

MODULE 8.2

Financial Framework



**NAMAs in the refrigeration,
air conditioning and foam sectors.
A technical handbook.**

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Proklima is a programme of the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. Since 2008 Proklima has been working successfully on behalf of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) under its International Climate Initiative (ICI) to promote ozone- and climate friendly technologies.

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The International Climate Initiative

Since 2008, the International Climate Initiative (ICI) of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) has been financing climate and biodiversity projects in developing and newly industrialising economies, as well as in countries in transition. Based on a decision taken by the German Parliament (Bundestag), a sum of EUR 120 million is available for use by the initiative annually. The ICI is a key element of Germany's implementation of fast start financing. The Energy and Climate Fund launched by the German Government in 2011 is a further source of funding for international climate protection projects, and for activities to conserve biodiversity. Part of that funding is deployed through the ICI. That fund is replenished from the auctioning of emission permits. This innovative source makes Germany well-prepared to deliver long-term financing for climate and biodiversity projects worldwide.

The ICI is active in four areas: Mitigating greenhouse gas emissions, adapting to the impacts of climate change, conserving natural carbon sinks with a focus on reducing emissions from deforestation and forest degradation (REDD+), as well as conserving biological diversity.

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Executive Summary

This module provides background on financing nationally appropriate mitigation actions (NAMAs) and on the application of financing NAMAs in the refrigeration, air conditioning and foam (RAC&F) sectors.

The three types of NAMAs and their respective financing mechanisms are introduced:

- Unilateral NAMAs – financed by the country itself,
- Supported NAMAs – financed through the “support” of an industrialised country,
- Credited NAMAs – financed through an (international) carbon credit mechanism.

Sources of funding for each of these NAMA types are identified: domestic financing for unilateral NAMAs, multi- and bilateral financing for supported NAMAs and credited NAMAs. References are provided for respective funding sources.

For the financing mechanism the existing frameworks and financing elements under the United Nations Framework Convention on Climate Change (UNFCCC) are outlined. The framework has been defined for unilateral NAMAs and supported NAMAs. The Conferences of the Parties (COP) to the UNFCCC so far have taken no decisions on specific features for credited NAMAs. Possible features have been introduced under the so-called New Market Mechanisms which will need further decisions on their details to become effective.

The main features of the NAMA types are explained according to their main features:

- Level of ambition for emission reduction,
- Level of measurement, reporting and verification (MRV),
- Level of International Consulting and Analysis (ICA)¹,
- International financial contribution.

With an increasing level of international financial contribution, the ambition level of emission reductions increases as well as the related MRV and ICA requirements. In principle, supported NAMAs are at least as demanding with regard to emission reductions as unilateral NAMAs. Credited NAMAs need to maintain full environmental integrity by ensuring that 1 tonne CO₂equivalent (CO₂eq) of reduced emissions equals at least 1 tonne CO₂eq of credited or traded emission rights. With regard to direct and indirect emission reductions from the RAC&F sector, full environmental integrity is maintained when emissions from short lived substances (mostly from direct emissions) are traded in different baskets than emissions from long lived substances (CO₂).

For each of the NAMA types possible examples from the RAC&F sector are provided.

For unilateral NAMAs, typically the technologies are well established, and can be introduced by the country at no regrets, i.e. at a benefit or net negative costs. An example is the domestic refrigeration sector with natural refrigerants and high energy efficiency as technology options. The technology is mainstream in developed countries and deployed by many developing countries.

For supported NAMAs, actions introduced by countries need to go beyond no-regret measures, i.e. require efforts which go beyond an established developing country benchmark or what represents the normal practice in developing countries. An example is the commercial refrigeration sector with natural refrigerants as technology option. The technology has been successfully demonstrated in developed and developing countries. In order to achieve mainstreaming significant barriers have to be removed.

For credited NAMAs, actions need to demonstrate verifiable reductions against the baseline to ensure the environmental integrity. 1 tonne of CO₂eq traded emissions needs to equal at least 1 tonne of reduced emissions. An example could be district heating and cooling systems, ideally supplied with energy from renewable energy sources and operating with natural refrigerants.

For the practical application in the country, chapter 3 provides a step-by-step guideline for the financing of NAMAs in the RAC&F sectors.

¹ ICA functions as a verification mechanism for the MRV

1. Introduction

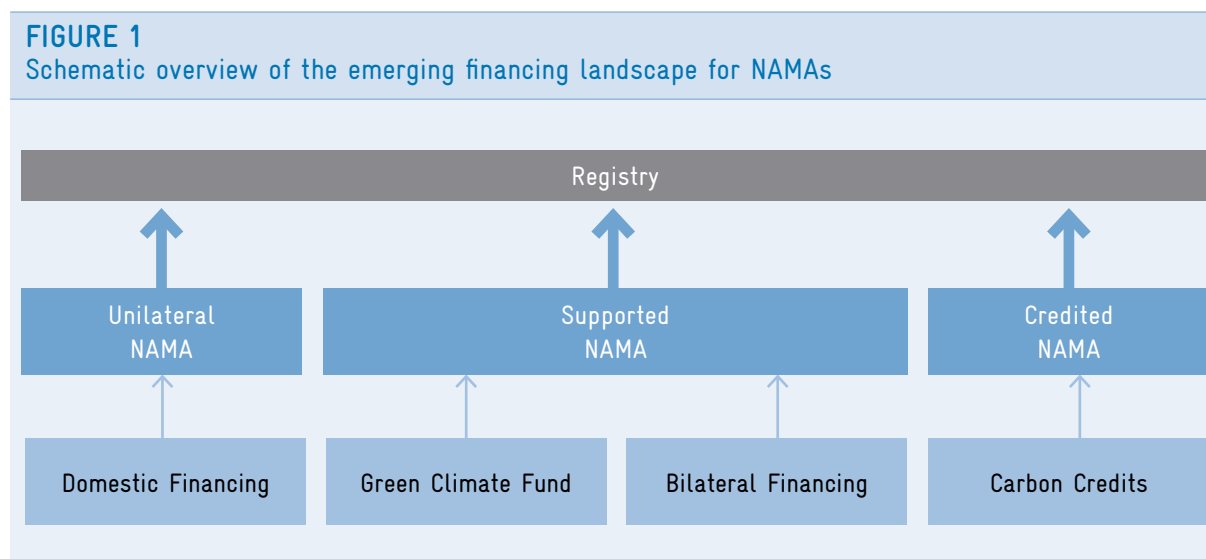
The Bali Action Plan (BAP) requested that large scale mitigation actions should encompass “supported and enabled technology, financing and capacity building, in a measurable, reportable and verifiable manner”². In the same context the UNFCCC also requires developing countries to take mitigation action and developed countries to financially and technologically support developing countries to meet their emission reduction targets.

Until now, there are no established rules and procedures under the convention for the financing of NAMAs. Therefore, in the future, it will still be required to further define what constitutes a NAMA, what support will be involved and how countries seeking financial support through the UNFCCC mechanism will be matched with donors. There are three different kinds of NAMAs, according to their specific financing mechanism:

- Unilateral NAMAs – financed by the country itself,
- Supported NAMAs – financed through the “support” of an industrialised country,
- Credited NAMAs – financed through an (international) carbon credit mechanism.

The concept of unilateral and supported NAMAs were discussed and adopted by the Conference of the Parties to the UNFCCC. Credited NAMAs were discussed but have not yet been adopted.

Figure 1 provides a schematic overview of the emerging financing landscape for NAMAs. Particularly within the context of internationally supported NAMAs, a registry will need to be established under the mandate of the UNFCCC as agreed during COP16 (Cancun Agreement). The registry will play the role of a clearinghouse between international donors or markets and national emission abatements. The registry will also function to gain recognition of unilateral action by developing countries on a voluntary basis. The UNFCCC prototype registry has been established in 2013³.



The categorisation into unilateral, supported and credited NAMAs is further applied in this module and explained in the context of the RAC&F sectors.

² <http://unfccc.int/resource/docs/2007/cop13/eng/06a01.pdf>

³ <https://process.unfccc.int/sites/nama>

2. Methodology for the RAC&F sectors

Within the RAC&F sectors non-negative marginal abatement costs or non-monetary barriers are holding more climate friendly solutions back from large scale market penetration. Policy measures need to be supplemented with suitable financing instruments to ensure sufficient funding for the reduction and avoidance of hydrofluorocarbon (HFC) consumption and the phase-in of more environmentally friendly technology options.

Key features on financing for the three NAMA categories in the RAC&F sectors are described in the following.

2.1 NAMA categories in the RAC&F sectors

Unilateral NAMAs

Unilateral NAMAs are carried out by the country itself. Measures are mainly supported by the countries on a no-regret basis, i.e. they have positive returns, e.g. through reduced energy bills, which are related to the increased energy efficiency of the technical option. These no-regret options reveal negative marginal abatement costs, and represent a net welfare gain from an economic viewpoint (cf. module 4). Unaffected by the costs, these NAMA no-regret-actions will lead to a measurable emission reduction in comparison to the business-as-usual (BAU) case.

Unilateral NAMAs can be financed e.g. through loans by national development banks to promote and accelerate the transition to a low carbon economy. They have interest rate subsidies or loan guarantee support programs. There are no international MRV requirements for unilateral NAMAs.

EXAMPLE 1

Unilateral NAMA – Domestic hydrocarbon refrigerators

An example for an action under a unilateral NAMA would be the accelerated penetration of domestic refrigerators containing hydrocarbon (HC) refrigerants and reaching best practice energy efficiency ratings within an international benchmark.

Hydrocarbons have better thermodynamic properties in comparison to HFCs. Therefore, such domestic refrigerators achieve the highest possible energy efficiency ratings.

HC refrigerators are well established in Europe and reach higher penetration rates than HFC models. Also, in some developing countries like China, HC domestic refrigerators are already fully established.

Higher penetration of HC domestic refrigerators is related to market competitiveness which in turn is realised through energy efficiency gains and energy savings. Widespread usage of HC domestic refrigerators results in an economic benefit for the developing country and its society.

As the technology is fully established internationally, additional support from developed countries on technology transfer or capacity building would only be required in specific cases or to a limited extent to overcome technical or regulatory, i.e. non-economic, barriers.

Supported NAMAs

Supported NAMAs are a further reduction step beyond what can be achieved with no-regret unilateral NAMAs. Actions will go beyond the common practice in developing countries. Typically the technology will aim at reaching international best practice with low direct and indirect emissions.

Measures on supported NAMAs will go beyond the no-regret level. The implementation of technologies will have positive marginal abatement costs. Supported financing will address the incremental costs on which the low carbon technologies exceed the costs of the conventional technologies. Local co-funding may be required for parts of the incremental costs or the costs not related to the incremental costs. International donors may also require that local funding will be available for scaling up measures initially funded by an international donor.

NAMAs which are financed with bilateral or multilateral support will need to meet a selection of yet to be determined criteria, such as:

- Targeted emission abatement levels,
- Description of the methodology and assumptions used,
- Elaboration of the costs and benefits of implementation,
- Analysis of the annual technical, capacity building and financing support required,
- Incremental costs over conventional technologies for implementation,
- Financial and environmental benchmarking of the technologies to be implemented,
- Other relevant sustainability indicators.

Bilaterally supported NAMAs can be registered with the UNFCCC registry, with the prototype registry installed in 2012.

Mitigation action and emission reductions on supported NAMAs are reported in the Biennial Update Reports (BUR) as part of the National Communications (NC) to the UNFCCC. The achievement of the emission reductions will likely be governed under a robust international MRV system and the reporting subject to the International Consultation Analysis.

Possible funding sources for supported NAMAs could be bilateral and multilateral funds (Transfer, 2012): Bilateral funds are currently the main funding source. An example is the British-German NAMA facility co-funded jointly by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) and the UK Department of Energy and Climate Change (BMU, 2012). Examples for multilateral funds are the Global Environmental Facility (GEF), the Clean Technology Fund of the World Bank (CTF) and possible NAMA facilities of the regional banks (Asian Development Bank, Inter-American Development Bank, African Development Bank).

The need for additional funding is discussed intensely at the UNFCCC Conferences of the Parties. Developed countries have initially responded to the request of developing countries for additional funding with the establishment of the Fast Start Climate Financing Pledges (WRI, 2012).

EXAMPLE 2

Supported mitigation actions as potential NAMA activities: Supermarket refrigeration in South Africa

With the support of the International Climate Initiative of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU), the Programme Proklima of the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH has implemented a demonstration project with the South African supermarket chain Pick n Pay. HCFC supermarket refrigeration systems were replaced by natural refrigerants and energy efficiency refrigeration systems in two pilot stores. The project resulted in an emission reduction of over 20 %.

The alternative, climate friendly systems require a 15 % to 20 % higher initial upfront investment. With a reduction of energy consumption of about 15 %, the new systems pay off over time. As the technology is still new to South Africa, without supporting the financing the market penetration of the climate friendlier systems will progress very slowly.

South Africa has about 1000 large-scale supermarkets. About 50 to 100 of the supermarkets per year will be refurbished with new systems anyway. A first target could be to achieve a high penetration rate of climate friendly alternatives for the new installations.

South Africa, as many other developing countries, has very high interest rates on commercial loans. Bank loans for climate friendly re-installations are not established instruments.

The introduction of climate friendly supermarkets on a wider scale can be established through a sector NAMA for supermarket refrigeration systems. The NAMA could be supported through a grant component on the upfront investment costs or through lowering the interest costs within supported or concessional loan financing. The supported NAMA will allow the projects to become financially feasible faster and therefore allow a faster penetration of the climate-friendly alternatives.

Credited NAMAs

The mitigation level of credited NAMAs is the highest and goes beyond the international established benchmark level. Other than unilateral NAMAs and supported NAMAs, the concept of credited NAMAs has not yet been adopted under the UNFCCC framework.

The financing of credited NAMAs is planned to be through the sale of carbon credits. The amount of carbon credits would be accounted on the basis of emissions reductions in terms of tonnes CO₂eq reduced. Credits could be sellable on a government to government clearing mechanism or through a private market based mechanism similar to the Clean Development Mechanism (CDM). To maintain the environmental integrity, emissions reductions would have to be stringently verified and required to be strictly additional.

The baseline methodology of credited NAMAs could be applicable to a complete sector similar to the European Trading Systems (ETS) and unlike the project based approach originally pursued under the CDM mechanism of the Kyoto Protocol.

EXAMPLE 3

Possible credited NAMA: District cooling in Chinese low carbon regions

Credited NAMAs are not yet an established mechanism under the UNFCCC. Credited NAMAs were, in contrast to unilateral and supported NAMAs, not yet adopted through the COP.

In 2011, China launched a pilot carbon emission trading scheme to be implemented in five provinces and eight cities as so-called low carbon pilot regions. The system will be effective from 2015. Currently methodologies for the implementation of the pilot schemes are being developed. Typically, the scheme controls large installations with significant emissions. The schemes which are developed in Xiamen, Fujian Province, and Shanghai, are also exploring design options for carbon trading schemes in the building sector (Climate Focus 2011).

The growing demand for air conditioning in the quickly expanding Chinese cities is a key driver for an increasing energy demand and resulting CO₂ emissions. Building air conditioning in China is typically realised through the installation of split type AC units. They also cause direct emissions through the leakage of refrigerants with high global warming potential (GWP). Over 90 % of installed split type AC units use the HCFC R-22 as refrigerant with a GWP of ca. 1800.

Both direct and indirect emissions can be substantially reduced by replacing split type AC units with efficient district cooling systems (DCS). DCS are centralised cooling systems that chill and distribute water to the air-conditioning system of the connected buildings. Compared with conventional systems, DCS are highly energy efficient with possible savings up to 35 %⁴.

By including DCS instead of conventional split type AC into new buildings or as retrofit for old buildings the business-as-usual emissions path can be substantially mitigated. Still, for a wider application of the efficient systems various barriers need to be removed. Key barriers are that DCS are still a relatively new concept to many developing countries and starting DCS projects appears risky: Long payback periods are required, billing and collection has to be managed across several different types of customers and there may be resistance from unitary AC system companies.

Carbon markets can be an effective way to overcome the barriers. If cities in Asia continue to grow and need to meet caps on the growth of carbon emissions, the best available technologies in terms of their low carbon footprint need to be implemented. Meeting residential cooling needs, DCSs will be among the best available technology options. A sufficiently high carbon price and a long lasting carbon regime with increasingly tightening caps would likely provide sufficient incentives to move DCS to the forefront of measures to be implemented.

Linking national or sub-national regulatory schemes like the China carbon scheme with the ETS can further expand the role of carbon markets. With this link European investors and technology providers would receive additional incentives to provide technology and financing to implement projects under the China trading scheme. In return carbon credits from China could be exchangeable with carbon credits or allowance units under the ETS. It should be noted that such linkages currently exist within the CDM under the Kyoto Protocol. However, the CDM scheme is only a transitory scheme. A direct linkage between national or regional carbon trading schemes with nationally defined carbon caps is more sustainable. It also provides a long term perspective for investors and technology providers. Thus, it can be assumed that the energy efficiency as well as the implementation of systems carrying natural refrigerants instead of HFC refrigerants will become more widespread through the possible linkage to such a credit based market mechanism.

⁴ www.emsd.gov.hk/emsd/eng/pee/wacs.shtml

TABLE 1
Overview of NAMA financing options with regard to RAC applications

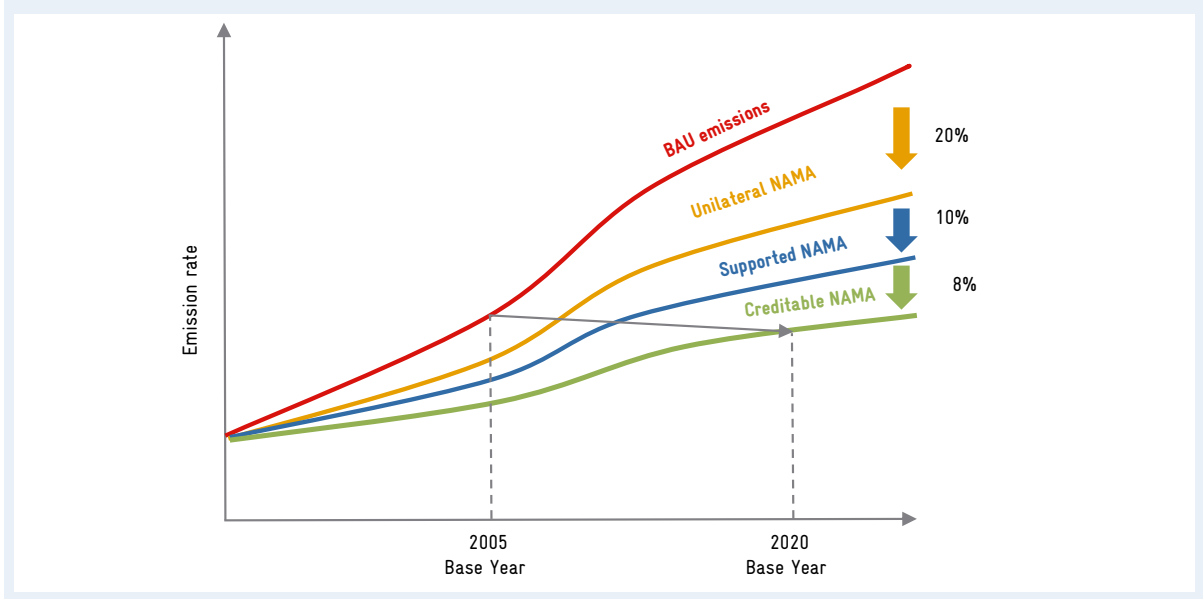
	NAMA type		
Emission reduction ambition level	No regret; better than BAU	Better than average in developing countries; targeting international best practice	Targeting what is technical and economic feasible; meeting carbon budget considerations under a 2°C target
RAC&F reference	Introduction and dissemination of climate friendly, established, no regret technologies with negative marginal abatement costs, no or little higher upfront costs; examples: R-600a domestic refrigeration, R-290 unitary AC	Introduction and dissemination of technologies with incremental higher upfront costs; no immediate amortisation of higher upfront costs through energy efficiency gains; examples: R-717, R-744, R-600a supermarket systems; R-290 chillers	Introduction and dissemination of technologies with significant entry barriers; Examples: District cooling systems
Registration	Not required	Required	Required
MRV/Level	Not required	Required/medium	Required/Level high
ICA	Not required	Required	Required
Bilateral/multi-lateral concessional contribution level	Low	Medium	Potentially high

Within the three different types of NAMAs the level of typically emissions mitigation ambition increases from unilateral to supported NAMAs and from supported to credited NAMAs, which is related to typically increasing margin abatement costs with the level of mitigation action pursued. The increasing level of emission abatement ambition is illustrated below. It shows a reduction from the BAU scenario of 20 % for a unilateral NAMA. This implies that at a lower reduction level the marginal abatement costs will be lower or even negative. Mitigation actions can be undertaken, accordingly at low costs or even realising a saving. With the implementation of supported NAMAs an additional level of mitigation will normally be achieved, in the example below additional 10 %. Here the marginal abatement costs will be higher and, possibly not fully affordable by the implementing country without international support. Credited NAMAs should comply with a reduction level that is in line with the national obligation and the national contribution to achieve the global 2°C target. As global emissions need to decrease drastically in this case, with action also undertaken in developing countries, credited NAMAs should lead to an overall reduction of emissions against the baseline i.e. emissions in the base year and not only the BAU scenario.

The different ambition levels are illustrated in Figure 2, where the mentioned reduction targets from the BAU are only of exemplary nature for illustration purposes and need to be specifically calculated for each determined NAMA.

FIGURE 2

Illustration of increasing emission reduction levels for unilateral, supported and credited NAMAs.



2.2 Specific financial and fiscal instruments in the RAC&F sector

For unilateral, supported and credited NAMAs, specific financial and fiscal instruments suitable to support NAMAs exist.

Unilateral NAMAs and financing instruments

So far the EU has taken the lead on phasing out HFCs. Key financing and fiscal instruments applied are targeting disincentives for the use of HFCs:

- Taxes and tax rebates,
- Deposits and refunds.

BOX 1

Country examples for the application of economic instruments related to the use of HFCs

Experiences from several EU Member States are available:

- Denmark (deposit-refund scheme since 1992; tax since 2001),
- Slovenia (tax since 2009),
- Sweden (deposit scheme; legally binding producer responsibility scheme since 2007, plan to introduce a tax on import and production of HFCs),
- Poland is going to impose a tax on HFC quantities placed on the market.

Deposits and refunds are typically used in the EU for the financing of disposal and recovery systems. For example, the manufacturers of refrigerators are required to pay into a central fund from which the retake of refrigerators and the extraction and destruction of refrigerants with high GWP is financed.

Taxes on HFCs are a way to disincentive their use. Governments can use the funds collected through taxes to rebate and fund the introduction of climate friendly technology alternatives for refrigeration and AC applications.

Supported NAMAs and financing instruments

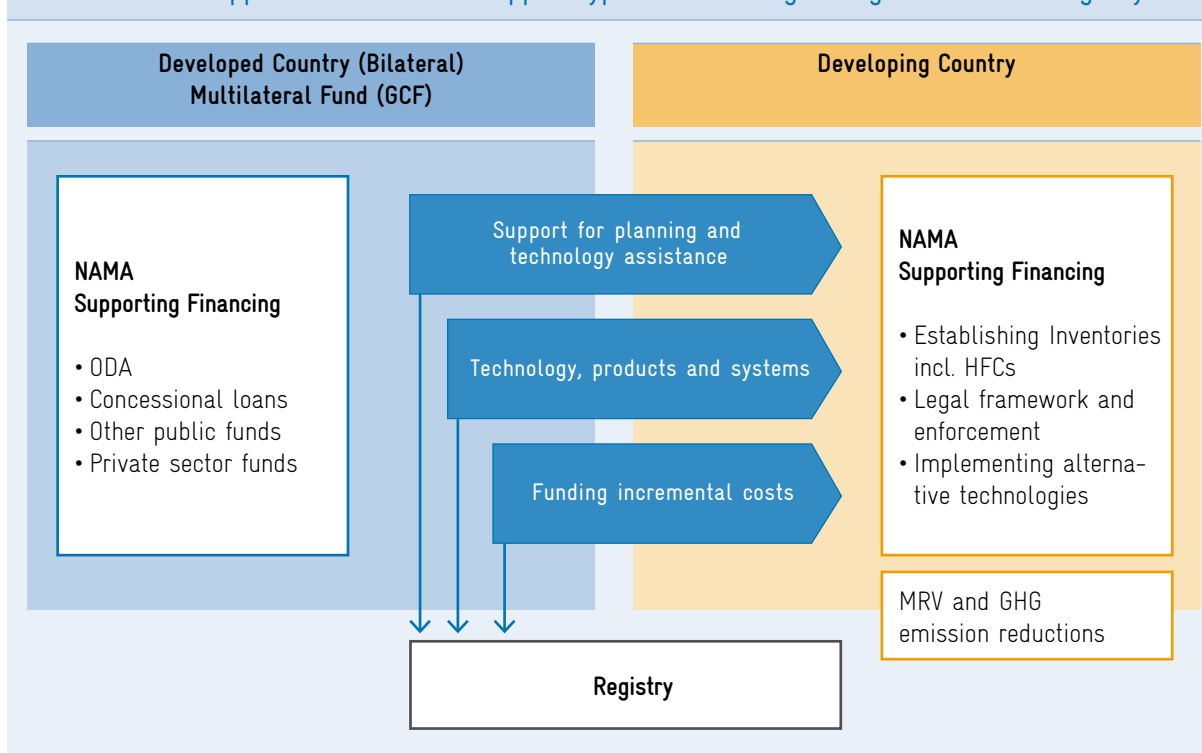
Supported NAMAs are supported with financial instruments from the international community. The funding for the support is derived either from multilateral, bilateral or private funds.

At COP16 in Cancun it was agreed to establish a NAMA registry. The formation of the registry was further confirmed during COP17 in Durban with the decision to implement a prototype registry. Consequently, a first prototype registry has been established in 2013. One of the functions of the registry is the matching of fund seeking NAMAs with supporting donors.

Supporting finance typically will be classified as official development assistance (ODA) from industrialised countries to Non-Annex I countries as per the classification of countries according to the Kyoto Protocol. The funds provided by industrialised countries will flow either via multilateral funds such as the Green Climate Fund or directly through bilateral support.

FIGURE 3

Illustration of supported NAMAs with support type and matching through the UNFCCC registry



BOX 2

Scope of the funding

The funding will support

- Planning and technological assistance,
- Climate friendly technologies, products and systems,
- Implementation of projects on a grant basis or funding of the incremental costs of climate friendly technologies (incremental costs refer to the additional costs of alternative systems over conventional systems on the basis of CO₂eq abated).

As part of the preparatory study for the review of the EU F-gas Regulation about 200 technologies were identified to replace HFCs at negative or low marginal costs per tonne CO₂eq abated (Schwarz et al., 2011).

In general, technologies deployed in the RAC&F sectors in developing countries have a significantly higher carbon footprint than technologies in industrialised countries. Industrialised countries were obliged first to phase-out chlorofluorocarbons (CFCs) and HCFCs in the RAC&F sectors and therefore had to search for alternative technologies. The EU was first to act on the phase-down of HFCs and to deploy alternatives for low carbon technologies. The EU also has led the deployment of natural refrigerants in the RAC&F sectors. Consequently, there is significant abatement potential on financing the transfer of advanced, climate friendly technologies to developing countries.

Further financial support will be required on capacity building measures, for example for the implementation of technology need assessments and for the identification of suitable technologies.

Areas to financially support the deployment of low carbon technologies can be divided in three key focus areas 1) Private equity for the support of the technology transfer, 2) Production financing targeting the transition to low carbon products and production through production conversions, 3) User based financing targeting the end users to deploy environmental technologies.

- **Private equity:** It plays a key role to finance technology innovations and to support their dissemination. Technology innovation and deployment in combination with an accelerated technology transfer can play a key role in mitigating carbon emissions from the RAC&F sectors. Initiatives to combine private equity financing with technology transfer for emissions mitigations were already launched by the Seed Capital Assistance Facility (SCAF), a Global Environment Facility (GEF) funded initiative of the United Nations Environment Programme (UNEP), Asian Development Bank (ADB) and African Development Bank (AfDB). The target was to provide public seed funding to be taken up and leveraged by private equity funds (UNFCCC 2011).

A similar seed funding facility focussing on the RAC&F sectors could effectively support the spread of innovative emission reduction technologies in the RAC&F sectors. To justify the public seed funding of such facilities, the fund would need to adhere to strict technology standards only allowing the support of technologies leading to technology breakthroughs with significant emission reductions.

- **Production Financing:** The approach of the Montreal Protocol for introducing ozone friendly technologies in the RAC&F sectors is driven by a combination of legal enforcement measures to limit the use of ozone depleting substances and technologies. In addition, the Montreal Protocol provides financing for the incremental costs of the production conversion to ozone friendly applications. Similar to measures taken under the Montreal Protocol, supporting financing under the climate regime, could provide financial support for the incremental costs of suitable alternative technologies⁵. The concept of incremental costs of alternative technologies in the context of the RAC&F sectors and emission mitigation is discussed under chapter 3 with reference to module 3 on alternative technologies. Possible financial instruments to finance incremental costs are:
 - Upfront grants for the conversion of production facilities for the production of low carbon applications, such as unitary AC appliances using R-290 instead of HFCs,
 - Concessional loans for the conversion of production facilities.

⁵ It needs to be mentioned here that the same enterprise would normally not qualify to receive funding for the reduction of ODS under the Montreal Protocol and then receive financing for the avoidance of GHG such as HFCs. In fact, such double conversion should be avoided by converting directly from ozone depleting HCFCs to ozone and climate friendly natural refrigerants or foam blowing agents.

- **User based financing:** Consumption oriented measures target the use of systems and appliances. The measures target the demand side of applications. Financial support goes to the users of the application providing incentives to purchase climate friendlier alternatives or retrofitting old units to achieve lower emissions.

Providing financial support for the demand side is more complicated than providing financial support to production facilities because typically a great number of users has to be addressed. To be effective and to limit the administrative burden of programmes, supporting measures normally target larger plants. An example of financial supporting measures is a scheme by the German Federal Office of Economics and Export Control (BAFA) for RAC applications with an annual energy consumption exceeding 150.000 kWh and an emission reduction potential of 35 %⁶. In this scheme BAFA provides financial support for up to 25 % of the upfront costs if natural refrigerants are deployed.

Of the more innovative financing instruments, leasing type financing could be suitable for areas with large dissemination potential. Through leasing arrangements a transformation can be undertaken for discounting the benefits through energy efficiency gains during the operation phase and at least partially offsetting the higher upfront costs of alternative low carbon technologies. With this financial entry hurdles could be mitigated. However, in order to install such leasing schemes, public support is required for taking the risk of leasing low carbon equipment to enterprises although these would only amortise and repay over time. The risk coverage then would also include the risk of collecting revenues from the lessee. Lessors are typically specialised financing companies with a sector specific focus.

Credited NAMAs and financing instruments

Credited NAMAs are financed through the generation of carbon certificates in national or international carbon markets or the borrowing against the future issuing of carbon credits.

As outlined in the case study above, carbon regimes theoretically could provide a sufficient incentive to initiate investments on climate friendly technologies. The CDM has generated about USD 2.2 billion of revenues per annum since its inception in 2008 (UNFCCC 2011). However, the current experience with carbon markets such as CDM and ETS, have shown that carbon markets will only function if they provide a sufficiently stable prediction for the demand of carbon credits and, consequently, on future cash flows. Banks will only lend against carbon cash flows if a stable cash flow from carbon revenues can be established. Without the prospect of a stable carbon cash flow or backing state guarantees, banks will not borrow against the cash flow and investors will not provide the upfront emission mitigation investments to reduce emissions. So far, the setup of carbon markets is not sufficiently strong enough to allow carbon markets to provide a stable basis for mitigation action. Still, carbon markets are a strong proposition within an international framework of ambitious carbon reduction targets. In this context China has taken an encouraging step with the development of the pilot carbon scheme. Combining NAMAs in the RAC&F sectors with the China carbon scheme seems to be a promising and innovative approach in this context.

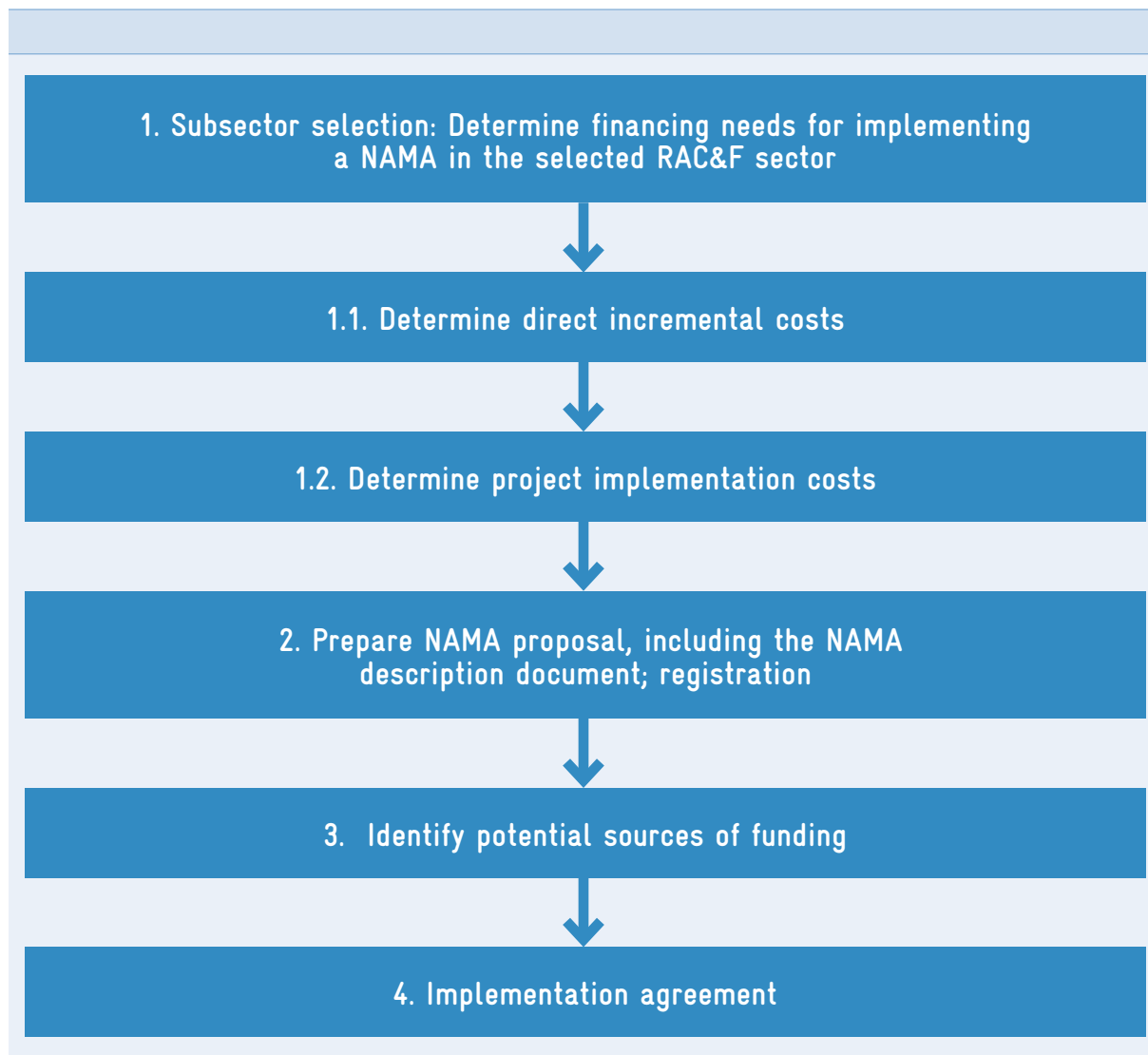
⁶ www.bafa.de/bafa/de/energie/kaelteanlagen/basisfoerderung/index.html

3. Practical application

The step-by-step process below is outlined for the formulation of a supported NAMA, seeking and matching international financial support. Similar steps should be taken for a unilateral NAMA. Within the national context, financing is provided through the implementing government, possibly supported by national financial institutions⁷.

The following step-by-step guide shows how to assess and select policy options to achieve reduction of emissions and consumption of HFCs most effectively and efficiently.

Steps for assessing costs and funding options:



Step 1: Subsector selection: Determine financing needs for implementing a NAMA in the selected RAC&F sector

In Step 1 determine the financing needs of a NAMA. For this select a RAC&F subsector, recognising among other factors the possible emission reduction potential. For example, the commercial refrigeration subsector may be selected for mitigation action. The selection of the relevant subsector typically takes place within a nationally driven stakeholder process. For the selected subsector, determine the financial needs for the transformation of the sector.

⁷ see also GIZ NAMA tool 8.2 Step 7 (2012)

1.1. Determine direct incremental costs.

In Step 1.1 establish the financing needs for the direct costs, e.g. the costs for the concerned enterprises to produce or use the alternative, low carbon technology options. Elements of these direct costs are the following:

- For the company producing the technology option: the incremental costs of the alternative low-GWP system and application costs versus the incumbent technology costs. For many alternative technology options, additional safety considerations will have to be considered which often increase the upfront costs of alternative systems.
- User level costs: including the incremental investment and operating costs of the alternative system and application costs versus the incumbent technology costs. Frequently upfront costs for users increase due to additional safety requirements and operating costs decrease due to improved energy efficiency through the use of natural refrigerants and lower refrigerant costs.

1.2. Determine project implementation costs.

In Step 1.2 reveal the project implementation costs (PIC) for carrying out a NAMA. These costs typically include the “management and policy” cost for the implementation of the NAMA and the costs for the technology assistance, such as technology transfer. These costs are different from and in addition to the more direct incremental costs for the implementation of the technology options described under step 1.1. Elements of the PIC are the following:

- **Preparatory costs** for the NAMA, including costs for the establishment of an HFC inventory as an essential part to set the baseline and the BAU in the RAC&F sectors
- **Policy and capacity building costs**, including the introduction of a system to tax or ban HFCs and rebates for climate friendly systems

There are no clearly established cost guidelines on determining the PICs, but generally a level of 5 % to 10 % of the total sector transformation costs can be considered appropriate. This level can be drawn up from related sector experiences such as carrying out technology and production transformations under the HCFC Phase out Management Plans (HPMPs) or initial costing levels for NAMAs⁸.

Step 2: Prepare NAMA proposal, including the NAMA description document; registration.

This step includes mainly the NAMA proposal to potential donors, in which you need to include the following:

- NAMA description document
- Registration type selection and outlining
- Selection of appropriate financing instruments
- Amount of financing sought and the related MRV level (UNFCCC, 2006)

Submit the NAMA to the NAMA registry of the UNFCCC to acquire international recognition and to match support; including financing, technology and capacity building, between the NAMA host country and the NAMA supporting donors. The registration is based on a NAMA design document outlining the following key parameters:

- Title
- Characteristics
- Objectives
- Implemented measures
- Management
- Key stakeholders
- Cost estimates
- (International) financing sought
- Rationale for support
- Potential sources of support
- Cost/benefits
- Financing instruments

⁸ GIZ 2012; there Table 6: Costs associated with the GIZ supported NAMA in Mexico

Step 3: Identify potential sources of funding

A long list of possible financing instruments has been discussed and outlined by COP16 (UNFCCC, 2011).

A robust MRV methodology (cf. module 7) is an essential element for the financing of a supported NAMA. The MRV results will be reviewed with the International Consultancy and Analysis (ICA) process as introduced at COP15 in Copenhagen. Appropriate MRV methodologies in the RAC&F context include the selection of measurable, quantitative monitoring parameters. An example for such a parameter is the number of old appliances and systems that have been replaced with more energy efficient equipment using natural refrigerants.

The matching between implementing and supporting countries is at the core of the supported NAMA process. Financial support can be in the form of grants in particular for the NAMA preparation and capacity building and for concessional loans such as favourable loan conditions for the introduction of low-GWP equipment. It can also cover incentives and mobilisation of private investments. Possible donors to finance NAMAs include – but are not limited to – bilateral financing (i.e. Annex I country supporting Non-Annex I country), multilateral financing such as through the Green Climate Fund or GEF, or financing through regional developing banks such as ADB, IADB, etc. The registry is meant to actively support the matching process between donors and countries seeking support.

Step 4: Implementation agreement

Once the match making has taken place, you should arrange for an implementation agreement to be decided upon, defining the targeted milestones. Such an agreement will be an important reference document for the ICA process. Also, make sure that efforts made by the receiving as well as the supporting country are mentioned in the National Communications to the UNFCCC.

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