapter 2) reflects two, possibly three important realizations:

1. investments have overwhelmingly been made in countries that can raise investment capital domestically
2. attracting investment capital from developed countries to developing countries requires much stronger incentives than the CDM has been able to deliver in its current form
3. the inherent risks, including regulatory risks, involved in many types of CDM projects, which are not addressed by the mechanism, remains a deterrent to foreign investment

The third of these realizations is an assumption, though it has been indirectly confirmed by the Climate Policy Initiative in a 2013 report (see Chapter 5).

FDI is often a mixed blessing. While it has the potential to stimulate economic growth by creating jobs, in some cases it also resembles selling the family silver, especially if central infrastructure is the object of investment. The track record of the 1990s BOT projects is not always the best reference point when foreign investors are invited to make key infrastructure investments. Expectations on both sides must be clear and transparent. That is why a 'partnership' is called for in PPPs that fundamentally does the same as the BOT.

The foreign investor may deploy his investment capital anywhere in the world. Unless there are very good reasons to invest in country X, neighbouring country Y is also an option. When evaluating the options, the foreign investor will look at the investment climate – the regulator's attitude and past actions – and at the options for taking out an insurance against regulatory risks in for example, an export credit agency that prices the guarantee according to the relevant NAMA host-country risk classification set by the OECD. Some developing countries do not even have a risk rating or are rated in the highest risk class of 7, which in itself is a significant deterrent to investment.

Prior to investing, foreign direct investors are obviously out of reach of the NAMA host-country regulator. Therefore a number of considerations relevant to the national public–private relationship do not apply to the foreign investor. Only when he is firmly established in the NAMA host country will the national regulations apply. Attracting FDI is therefore mainly a question of offering attractive investment options with appealing risk/return ratios. In many cases it can be impossible for NAMA host countries to establish such conditions without assistance through international public–*public* partnerships.

Private international finance also includes hundreds of venture capitalists, as listed, for example, on the websites of the European Venture Capital Association www.evca.eu or the American National Venture Capital Association (www.nvca.org), with more than four hundred members. Most of these venture capitalists focus on national or developed country investments, but they are increasingly looking into emerging markets. Overall, the amount of financing potentially brought to the table by the private sector is significant – and would probably be sufficient to meet investment needs – provided conditions are sufficiently conducive. If investments fall short, it will be because the conditions are not conducive.

Hybrid sources of financing

The hybrid financiers fall into three groups

1. Privately operated investment funds with public capital
 2. Export credit agencies (ECAs) providing insurance for FDI backed by their government
 3. Private philanthropic foundations
- 1) Publicly owned investment institutions with public capital targeting private-sector investment are indeed development institutions, but they are established with a specific profit objective in mind. Their core capital is public and is devoted to business development objectives in developing countries. The International Finance Corporation (IFC) within the World Bank group is probably the best known of these institutions, but practically all developed countries have established such institutions as part of their development assistance activities. For instance www.edfi.eu provides an overview of European development finance institutions, including the well-known German KfW. Other development banks like the Nordic Investment Bank or the regional development banks (ADB, AsDB, IDB, EBRD) have investment-for-profit activities embedded within the banks' overall operations as a separate window or else have established dedicated private-sector initia-

tives. The document *Accessing International Financing for Climate Change Mitigation: A Guidebook for Developing Countries* has further details of these institutions. Among themselves these institutions have a wide array of investment products and investment structures available for the support of private-sector development and investment, and some of them are establishing new structures specifically in support of climate-related business development. One example is the British–German NAMA Facility or the Danish KIF (the Climate Investment Fund).

2) Developed countries' export credit agencies (ECAs) are ultimately guaranteed by their host governments, but they operate as private-sector insurance entities providing a range of guarantee products for investments abroad. A comprehensive list can be found on, for example, the Danish ECAs (EKF) website.⁵ The provision of risk guarantees is indispensable when it comes to bringing foreign investors into sectors that are dependent on public-sector regulation, as is the case for a significant proportion of NAMAs. The ECAs are therefore central if FDI is expected to play any role in the leveraged NAMA financing. These funds can be actively engaged in discussions of structures that can attract the private sector, particularly the foreign direct investor. If the expectation for future climate financing is a high degree of leveraging, which is the same as a significant involvement of private-sector capital, these institutions should be anticipated to play very significant roles in the future structuring of climate finance, including the financial engineering of NAMAs. It is, therefore, a very good place to start when considering NAMA finance. The involvement of such hybrid development capital is a comfort factor for other investors, among them pension funds that devote part of their capital to venture investments and that are increasingly also focusing on climate change-related investments. Pensions funds usually do not have much capacity for due diligence, therefore they will typically follow investors with good due diligence capacity or those, like the hybrids, that have a built-in risk-mitigation effect.

3) Private philanthropic foundations have been in existence and have provided altruistic funding for a multitude of purposes for more than a century through funds like the Rockefeller Foundation or the Ford Foundation, and by now more than 70,000 others in the US alone. In addition, given that most donations are stand-alone interventions that reflect the founder's or foundation's particular values, it becomes more than difficult to define a strategy for the involvement of philanthropic

foundations in financing a NAMA. But the landscape of private philanthropy has evolved over the past couple of decades towards embracing the principles and concepts of the private sector. The change in approach by some but certainly not all trustees favours mission-related investment (MRI) and fits particularly well with financial structures for NAMAs that 'require the provision of finance that is either more patient, less risk averse, less demanding in terms of return on investment or generally just more flexible as long as the promise is a transformational change that, if truly successful and according to plan, will return the investment to the fund'.⁶

Through this change in approach, philanthropic funds have come very close to adopting investment strategies that are akin to the hybrids. The funds can well be seen as investors in hybrid investment vehicles, which relieve them of the demanding project-level due-diligence processes for which they, like the pension funds, have only limited resources. The challenge, however, is to match supply and demand, and for the NAMA developer to realize that even among the philanthropists there is a growing belief that there is no reason to waste philanthropic private-sector capital on actions that could have been turned into profitable businesses.

5 <http://www.ekf.dk/en/WhatWeDo/Products/Pages/default.aspx>

6 S.E. Lütken, *Financial Engineering of Climate Investment in Developing Countries: Nationally Appropriate Mitigation Action and How to Finance It*, Anthem Press, 2014.

Instruments

The financial engineering of NAMAs is mostly a matter of using existing financial instruments to ensure desirable investments from a climate change mitigation perspective, and less about developing new ones.⁷ The four main actors (public, private, national and international) have different instruments at their disposal and different capabilities in terms of the development and deployment of these instruments.

The types of instruments available in financial engineering can be categorized broadly according to their focus on:

1. cash flow,
2. asset finance, or
3. risk mitigation.

These types of financing or instruments are regarded differently by private- and public-sector actors respectively. Whereas the private sector invests on the basis of the size and quality of the expected cash flows and the returns on investment, the public sector's prioritization of a multitude of purposes in a finance bill might be driven by cost efficiency, but rarely by considerations of profitability. While the two thus may evaluate actions differently, they both distinguish asset investment, called capital expenditure or 'capex', from cash flow or operational costs and revenues.

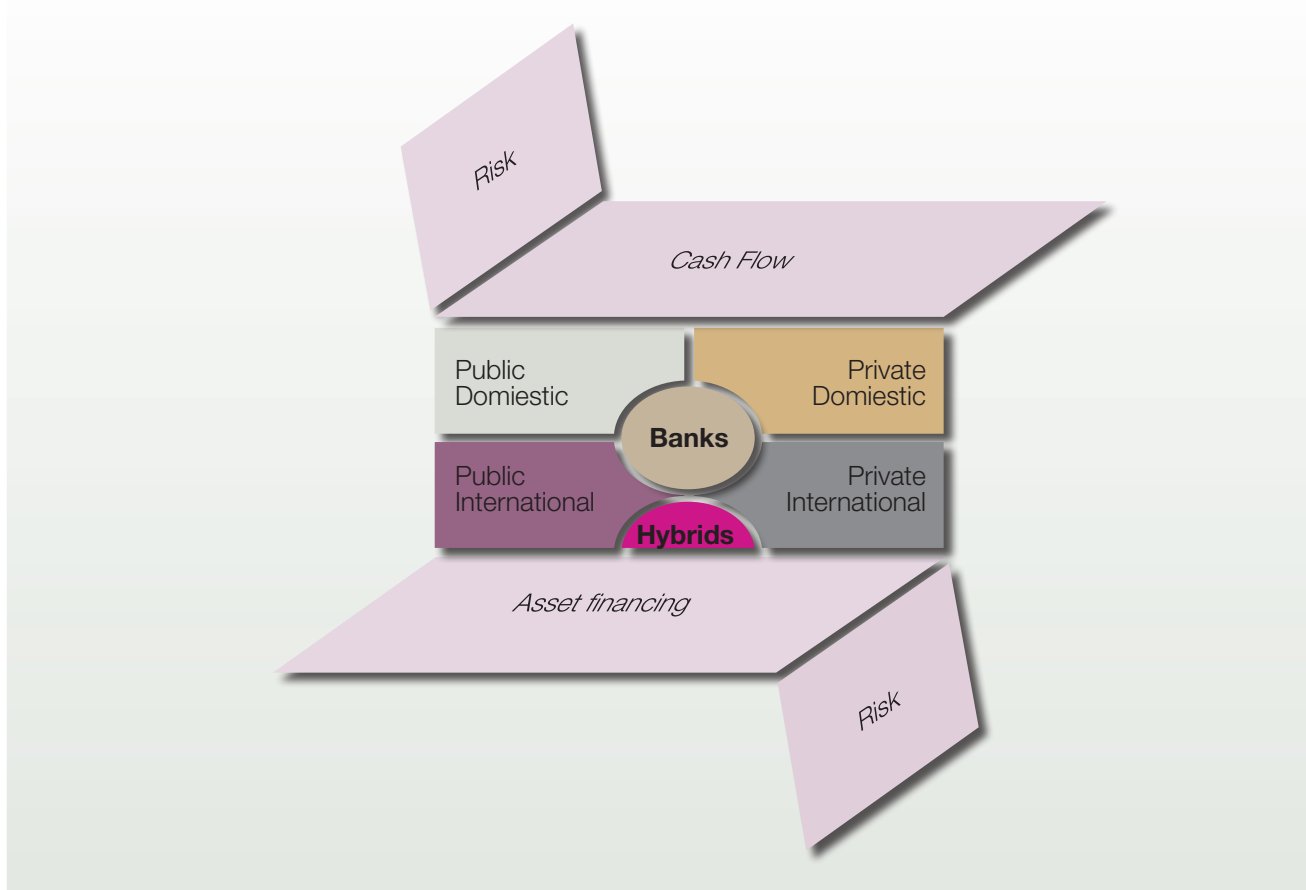
It is the public sector's prerogative to invest even if there is no cash flow at all. Such investments are typically 'public goods' investment like roads, parks, street lights or operational costs like pension schemes and education. Many climate change adaptation investments fall into this category, such as protection against rising water levels and changing weather patterns, whereas deciding how to regard investments for mitigation is less straightforward. Most mitigation investments do involve cash flow (also without a carbon market) and may be made subject to 'polluter pays' principles. The latter, however, requires a willingness to tax the polluter. The private sector will not 'contribute' without being taxed to do so.

Another difference between public and private is the consideration of risk. Private investment is not driven by profitability alone, but rather by risk/return considerations. A greater risk should be rewarded with a greater return. Risks are barriers that need to be overcome or removed to mobilize private capital. Certain risks and risk levels are acceptable, others are not. That means that on the one hand not all risks need to be removed entirely, but on the other hand not all risks can be compensated for by a higher return. The stakes are different in public sector investment. In fact, in project investment the public sector, in its role as regulator, is commonly regarded as a significant source of risk.

Figure 5 adds these additional dimensions over and above the basic differentiation of the six sources in NAMA financing.

⁷ Although for a range of optional new instruments; see S.E. Lütken, *Financial Engineering of Climate Investment in Developing Countries: Nationally Appropriate Mitigation Action and How to Finance It*, Anthem Press, 2014.

Figure 5. Dimensions of NAMA finance



Most financing instruments currently in the toolbox are focused on capital investment, but the three types are closely interlinked: equity (capital investment) is only put at risk if predictable cash flows provide acceptable returns on investment; acceptable returns, expressed as a risk/return relation, depend on options for risk cover, which again determines the structuring of the financing and influences the demand for cash flow resulting from the cost of the finance.

Table 2 lists the different instruments relevant mostly to private-sector investors, assuming that these are

ultimately the investors that are preferably to be incentivized through the financial engineering of NAMAs. In practice, however, the provision of private equity as defined in Chapter 2 happens only when all other financial instruments have been orchestrated. Thus, for the sake of clarity, these other financial instruments, which are mostly in the hands of the public regulator in the role of NAMA initiator or initial financier, are presented first. They are regarded as 'non-market-based instruments', although their purpose is exactly to create, or alter, market conditions.

Table 2. Financial instruments

Instrument	Characteristics	Typical providers
Equity	Investments made directly in projects or operating assets by investors that take ownership in accordance with their provision of capital	Private companies, individuals, venture funds, publicly funded venture funds (hybrids), pension funds
Mezzanine (first loss)	A tranche of finance that, in the event of a default, takes the first loss before other tranches of finance. Also called mezzanine finance or sometimes 'junior debt'. May be regarded as a hybrid of debt and equity	Private companies, venture funds, publicly funded venture funds (hybrids)
Loans	Traditional debt finance on standard terms (market rate and tenor), commonly provided by banks, including development banks	Banks, development banks, publicly funded venture funds (hybrids), pension funds
Soft loans	Loans on favourable terms (below market price) with low interest rates, long maturities and possible grace periods. A subset of soft loans are mixed credits that under OECD rules must contain at least a 35% grant element	Bilateral donors (through commercial banks), multilateral development banks
Dedicated credit lines	Lines of credit (debt finance) for investing in projects that meet specified criteria, e.g. related to climate change. Credit lines are typically established by development banks or less commonly by public entities (government agencies) channelled through a private-sector bank or financial institution for the financing of (most often) private-sector initiatives	Multilateral and bilateral development banks
Risk cover instruments, Guarantees	Several instruments provided by either the public or the private sector, most often in the form of insurances against certain events. Governments will typically be providing political (policy) guarantees, government agencies may be insuring such guarantees; private-sector entities may be providing technical (technology) risk cover. Guarantees (except government guarantees) are paid for like an insurance policy	Export credit agencies, insurance companies, banks, governments, technology suppliers
Project finance	Financing structured around a project's own operating cash flows and assets, without requiring additional financial guarantees by the project sponsors. Loans in a project finance structure are also called 'non-recourse' lending. Project finance essentially depends on the structuring of the risk through risk cover instruments	All of the above
Bonds	A debt investment in which an investor lends money to an entity (corporate or governmental) that borrows the funds for a defined period of time at a fixed interest rate. The bond (i.e. the debt) may be traded on an exchange and bought by anyone	Financial arrangers like banks and credit institutions, large corporations, governments
Grant	Provision of funds without expectation of repayment, using government budgetary allocations, and/or international financial institution or donor funds. For example, funds provided to pay up-front cost of measures or projects	Bilateral donors, philanthropic funds
Carbon credits	Certificates proving the reduction of 1 ton of CO ₂ e, whether traded on the basis of Emissions Reduction Purchase Agreements, over the counter or in formal emission trading systems like the EU ETS	Project developers/owners, the carbon market(s)

Non-market-based instruments

Table 2 presents financial instruments that pertain to a financial market. However, the public-sector regulator can activate private investment through either regulation or incentive (see Table 3). These instruments are often referred to as 'non-market mechanisms'. Regulation is commonplace – that is what government is all about. The private sector is used to regulation and is not against it as long as it is predictable, non-discriminating and does not erode business competitiveness. Particularly in sectors like the energy sector, where investment horizons are very long, the predictability of regulatory regimes is crucial. If regulation is not in conformity with these three requirements, the private sector, and particularly the foreign investor, will stay away.

Table 3. Public-sector intervention modes to encourage private investment

Instruments
Grants
Purchase of assets
Fixed payment for services
Additional payment, subsidies (e.g. feed-in tariffs)
Removing subsidies
Tax
Tax credits/reductions/exemptions
Variable or accelerated depreciation
Guarantee schemes
Loan schemes
Technology standards (forcing investment)

Source: Inspired by UNEP RISØ (2011) (Low Carbon Development Strategies)

Regulation is a good way to activate especially the profitable emissions reduction options that are found in energy efficiency programmes. The private sector would, of course, have to reallocate investment capital against its immediate inclinations, but being regulated into making a profitable investment is less of a burden than being imposed a direct cost.

If action is imposed, there must be an assurance that the burden will be bearable for all targeted households or corporations. Imposing investments may have to be accompanied by a government-supported or government-arranged financing model that can distribute the investment costs over a longer period of time.

Such models, for example, in the form of microfinance schemes, might attract international donor support.

If levies or taxes are imposed to serve as a source for financing for a particular action, possibly as part of a cross-subsidization scheme, it is obviously crucial that the revenue be ring-fenced against any pressure to divert it to other purposes. If unsustainable conduct in one sector is to support sustainable conduct in another, the revenue has to be dependable. Carbon taxes in a number of developed countries are an example of a tax that relies on the continued use of fossil fuels and has become an important contributor to the general government budget. Once fossil fuels have been phased out, the tax has to be replaced by a new tax on renewable energy. Purpose-specific levies are therefore in danger of becoming part of the overall government revenue stream and eventually consumed for other purposes. A tax on fuel or a reduction in a fuel subsidy may provide the basis for a financing instrument that can support, for example, the imposed exchange of electric water heaters into solar water heaters. Such a model requires setting the tax at a level that does not significantly reduce the unsustainable conduct. If that happens, the revenues will not arrive and the model falls apart. A modest reduction in fuel consumption would be the objective, while ensuring that the revenues are not diverted to other purposes.

The non-market-based mechanisms are not financing models per se, but instruments that impose actions that require financing. In some cases, where the financial burden on each legal entity, be it a person or a company, is small compared to paying capacity, financing will stem from the reallocation of current spending. In other cases where the financing burden is higher, the traditional financial instruments listed in Table 2 will have to be activated, whether as a result of the regulated entities' own initiative or initiated by the regulator as part of the regulation.

Asset financing

Traditional loan instruments will ultimately provide the lion's share of climate and NAMA financing. Loans exist in different forms apart from traditional bank financing, the most interesting probably being the soft loan model that is a hybrid instrument involving development assistance. Many renewable energy and energy efficiency projects have been financed through this model, which is regulated by the OECD Development Assistance Committee (DAC). DAC has set a minimum of a 35% grant element for soft loans, usually resulting in interest-free loans with an additional reduction of the principal. Traditional soft loans often come with strings attached

in the form of 'national content' requirements that set minimums for supplies stemming from the country of origin of the mixed credit.

Another loan instrument is the bond. The green bond has become an increasingly realistic financing vehicle with significant potentials for bringing in private capital to climate-related investments. Because it is a liquid asset, it is attractive to institutional investors with no capacity for project-specific due diligence. Bonds are attractive due to their typically longer maturities and lower prices compared to bank loans, depending on the risk rating. It may become one of the central building blocks for the financing of NAMAs, particularly if combined with other means and instruments. The World Bank and IFC have already floated green bonds for billions of dollars.

An important instrument for bridging financing gaps is mezzanine financing or 'first loss'. Most hybrid financiers offer mezzanine capital, which is basically a loan that can be converted into equity if the project is getting into arrears or at risk of doing so. Such conversion eases the strain on the project as the lender accepts that interest will no longer be paid, only dividends if the operation succeeds and the project survives. If it does not, the loan-turned-equity is lost together with the original equity, hence the name 'first loss'. The Climate Policy Initiative⁸ identified *protection* against first loss as one of the crucial instruments required to free additional investment capital for climate investment. Such protection would fall under the risk cover instruments.

Risk cover

Any investment is subject to risks. Financial engineering is as much an exercise in risk avoidance, risk mitigation and risk management and distribution as in putting together a financing plan. Fundamentally, a technological risk should be allocated to the technology provider to a reasonable extent, a currency risk should be hedged by the banks, and a regulatory or political risk should be neutralized to the extent possible by the regulator. Risk mitigation is the key to known and tested models for putting together financial instruments in project finance and therefore in many cases also in NAMA finance.

"Currently, gaps in risk coverage hinder renewable energy investments. Risk — whether real or perceived — is in fact the single most important factor preventing renewable energy projects from finding financial investors, or raising the returns that these investors demand. It is also one thing that policymakers can cause, con-

trol, alleviate, or help mitigate."⁹ The regulatory environment, which is the prime point of interaction between the public and private sectors, is thus one of the prime obstacles to the financial engineering of NAMAs. While, of course, only a part of the NAMAs concerns renewable energy, many relate to public services that affect citizens and are therefore politically sensitive and may ultimately lead to the non-enforcement of consumer payments. The private sector is not equipped to tackle such risks and will be looking for insurance. Project companies may attempt to enter take-or-pay contracts with a public utility, but that only means that the risk is now on the public utility — the project company's only customer — and the public utility may be unable to pay if consumers do not pay their bills.

While this particular risk cover may be in short supply, there are other useful risk-mitigation products on the market. The main shortcoming of these risk cover instruments is, however, that they are generally only available to foreign investors. The local private sector in NAMA host countries does not have access to risk cover, despite being exposed to largely the same risks.

Grants

Grants are easily understandable, but they are few and far between for the implementation of NAMAs. The Global Environment Facility may be the only real source of grant financing for climate investment. However, the GEF requires significant co-financing. GEF itself states that its requirements are probably among the most burdensome among climate financiers. Grants, however, in one form or another, may be necessary to bring generally unprofitable actions to materialization. No matter how ingenious the financial engineering of the NAMA, there may be a leftover cost that needs to be accommodated. This might ultimately have to be covered through a form of grant, but it does not have to be a grant for the asset: it might alternatively be a grant offered on top of existing cash flows.

Cash flow: carbon credits and other options

Few if any instruments are targeted at the provision of long-term cash flows. Such instruments would be incompatible with the way in which traditional donor funding is allocated. However, one of the main criteria for the transformational changes sought for in NAMAs is that incentives structures in a given sector are altered towards a preference for more desirable investment alternatives. This requires a permanent change to the cash flows.

8 Risk Gaps: First-Loss Protection Mechanisms, CPI, January 2013.

9 climate-i, 22nd January 2013, and <http://climatepolicyinitiative.org/publication/risk-gaps/>

The list of instruments in Table 2 is short of such options. The CDM is practically the only instrument designed to provide such cash flows, but as future cash flows from the carbon market cannot be insured it cannot serve as collateral for raising investment capital. Even a reformed CDM is unlikely to reinvigorate carbon credit-based cash flows, but 'new market mechanisms' may reinvent the credit for domestic purposes – a trend which is growing rapidly.

Another option for long-term cash flows is feed-in tariffs, typically in the energy sector, but other fixed payments for desired services in waste, water, transport or other public sector-administered services are equally relevant. Such favourable tariffs are generally offered by the public sector or public sector-controlled entities and require a public-sector budget. Such budgets are difficult to bring about, and in times of crisis they are at risk of erosion. Denting into such schemes is detrimental to the private sector's trust in their stability, and guarantees are in demand – but rarely in supply. The United States' Overseas Private Investment Corporation (OPIC) has pioneered a feed-in-tariff insurance product which provides policy risk coverage in developing countries, but these are clearly unavailable to domestic investors in NAMA host countries.

If the transformational changes sought for in NAMAs particularly require a permanent change in cash flows, the NAMA host-country regulator is thus faced with the challenge of either imposing a domestic cap-and-trade system on its domestic private sector or of committing itself to a long-term feed-in-tariff approach in one or more emissions reduction-relevant sectors,¹⁰ being aware that once established it will be a recurring line of expenditure on the finance bill for twenty or more years to come.

It is fundamentally the financing of these additional costs that constitutes the core challenge in the financial engineering of NAMAs, mainly because donor-based sources of such financing cannot commit themselves to long-term cash flow contributions. Mechanisms are needed that can transform one-time budgetary allocations from any donor administered programme, including the Green Climate Fund, into long-term cash flows. Such 'exchange mechanisms' should become central instruments in the financial engineering of NAMAs. In the meantime, instruments for reducing the size of the bill can stand in, for example, by reducing the financing costs for investors and thus the latter's demands for additional payments.

10 A feed-in tariff normally pertains to renewable energy, but it is just one example of 'additional payment' for services, as indicated in Table 3.

Leveraging Finance for NAMAs

'Leveraging' is the common term for describing the fact that much NAMA funding is ultimately expected to originate from sources other than dedicated public international NAMA financing, for example, to be channelled through the Green Climate Fund. Leveraging is not a new term but a common concept in the financial sector. The following example is from the UNFCCC/UNDP/UNEP NAMA Guidance: 'If I have 100 dollars, how many additional investors can I attract for an investment by putting up my 100 dollars? That depends on two crucial factors: the identity of the owner of the 100 dollars and how he intends to spend it.' Also here, investment should be distinguished from cash flow. Leverage in the public sense can also be a challenging concept to employ since its definition implies that the investment being leveraged would not proceed on its own 'but for' the public contribution. As with the CDM, proving this additionality can be tricky. In the best case this condition holds true and the public finance 'crowds in' private finance. In the middle case the public money helps to finance the activity alongside private investment, but the one does not leverage the other: the public and private actors are simply co-financiers in a project. In the worst case, the availability of public financing, often concessional, actually 'crowds out' private investment.

If a major part of future climate finance is to be leveraged from the private sector, and particularly the international private sector, the first consideration when planning a NAMA must be to determine its role. If NAMAs are to leverage international private-sector financing, the international private sector will dictate the conditions for its commitment of capital. It is not at all certain that the activity in question for a NAMA traditionally involves the private sector. In many countries the energy sector is publicly owned, and there may be no plans or desire to change that. Therefore, the two routes of financing – public and private – will remain. The public-sector route, however, has fewer instruments to employ, and will not be able to benefit from the private sectors' financing capacity.

No magic formula will eliminate the additional cost that is affiliated with some – but certainly not all – activities

that can be considered as prospective NAMAs. Such costs will not be addressed by 'innovative financial sources', but they may be addressed in part through innovative ways of employing already known sources of finance, the purpose of which would be to significantly reduce the cost in the same way as a 5% loan is cheaper to service than a 10% loan. And this – in all its simplicity – is the basic objective of the financial engineering of NAMAs: to reduce the costs of financing by employing a multitude of financial instruments, including risk mitigation instruments, so that more projects, programmes and policies are pushed upwards in the fundamental investment pyramid in Figure 3.

Who goes first?

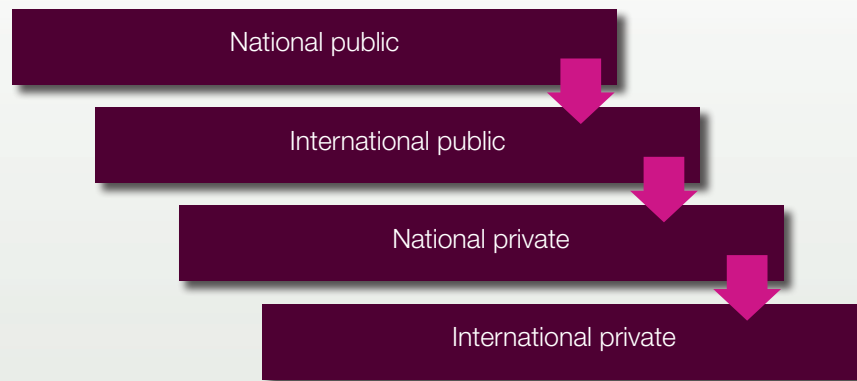
Leveraging normally involves a financier in a leading role. In NAMA development, the leading financier is typically a domestic, public institution. Demonstrating the ability to mobilize national resources, either through a revision of government budgets or by showing a willingness to regulate the private sector, is a good starting point.

With the NAMA initiative resting with the public sector, it is logical that the public sector should go first in order to inspire private-sector investment. Identifying the possible options for redirecting funds or sources of cross-subsidization is an exercise in itself. The UNFCCC NAMA guidebook suggests using the Climate Public Expenditure and Institutional Review (CPEIR) developed in 2012 by UNDP and the Overseas Development Institute (ODI) to assist in budget analysis relevant to public climate expenditure.¹¹

Any freed-up cash flow or investment capital from the national budget may be used to leverage international public (donor) finance. This does not mean that the two sources of public funding, national and donor, should be deployed in the same manner. The two should be deployed where their special characteristics are most valuable. For instance, international donor funding has distinct advantages for risk cover, particularly if foreign private investment is also being sought. NAMA host

¹¹ UNDP/ODI (August 2012).

Figure 6. The right order of leveraging



Source: S. E. Lütken 2014

country strength, on the other hand, lies in the government's regulatory power and the power to rearrange the national budget in support of specific purposes. Structuring the available finance from these two sources may create investment conditions and options that are attractive for the local private sector, possibly even sufficiently attractive for the foreign private investor, who generally faces higher investment risks than his local competitor.

Thus there is a 'right order of leveraging' (see Figure 6) (S.E. Lütken 2014). As the national private sector has limited leveraging power over the foreign public donor, the national public sector should start its leveraging effort by presenting its policy ideas to international donors *before* it starts deploying its national financing capacity with the aim of securing private-sector initiative.

The financing value chain

Financial 'engineering' is fundamentally about applying more than one type of financing with the aim of bringing about a full financial package. As illustrated, the toolbox is already diverse and relates to four targets: the asset, the finance, the cash flow and the risk. If the point of departure is to put in place frameworks that leverage the private-sector investor and his banking partners' investment appetite, the banks may thus be satisfied by four types of instruments (reference is made to Table 2):

1. Support of the asset (GEF incremental costs),
2. Support of the finance (Mixed credit),
3. Support of the cash flow, or
4. Reduction of the risk (Export credit)

Supporting the asset refers to the approach represented by GEF, which ultimately lessens the burden of debt service because the debt is smaller. Supporting the finance is a model used by development agencies either through 'mixed credits' or soft loans, or through simple concessional loans offered by, for example, IDA (the International Development Agency) as part of the World Bank. Support of the finance may also materialize as the provision of access to market-based financing on terms that are otherwise reserved for other purposes or clients. Support of the cash flow, as already established, in the absence of international support options normally has to originate in NAMA host-country national budgetary allocations. The reduction of risk normally succeeds through insurance companies or export credit agencies.

The financing value chain is illustrated in Figure 7, distributed into the four categories – support for the asset, support for the financing, support for the cash flow and guarantees. Provision of guarantees reduces the cost of financing, concessional loans reduce the cost of operating the asset, enhancing the cash flows improves the debt service capacity, and a grant for the asset naturally reduces the cost of implementation. At the same time, the relationship between the four possible interventions is thus also indicative of the cost of the instrument. The further up the hierarchy, the more leveraging is achieved downstream. Thus, when putting together instruments in a financial 'package' for a NAMA, the larger the share of instruments to the left in Figure 7, the higher the potential for leveraging.

Box 1: The Leveraging Capacity of Fossil Fuel Subsidies

Removal of subsidies to fossil fuel is one of the most obvious sources of finance for other climate friendly investments. The G-20 countries agreed in September 2009 to phase-out inefficient fossil-fuel subsidies over the medium term. It amounts to US\$312 billion worldwide and 95% of current growth in oil demand is coming from countries where the oil price is subject to subsidies (IEA World Energy Outlook 2010). The IEA estimates that removing fossil-fuel consumption subsidies would reduce global carbon-dioxide emissions by 1.5 to 2 billion tons by 2020.

While the fuel subsidies seems to indicate an overwhelming capacity in NAMA countries to provide cash flow support it may just as well indicate a lack of imagination as to how such cash flows could be partly redeployed without causing public uprising. Table 3 presented a number of deployment options in terms of financial regulatory instruments available to the public regulator. Commonly, the relationship between required feed-in tariff and land based wind energy investment costs is between 1:15 and 1:20 on an annual basis, but obviously finance depends on many other parameters. Therefore, the resulting 500 GW of wind energy (about 10 times the current annual global wind capacity addition) that could be supported by the current fuel subsidies is only a theoretical number, but it does indicate a sizeable potential in a redirection of fossil fuel subsidies.

For ease of implementation, support of an already established support system is to be preferred over the creation of new ones. For instance, supporting the current export credit system's guarantees is likely to have far-reaching effects instead of establishing a new guarantee instrument. The reason is at least two-fold: 1) as the system already exists, it can be deployed immediately; and 2) it already possesses the experience and expertise to design guarantees that precisely match the demand. The same principles apply to other sorts of financing, for example, the equity funds already mentioned. There is no shortage of investment capital, and new investment funds will only be redundant as long as investment frameworks remain unchanged. Should such new funds assume a riskier investment profile, they will find themselves alone in the market with no co-investors. A Green Climate Fund as a high-risk investor is therefore not a way forward. Instead Michaelowa and Hoch (2013)¹² have suggested the Green Climate Fund as an instrument to fill the gap in cash flow support, which would be much more visionary.

¹² For further discussion of the Green Climate Fund's possible role in relation to feed-in tariffs, see Michaelowa and Hoch, *Design options for the Green Climate Fund to support renewable energy feed-in tariffs in developing countries*, World Future Council, September 2013.

Figure 7. The financing Value chain

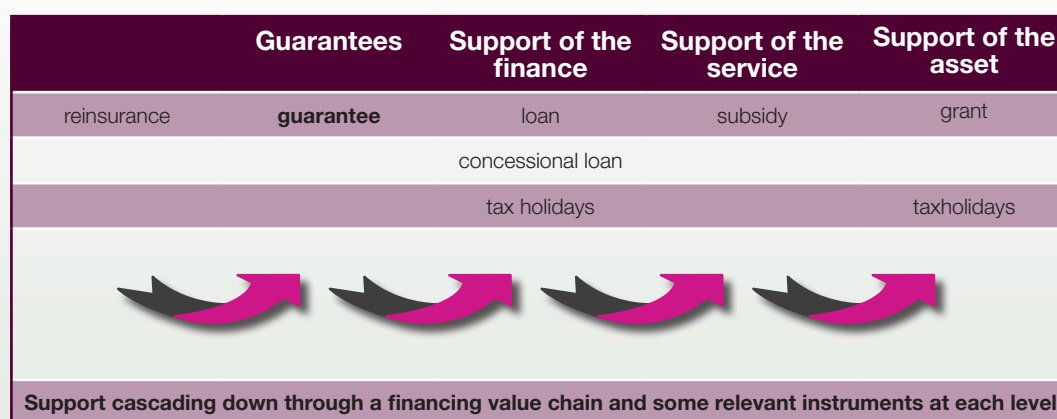


Figure 8. Risk/return control panel



Separating the instrument from its supplier may therefore not always be possible or even desirable. Institutions have their strengths and weaknesses, for instance the traditional shortcoming of bilateral assistance in terms of provision of cash flow (which is the reason for Michaelowa and Hoch's proposal). In current settings, however, bilateral donors have particular strengths for the provision of guarantees. This could take the form of a simple control panel like Figure 8, where the two public-sector partners influence risk and return on investments through the instruments they put in place, with the international public sector focusing on the reduction of risk (which is in part a result of the international investors' evaluation of the national regulator), while the national public sector focuses on the establishment of sufficient cash flow to make private-sector investments come together.

This division of labour is mainly a result of the current absence of grant-based cash flows ('returns' in Figure 8), probably due to their incompatibility with the way in which donor funding is allocated. Therefore, the national budget would have to entertain a feed-in tariff on its own. A feed-in tariff could, for instance, be funded through a reduction in national fossil-fuel subsidies (rearranging the national budget).

National Climate Funds

Some countries are finding ways in which domestic funding originating from savings or revenues in one activity (e.g. the reduction of subsidies) can be activated for funding any emissions reductions activities, regardless of sector affiliation. Mexico has established a NAMA fund that can accrue such amounts and at the

same time serve as a national coordinator for NAMA financing, including international funding. Such structures require a general national priority for NAMA development and awareness of the fact that without activating the possible national funding sources the chances of attracting any other source of funding – private or public – are limited.

The challenge for the national climate funds is that, while they may be practical for concentrating funds from different sources, they may not be practical for deploying the financing in the form of specially designed instruments for particular purposes. Instead of blending different kinds of financial instruments, all contributions might instead be homogenized into grants, which is ultimately the opposite of blending. They may in effect work counter to the financing value chain and forgo valuable leveraging options. Before establishing such national funds, it should therefore be carefully considered whether they serve a purpose in terms of the *deployment* of financial resources, or whether they ultimately become parallel structures with limited experience alongside existing institutions with more experience and dedicated instruments.

They might nonetheless be efficient as revolving funds, although this will not make them more efficient in terms of leveraging. A common investment barrier is high up-front costs, or more precisely the price of the asset. Access to patient capital is one of the most efficient responses in cases where the asset is profitable over time, like most energy-efficiency investments. Funds that address this financing shortfall can be established as revolving funds that return the longer term profits

into new investments. Revolving funds are obviously not exempt from the logic of the financing value chain, but as outlays return to the investment fund in full, they are self-sustaining and require no cash flow support. This is the fundamental principle underlying Energy Service Companies (ESCOs), which, for instance, take over the energy supply for an energy-intensive industrial facility, invest their capital in efficient equipment and operate the energy supply over a few years to recover that investment through savings, after which they return the more efficient energy-supply system to the host of the installation. Similar models are used in the housing sector and could equally be used in public transport, for instance, for electric buses.

In cases where an asset cannot produce the service at the market price due to high operating costs or high capital costs, the investment has to be supported throughout its financial lifetime by one of the instruments suggested, mainly guarantees and/or favourable loan arrangements or, as a last resort, by a GEF-like grant for the capital costs. If the lack of competitiveness is caused by subsidies for competing technologies, the immediate answer would be a revision of the subsidy policy. Unrevised subsidies may be increasingly difficult to uphold in parallel to requests for (grant) funding of competing alternatives. Also ESCOs become increasingly relevant with reduced subsidies.

Layered, phased and parallel NAMAs

Engineering the financial model for a NAMA need not be an isolated effort for a single policy or programme. For instance, a phasing-out programme for inefficient coal-fired power plants could be accompanied by a nationwide energy efficiency programme or a household solar water heating programme that avoids the need to invest in replacement capacity. Mauritius has successfully run such a programme for years, replacing the need to invest in coal-based electricity generation. Saved operational costs for power generation from one NAMA could be directed towards a grant programme for CFLs or solar water heaters in another NAMA. A third NAMA could introduce the compulsory exchange of inefficient equipment such as pumps if savings in the second NAMA are not sufficient to reach the objective of the first NAMA.

A phased NAMA could introduce a smaller regional programme for rural solar PV lighting based on a national grant to demonstrate its benefits in emissions reductions (savings on generator fuel) and social aspects (reach to households without generators), while preparing a national programme as Phase 2 for the possible intervention of emissions traders in the CDM

or the voluntary carbon market. Alternatively it might apply to bilateral donors with micro-credit schemes or interests in providing grants on the basis of emissions reductions, possibly accompanied by requirements for technology purchases (currently seen in Japanese interventions).

A layered NAMA could introduce two or more avenues of emissions reductions in the same industry. For instance, imposing waste heat recovery systems in the cement industry as step 1, e.g. through the use of ESCOs, introducing clinker replacements through regulation as step 2, and finally imposing a gradual shift towards renewable fuels in the production (e.g. biomass or sludge) as step 3 would constitute layers. As waste heat recovery is normally profitable, it may support the net costs incurred in steps 2 and 3.

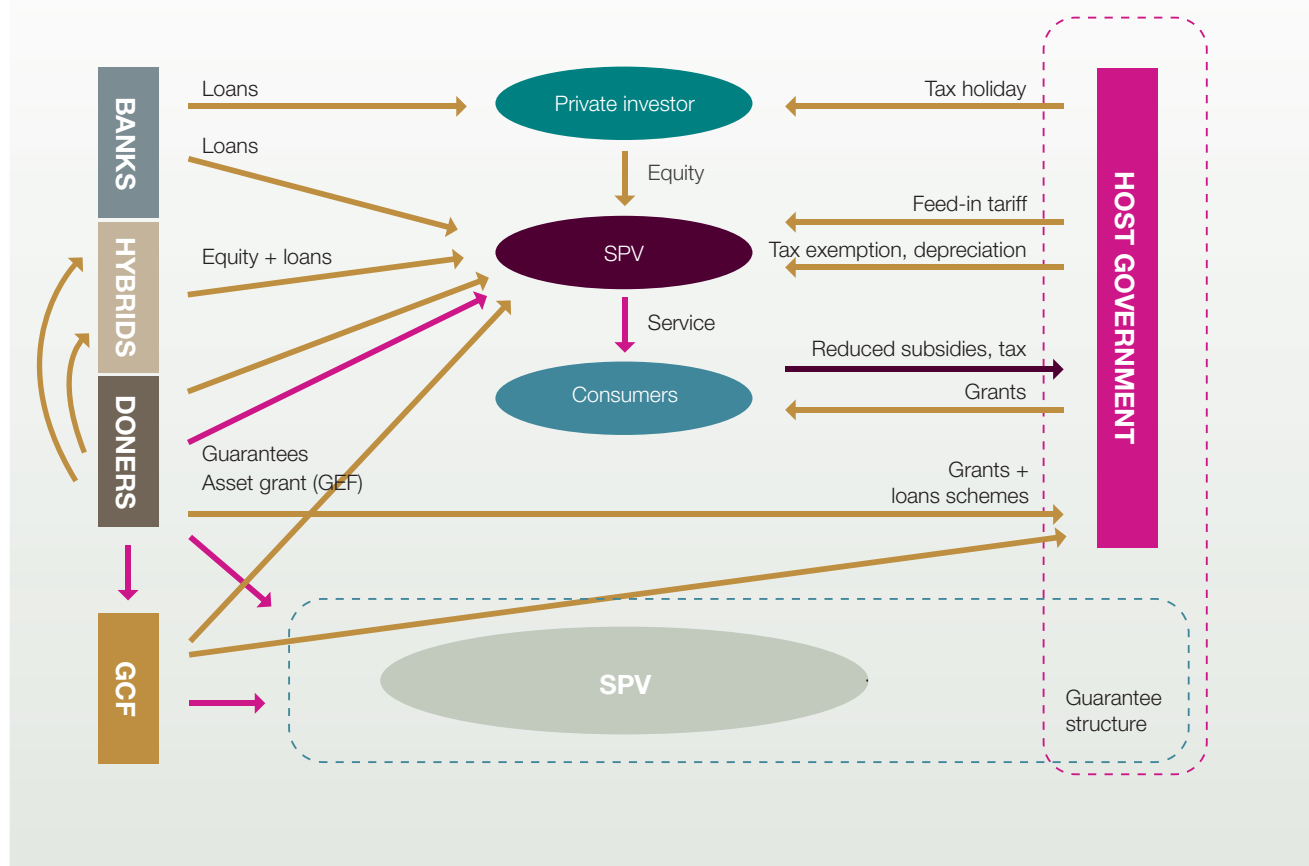
Such mutually supporting NAMAs may be efficient emissions reduction responses, although the cross-subsidization that they might represent complicates the financial engineering and puts the entire model at risk. The ideal situation is therefore if such mutually supporting NAMAs can serve both as stand-alone activities and as possible elements in a grander scheme.

Putting the pieces together

The main principle from a financing and leveraging point of view is that the leveraging instruments listed in Table 3 are sought to be capitalized first. Those are the options for the deployment of public-sector funds. The structuring of these, employing different sources of *public* funding, is what will ultimately determine the size of the private sector's involvement. Sufficient funding should be secured before launch to avoid the risk of having to change halfway. Discontinuity and smallness of scale are significant deterrents to private-sector involvement.

The advantage of starting with private-sector conditions is that the gaps in the financing models are identified early on, including particularly the gaps in risk cover, as identified by CPI. This may help substantiate the requirements for donor involvement. As mentioned above, donor governments are particularly well-suited for the provision of political guarantees for the involvement of the private sector.

Figure 9. Expanded securitization model



Source: S. E. Lütken 2014

Although donor countries' export credit agencies are so far only relevant to FDI – the last source of finance according to the hierarchy established in Figure 6 – the principle also applies in national contexts in which investment guarantees are notoriously difficult to obtain, often with the requirement that an amount in cash similar to the size of the guarantee be deposited in a bank. Such a guarantee is obviously worthless. Supporting national guarantee structures could release local private-sector investments and at the same time put national investors on an equal footing with foreign investors in joint projects. In such joint projects other hybrid institutions provide another efficient instrument in the form of equity. Equity participation by a hybrid financing institution stretches the reach of the private-sector investments and is an efficient supplement to the guarantees. It also has the nature of a revolving fund in that it withdraws (divests) invested capital once the project is a going venture and deploys it in new ventures.

Figure 9 puts the elements together in an 'expanded securitization model', the structure of which is inherited from project finance and adapted to the NAMA. It includes the developed country sources of finance to the

left and the NAMA host government to the right, playing the role both as part-financier and part-financing channel for international funding. In the middle of the figure is an investment resulting from the NAMA undertaken by a private investor on the basis of instruments established and financed through different institutions. This model includes the Green Climate Fund in different roles, including that of providing guarantees and/or support for cash flows through the NAMA host government, but it also includes taxation-based cash flows in the NAMA host country directed towards the consumers that benefit from the services provided by the private investor. The SPV, or Special Purpose Vehicle, in the centre of the figure is the entity around which the financial engineering is concentrated, as was the case in the heyday of the BOT model and as continues to be the case for today's PPPs. Loans and guarantees support the basic equity investment undertaken by private investors, possibly in partnership with hybrid financial institutions that co-invest on the basis of market-based investment criteria, that is, risk/return ratios at par with market requirements.

Now the challenge is how to get to this point.

The aggregator

The UNFCCC Secretariat has established a NAMA Registry to which countries can submit their unilateral NAMAs for recognition or proposals for supported NAMAs with the aim of attracting donor funding. This is a platform through which requests for financing can already be channelled. The disadvantage of this approach is that proposals may not reflect the priorities of any donor, nor does the approach allow for any financial engineering with engagement from a group of donors in different roles and with different financial instruments. It requires financiers themselves to coordinate their involvement in a particular NAMA, unless any of them want to be the sole financier. If not, this constitutes a kind of random syndication model, which is unlikely to bring about an efficient financial model for any NAMA.

Generating insights into different financing models and instruments is not a skill commonly existing within the line ministries of NAMA host countries, which are the most likely initiator or developer of NAMA proposals. Therefore, identifying a central financial institution that can provide advice on the structuring of the finance for a particular NAMA is essential. Such an institution may play the role of financial “aggregator” based on its understanding of the functions of various financial instruments.

An aggregator will act as a neutral financial adviser or “financial engineer”, but may have a potential interest in eventually becoming involved financially in the implementation of the NAMA. Part of this assistance may be delivered through donor-funded ‘readiness’ programmes, but even these are at risk of being disconnected from the financial sector because that is not their traditional affiliation. The most obvious candidates for the aggregator role are the ‘hybrid’ financiers, who are most likely to be familiar with the entire range of public- and private-sector instruments due to their foundation as publicly supported financial institutions with a private-sector operational mandate.

In traditional assistance, the aggregator function is mainly established on the supply side at donor coordination meetings when programmes are being implemented, more than when the programmes are being designed. The perspectives for the aggregator, however, lie in actively concerting the financial engineering effort *before* implementation. The aggregator would need to devise a strategy for leveraging finance for a number of instruments from the most relevant sources among national and international financiers divided among a multitude of institutions. The aggregators’ role

is a significant expansion of the one filled by syndicators during the 1990s financial engineering of private infrastructure. The syndicator organized several financing sources in order to bring financial closure to a single project structure. The aggregator must, in addition, help structure the demands for financial instruments, prospectively deployed through public–public partnerships, which can be presented to the donor community, possibly including the Green Climate Fund. This is a function that has little, if any, experience in the financial community.

The idea of formalized aggregators to devise financing models for NAMAs, including proposals for financing instruments, is presented by S.E. Lütken (2014). This is not straightforward to implement because it interferes with the way in which development assistance is normally deployed. The NAMA Facility has already indicated that it is willing to provide instruments as necessary, but that is so far the only example, which does not exactly fill the aggregator’s role; rather, it takes form of a one-stop shop or a ‘financial supermarket’ that delivers whatever is required. The challenge is to know exactly what is required, which is where the aggregator’s expertise and independent advice comes in. So far, NAMA financing schemes do not provide new models of financing. Instead, they produce new selection criteria for the provision of traditional (and already existing) financing. They require applicants to describe their ideas and budget for them before any financing model has been considered that will facilitate such budgeting. Applicants, therefore, at best, may be able to calculate basic ‘incremental costs’ without any sophistication, which inevitably leads them into the least efficient NAMA financing model.

Lütken suggests that ‘aggregating’ the finance and devoting different sources to differing purposes should be done on a case-by-case basis by shifting teams of financial engineers (for lack of a better title). Whatever the composition of these teams – ad-hoc groups of representatives from different financing institutions assisted by financial engineers, or a formalized aggregating company or institution with the task of putting together the best possible financing structure for a given NAMA – they would have to follow a strategy that brings as much existing investment capital as possible into the service of the climate change mitigation objective.

Conclusion

NAMAs have brought asset finance back into the centre of the climate change agenda, and NAMA host countries are looking for ways to attract 'climate finance' from yet undefined sources. The past ten years of experience with CDM, however, has been that by and large the asset finance has originated with the developing countries themselves. The NAMA idea is unlikely to change this pattern, but the renewed focus on asset finance should help bring some of the central investment parameters related to risk avoidance into focus together with the obvious shortage of instruments that can enhance long-term cash flows for low emission alternatives. In terms of risk mitigation – particularly regulatory and policy risks – it is exactly those that governments and donors acting jointly are best suited to addressing.

However, there is an obvious 'NAMA financing gap'. Current models for applying development and climate assistance are either:

1. long-term asset financing, including investment guarantees, or
2. short-term operational budgets (short grant programmes),

whereas long-term financing models or platforms for enhanced cash flows do not exist among international financial institutions. At the same time, however, it is exactly dependable long-term cash flows that enable the transformational changes that NAMAs ultimately have to deliver in order to attract the international

financier. When looking for innovation in climate and NAMA finance, this should mainly focus on models for establishing such long-term cash flows and on guarantee models that ensure the market's trust in such cash flows. In addition, development of instruments such as green bonds, expanded guarantees and mixed green credits may help reduce cash flow demand.

NAMA host countries need to provide investment climates that are stable and long term. This requires long term financing, which is incompatible with traditional ways of providing bilateral assistance. Countries need models that can convert short term finance into long term investment regimes. Countries need instruments that link public and private finance that are grossly uncoordinated. And countries need to realize that the prime audience for their investment regimes is their own local private sector. Although this sounds as if donors are marginal to NAMA development, they are essential in catalytic roles, to bridge financial gaps, and not least to lead the way in their own reduction efforts. But NAMAs, to be sustainable, and thus transformational, must to the largest possible extent rely on national resources in the long term. The NAMA is a platform and a concept to bring matured investors and financing, – assisted by developed countries, and possibly with institutions in aggregator roles – into low-carbon development in NAMA host countries. Both parties, however, must realize their roles and be willing to play them conscientiously. If they succeed in that, the financial engineering of NAMAs will be a central factor in meeting the 2 degree challenge.

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