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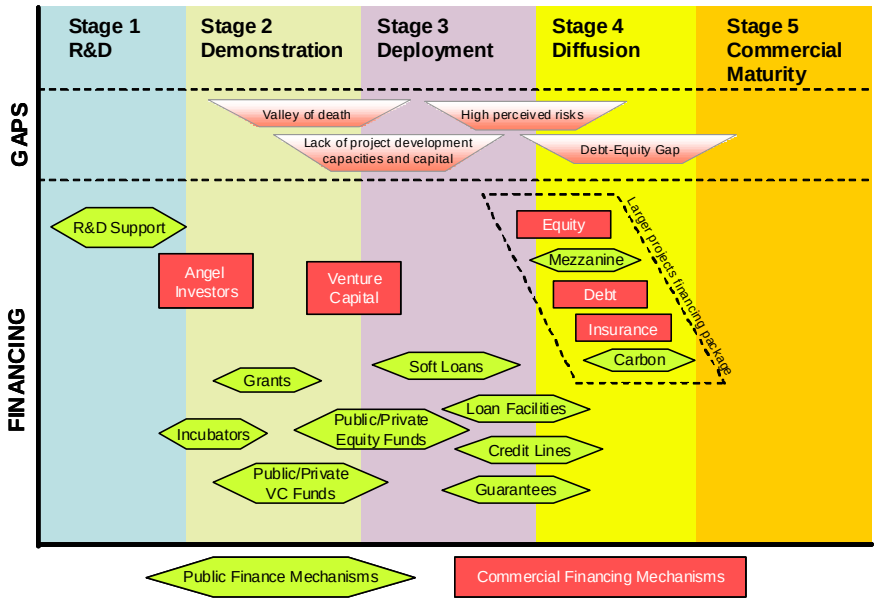
PUBLIC FINANCE MECHANISMS TO MOBILISE INVESTMENT IN CLIMATE CHANGE MITIGATION

An overview of mechanisms being used today to help scale up the climate mitigation markets, with a particular focus on the clean energy sector.

UNITED NATIONS ENVIRONMENT PROGRAMME

ADVANCE DRAFT

PUBLIC FINANCE MECHANISMS TO MOBILISE INVESTMENT IN CLIMATE CHANGE MITIGATION



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SEFI SUSTAINABLE ENERGY FINANCE INITIATIVE

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Executive Summary

In August 2007, the Secretariat of the United Nations Framework Convention on Climate Change (UNFCCC) published a technical paper, *Investment and Financial Flows to Address Climate Change*, which estimated that USD200-210 billion in additional investment will be required annually by 2030 to meet global greenhouse gas (GHG) emissions reduction targets. The technical Paper concludes that the **lion's share will need to come from the private sector** and that it will require substantial additional **public funding to mobilise and leverage that private capital**.

Parties to the UNFCCC are currently assessing how to respond to this challenge. Discussions focus on new financing resources and vehicles to support the development, deployment, diffusion and transfer of climate-friendly technologies in developing countries. Key questions include: What should be the scale of new financing by governments? How can public monies **mobilise and leverage sufficient commercial capital** to achieve greenhouse gas emissions reduction objectives? In other words: **how can the most be made of those new financing resources?**

Much of this government support will be used to set up or expand existing Public Finance Mechanisms (PFMs) aimed at climate change negotiation. These PFMs vary in their structure and focus, but all broadly seek to mobilise commercial financing and build commercially sustainable markets for GHG mitigation activities. Examples of climate mitigation focused PFM include:

- ***Credit lines*** to local commercial financial institutions (CFI) for providing both senior and mezzanine debt to projects;
- ***Guarantees*** to share with local CFIs the commercial credit risks of lending to projects and companies;
- ***Debt financing*** of projects by entities other than CFIs;
- ***Private equity (PE) funds*** investing risk capital in companies and projects;
- ***Venture capital (VC) funds*** investing risk capital in technology innovations,
- ***Carbon finance*** facilities that monetize the advanced sale of emissions reductions to finance project investment costs;
- ***Grants*** and contingent grants to share project development costs, and
- ***Loan softening programmes,*** to mobilise domestic sources of capital,
- ***Inducement prizes,*** to stimulate R&D or technology development,
- ***Technical assistance*** to build the capacity of all actors along the financing chain.

There is a **substantial body of experience** with the use of these PFMs for promoting investments in energy efficiency (EE) and renewable energy (RE) technologies, in particular. Various mechanisms are needed to enable the development and deployment of technology along the **technology innovation pathway**. In developing countries PFMs have mostly been used to support technologies that are in the later stages of innovation but are still facing significant market barriers that inhibit their deployment. In developed countries some mechanisms are also targeting investments in pre-commercial technologies that have yet to enter the market.

If well managed, PFMs can bring down market barriers, bridge gaps and share risks with the private sector. To be successful, however, rather than operating in isolation they **must be aimed at complementing national policy instruments** such as regulations, taxes and market mechanisms. Their role is to help commercial financiers act within a national policy framework, filling gaps and sharing risks where the private sector is initially unwilling or unable to act on its own.

Besides being aligned with policy frameworks, PFMs must also be structured to act along the entire chain of **financial intermediation,** which can include development finance institutions (DFIs), CFIs, investors, equipment manufacturers and technology delivery companies. In **many cases technical assistance (TA) programmes are needed** to build the capacities of these market actors to create a pipeline of investment-ready projects, a pre-condition for leveraging commercial funding.

A key question is how much commercial financing can be **mobilised and leveraged** by a given amount of public money? An assessment of experience with a number of different models of PFMs shows that typical leverage ratios range from 3 to 15:1. Based on this assessment, it is estimated that if a concerted programme of PFMs were scaled up, **USD10 billion in public monies could leverage USD50-150 billion** in total investment in the climate mitigation sectors.

This estimate is conservative in that it does not take into account the fact that many PFMs "roll over", supporting multiple generations of investments, and help create markets that continue to grow after the public funds are expended or recouped. It is important, however, to consider that such calculations represent programme capacity: the actual amount of capital mobilised depends on the size of the pipeline of bankable projects seeking investment. This **supply** of capital needs a corresponding **demand** for financing if programme leverage is to be achieved.

In addition to leverage, other factors that determine how successful a PFM will be in catalysing clean energy market growth include:

- long-term **effectiveness** – does the financial mechanism target the most reliable technologies and promising projects, and leave a financially sustainable market in place upon its completion?

- **fairness and equity** – is the finance mechanism adaptable to local market conditions and implemented in ways that maximise social and economic development co-benefits?

Table 1 lists some of the most common PFMs used today in the energy efficiency and renewable energy sectors and summarises the barriers and market segments they address.

Most have been used in a range of countries and some have the track record to justify replication and scaling up.

It has been found that PFMs at any scale can be made most effective and efficient if they:

- Accurately assess technology *market barriers* and financial *market conditions*;
- Target market segments where the project *economics are compelling*;
- Take a *programmatic approach* to financial mechanism design;
- Use and *strengthen existing capacities* throughout the chain of financial intermediation;
- Address the lending or *investment criteria* of commercial financial actors;
- Define *project responsibilities* based on a complete roles and risk analysis;
- Include marketing and *market aggregation plans*; and
- Develop plans for public or donor-supported *technical assistance programmes* to build capacities, fill gaps, and take on any roles or risks not assumed by commercial parties.

The purpose of this report is to provide an overview of PFMs that mobilise and leverage commercial financing, build commercially sustainable markets, and increase capacity to deliver clean energy and other climate-mitigation technologies, projects and businesses. These mechanisms can play a prominent role in the implementation of an international mitigation strategy.

The report is based on a substantial body of experience in a wide variety of developed and developing countries. It suggests ways in which PFMs could be used at the national and international scale, offers scale up and replication strategies, and identifies how they might fit into a new financial framework under the UNFCCC.

UNEP and Public Finance

Changing attitudes and helping mainstream financiers to consider low carbon investments are key components of the energy and climate work within UNEP and the starting point for the UNEP Sustainable Energy Finance Initiative. SEFI provides current and targeted information to financiers and facilitates new economic tools that combine social and environmental factors – both risks and returns – as integral measures of economic performance. In the area of public finance, UNEP has recently set up the SEFI Public Finance Alliance (SEF Alliance), a partnership of public finance agencies focused on clean energy and climate sector development. This report, as well as a number of others on the public finance topic (available at www.sefalliance.org), builds off the experience of these members, the development finance community and other actors working to shift private sector investment towards a more sustainable development path.

Table 1: Overview of Public Finance Mechanisms

Mechanism		Description	Barriers	Financial Markets	Sectors
Debt	**Credit Line for Senior Debt**	Credit line provided to CFIs for on-lending to projects or corporations in the form of senior debt	CFIs lack funds and have high interest rates	Underdeveloped financial markets where there is lack of liquidity, particularly for long term lending, and borrowing costs are high	Large-scale RE and EE; wholesale loans for energy access markets
	Credit Line for Subordinated Debt	Credit line to CFIs for on-lending to projects with subordinated repayment obligations	Debt-Equity gap, whereby project sponsors lack sufficient equity to secure senior debt	Lack of liquidity in both equity and debt markets	Medium and small-scale
	Guarantee	Shares project credit (i.e. loan) risks with CFIs	High credit risks, particularly perceived risks	Existence of guarantee institutions & experience with credit enhancements	Large-scale RE and EE and energy access markets
	Project Loan Facility	Debt providing by DFIs directly to projects	CFIs unable to address the sector	Strong political environment to enforce contracts and enabling laws for special purpose entity	Large and Medium scale EE and RE
Equity	**Private Equity Fund**	Equity investments in companies or projects	Lack of risk capital; restrictive debt-to-equity ratio	Highly developed capital markets to allow equity investors to exit from the investee	Large scale grid-connected RE; energy companies
	Venture Capital Fund	Equity investments in technology companies	Lack of risk capital for new technology development	Developed capital markets to allow eventual exits.	Any new technology
Carbon	**Carbon Finance**	Monetisation of future cash flows from the advanced sale of Carbon Credits to finance project investment costs	Lack of project development capital; lack of cash flow for additional security; uncertain delivery of carbon credits	Availability of underlying financing for projects. Adequate institutional capacity to host CDM/JI project and to enforce contracts.	Large-scale RE and EE; programme of activities such as in energy access markets
	Carbon Transactions in post-2012 credits	Contracting for the purchase of Carbon Credits to be delivered after 2012	Lack of regulatory framework and short-term compliance driven buyers.	Availability of underlying financing. Adequate institutional capacity to host CDM/JI project and to enforce contracts.	Any GHG emissions reduction project.
Innovative Grants*	**Project Development Grants**	Grants "loaned" without interest or repayment until projects are financially viable	Poorly capitalised developers; costly and time consuming development process	Can be needed in any financial market context	Any sector
	Loan softening programmes	Grants to help CFIs begin lending their own capital to end-users initially on concessional terms.	Lack of FI interest in lending to new sectors; limited knowledge of market demand.	Competitive local lending markets	Medium and small scale EE and RE
	Inducement Prizes	"Ex-ante prizes" to stimulate technology development. Unproven in climate sector.	High and risky technology development costs and spill-over effects	Sufficient financing availability to deploy winning technologies	Any technology sector
	** Although all PFMs are concessional in some way, and therefore include some grant component, these grant based mechanisms do not include an underlying financing component, as this capital is expected to be mobilised commercially by the target CFIs.*				

List of Acronyms

ADB	Asian Development Bank
CCS	Carbon Capture and Storage
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CFI	Commercial Financial Institution
DEDE	Department for Alternative Energy Development and Efficiency
DFI	Development Financial Institution
EE	Energy Efficiency
ESCOs	Energy Service Companies
FDI	Foreign Direct Investment
GEF	Global Environment Facility
GHG	Greenhouse Gas
IET	International Emission Trading
IFC	International Finance Corporation
JI	Joint Implementation
MIGA	Multilateral Investment Guarantee Agency
ODA	Official Development Assistance
PE	Private Equity
PFM	Public Finance Mechanism
RD&D (R&D)	Research Development and Deployment (Research and Development)
RE	Renewable Energy
SEF Alliance	SEFI Public Finance Alliance
SEFI	Sustainable Energy Finance Initiative
TA	Technical Assistance
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
VC	Venture Capital
WB	World Bank

Introduction

In August 2007, the Secretariat of the United Nations Framework Convention on Climate Change (UNFCCC) published a technical paper, *Investment and Financial Flows to Address Climate Change,* which estimated that USD200−210 billion in additional investment will be required annually by 2030 to meet global greenhouse gas (GHG) emissions reduction targets. The technical paper concludes that although the lion's share of this investment will need to come from the private sector, substantial additional public funding will be required to mobilise and leverage that needed private capital.

Parties to the UNFCCC are currently assessing how to respond to this challenge. Discussions focus on new financing resources and vehicles to support the development, deployment, diffusion and transfer of climate-friendly technologies in and to developing countries. Key questions include: What should be the scale of new financing by governments? How can public monies mobilise and leverage sufficient commercial capital to achieve GHG reduction objectives? In other words: how can the most be made of those new financing resources?

A wide range of Public Finance Mechanisms (PFMs) exist that catalyse commercial investment in low-carbon technologies and projects. The purpose of this report is to provide an overview of those PFMs that mobilise and leverage commercial financing, build commercially sustainable markets, and increase capacity to deliver clean energy and other climate-mitigation technologies, projects and businesses. These mechanisms can play a prominent role in the implementation of an international mitigation strategy.

The report is based on a substantial body of experience with PFMs that have been used to mobilise investment in renewable energy (RE) and energy efficiency (EE) technologies in a wide variety of developed and developing countries. The report summarises the rationale and design criteria for PFMs, describes a range of mechanisms, and offers strategies for their scale up and replication, should they be included in a new financial architecture under the UNFCCC.

Although the focus on this document is mostly on PFMs used with low-carbon energy technologies, the mechanisms presented to a large extent are technology neutral and could be used for other areas of climate mitigation as new low-carbon technologies and processes are developed and become ready for implementation at scale.

Part I Rationale and Framework for Public Finance Mechanisms

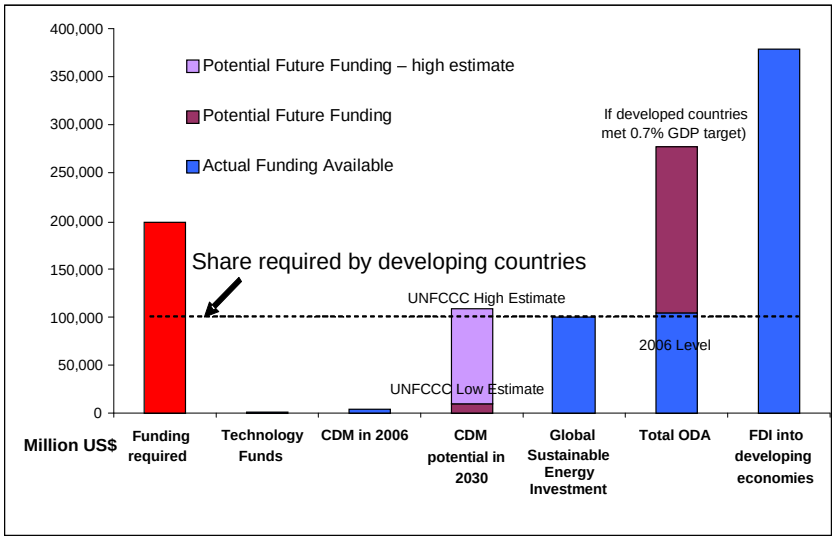
1.1 The financing challenge

1.1.1 Climate mitigation investment – how much will be needed?

Climate change mitigation requires investment in a range of technologies, projects and businesses in a variety of economic sectors including energy supply and distribution, industry, buildings, transport, waste, agriculture and forestry. Investment is needed throughout the cycle of innovation and market transformation, from research and development (R&D) through to demonstration, deployment, diffusion and commercial maturity.

The specific investment needs are challenging, but not overwhelming. For seven major GHG emission sectors, the **additional** investment requirements by 2030 have been estimated annually at (UNFCCC, 2007):

- industry (USD36 bn),
- buildings (USD51 bn),
- transport (USD88 bn),
- waste (USD1 bn),
- agriculture (USD35 bn),
- forestry (USD21 bn), and
- technology RD&D (USD35−45 billion).



Sources: New Energy Finance, WRI, UNCTAD Statistics, UNFCCC and World Bank

Figure 1: Global Investment Requirements for Climate Mitigation

The largest climate mitigation sector, energy supply, is actually expected to see an overall decrease of USD67 billion in investment requirement, due to increased energy efficiency and biofuels usage. In total about USD200 billion in additional investment needs to be mobilised annually. This does not include the underlying investment that the various sectors would normally need to mobilise regardless of climate considerations. For instance in the power sector when the underlying investment requirements are added to the additional 'decarbonisation' costs, about USD148 billion out of USD432 billion of projected annual investment is predicted to be low carbon (i.e., renewables, carbon capture and storage (CCS) and nuclear energy). These amounts are large relative to the funding mechanisms already established under the UNFCCC and Kyoto Protocol, but small (0.3 to 0.5 percent) relative to global GDP in 2030. Figure 1 provides a comparison of these investment requirements with other funding levels or targets.

1.1.2 What are the financial obligations of developed countries under the Convention and the Kyoto Protocol?

Developed countries are required to provide new and additional financial resources to meet the agreed costs of developing countries in complying with their obligations under the UNFCCC. This includes implementing measures to mitigate climate change by addressing

anthropogenic emissions by sources, such as fossil fuel combustion and removals by sinks (UNFCCC 1992). Developing countries may avail themselves of financial resources related to the implementation of the Convention through bilateral, regional and other multilateral channels. The Kyoto Protocol added three financial mechanisms to this mix – the Clean Development Mechanism (CDM), Joint Implementation (JI), and International Emissions Trading (IET) - to help developed countries comply with their qualified emission limitations and reduction commitments under the Protocol and developing and transition countries, in the case of the CDM and JI, respectively, achieve their sustainable development objectives (UNFCCC 1998).

1.1.3 Where has financing for mitigation historically come from and what new sources of funds are under consideration?

Financing for climate change has generally flowed from four sources: (i) internally generated sources of funds, including private sector and public sector financing; (ii) foreign direct investment; (iii) the carbon market; and (iv) bilateral and multilateral development assistance, including the Global Environment Facility (GEF). Each of these sources is expected to continue to play a critical role in the future climate regime. Overall investment in renewable energy and energy efficiency has increased dramatically in recent years (see figure 2), up more than five times globally and fourteen times in developing countries between 2004 and 2007 [UNEP, New Energy Finance 2008]. About 94 percent of this investment in 2007 came from the private sector. Private sector investment and the carbon market, however, are unlikely to meet the needs of many countries and sectors, particularly those in early stages of development. For many developing countries, and particularly the least developed countries, increased Official Development Assistance (ODA) and concessional financing or an expanded CDM will be required. New ways to generate these sources of funding will be needed and funds made available will have to be allocated effectively and efficiently.

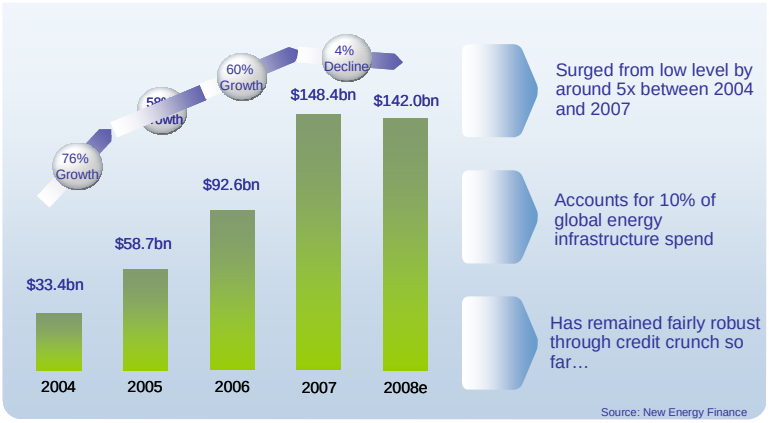
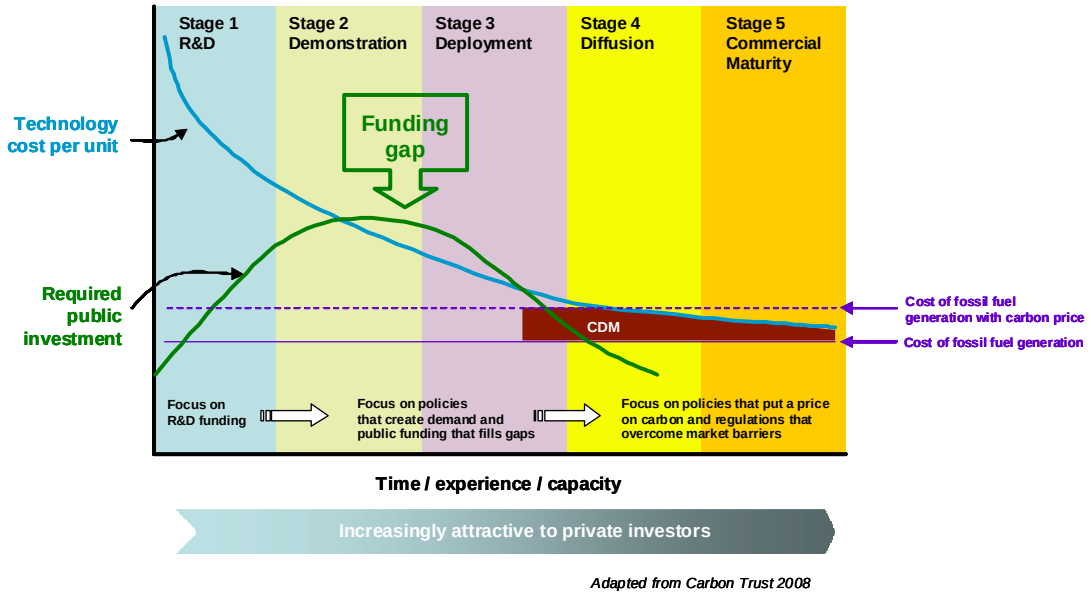


Figure 2: Global New Investment in Sustainable Energy, 2004 – 2008

Developed and developing countries and the environmental community have put forth a number of proposals to expand the sources of funds.[1] Examples of these options include: expanding the CDM, new bilateral and multilateral funds, auctioning of emission allowances, international air travel levy, extension of the two percent levy on CDM to other market mechanisms, funds drawn from foreign currency reserves, and donated special drawing rights. Some of these options, such as the auctioning of a share of emission allowances, could generate revenues commensurate with the additional needs. Each option faces unique technical and political barriers which will need to be addressed before a consensus is likely to be reached. If additional funds are available and applied through effective PFMs that leverage private capital five to ten times, then the USD200 billion capital mobilisation challenge may be achievable.

[1] Annex B provides a summary of these proposals.



Adapted from Carbon Trust 2008

Figure 3: The Funding Gap along the Technology Innovation Path

1.2 Policy frameworks and the technology innovation pathway

The process of developing and deploying new technologies and transforming the markets needed to achieve climate mitigation goals follows an innovation pathway consisting of: (1) R&D, (2) demonstration, (3) deployment, (4) diffusion, and (5) commercial maturity [Haites et al, 2008]. An evolving mix of policy and support instruments are needed to help technologies progress down this pathway, including regulations and codes, fiscal incentives, PFMs, market mechanisms, voluntary agreements and information dissemination.

The most important role of government should be creating the enabling policy framework. The correct policy mix must evolve over time, as technologies and markets mature, volumes increase and cost reductions are realized. In simple terms, during the RD&D stages, policies are needed that support innovation and accelerate technology development. During the initial deployment and early diffusion stages, policies are needed that foster an initial demand for the technology and bring down barriers to its market entry. Once the technology is ready for wider diffusion, including transfer to other countries, policies are needed that put a price on carbon and address other market failures such as perverse subsidies.

For many countries, however, enabling policies on their own may be insufficient to mobilise the many types of investment needed to move a technology from innovation to deployment to market transformation. As technologies move out of the laboratory into the early commercialisation stages, private capital may be hard to secure because of business, technology and policy risks, high initial production costs and a wide range of market barriers. Funding gaps create a 'valley of death' that prevents many promising technologies from making it to market. Public funding and related interventions are therefore needed to bring down market barriers, bridge gaps and share risks with the private sector. Figure 3 provides a visual description of where public investment is most needed. This stretches across the demonstration and initial deployment stages and through early diffusion when the technology is being deployed commercially, but has not achieved the volumes and cost reductions necessary for it to be fully competitive with conventional technologies, even with the price of carbon factored in. Across these stages, market inefficiencies and barriers to

Box 1: Example Credit Line – Thailand Energy Efficiency Revolving Fund

The TEERF has been established by the Government of Thailand and managed by the Ministry of Energy, Department of Alternative Energy Development and Efficiency (DEDE). The Fund receives revenues from a petroleum tax, yielding approximately USD50 million per year and presently having an accumulated balance of approximately USD350 million. The Fund provides credit lines to participating Thai banks on a full-recourse basis and at zero interest rate with the requirement that the funds be on-lent to project borrowers at an interest rate of no more than four percent. The Fund initially (2003-2007) provided up to 50 percent of on-lent capital, with the remaining coming from the bank's own resources; in its second phase, the Fund is reducing its share to 30 percent.

Six major Thai commercial banks are participating in the programme. The banks are responsible for most aspects of the lending process, including marketing, appraisal and credit approval, and, loan collections and enforcing all remedies in default events. DEDE assists banks with technical appraisals of projects, which has proved an important component of Fund operations. The Fund is also used to pay for technical assistance programmes, such as energy audits and project feasibility studies.

deployment will usually necessitate different forms of PFMs to get technologies through to the scaled-up diffusion phase.

Even once they are commercially proven, PFMs are often still needed in the diffusion and commercialisation stages to overcome a variety of market barriers that prevent clean technologies from achieving their full economic and environmental potential. Figure 4 shows a simple mapping along the technology innovation pathway of some of the most pressing gaps that hinder commercial investment mobilisation and some of the PFMs that are being used today to address these gaps.

1.3 Introducing Public Finance Mechanisms

1.3.1 Objectives of PFMs

PFMs used for climate mitigation purposes have a twofold objective: first, to directly mobilise or leverage commercial investment into low-carbon technology innovation and deployment and, secondly, to indirectly create scaled up and commercially sustainable markets for these technologies. To make the best use of public funding, it is essential that both these direct and indirect outcomes are sought when designing and implementing clean energy or other climate-focused PFMs. Direct short-term benefits should not create market distortions that indirectly hinder the growth of sustainable long-term markets.

PFM Objective 1 – Directly Mobilising Commercial Investment

Within a broad-based climate mitigation strategy, the main role of PFMs is to address financing gaps where the private sector is unable or unwilling to provide capital on a purely commercial basis. The quantum of private capital mobilised by public funding, described as leverage, needs to be carefully addressed in the design of PFMs. If a specific mechanism can leverage commercial investment by 3 or 4 to 1 (which credit lines, for example, typically achieve), then public funding of USD1 billion for its implementation would directly mobilise USD3–4 billion in total climate mitigation investment. This ratio can be higher or lower depending on the structure of the programme and will vary for different mechanisms and local contexts. Furthermore, many PFMs "roll over" and support multiple generations of

investments before they are fully expended and so the long-term capital mobilisation can be significantly larger.

An example of the leveraging effect is shown in Box 4 for a partial credit guarantee where the ratio of total project investment to public money is 15:1.

PFM Objective 2 – Scaling-Up Sustainable Markets

Besides directly mobilising investment, PFMs also aim to indirectly scale up climate mitigation markets by helping key actors up the experience curve and technologies down the cost curve. For instance, when a CFI becomes engaged in climate mitigation sectors through the support of PFMs, it builds and improves its capacities to deliver capital to these markets. It establishes relationships with first movers in industry, gains experience with managing the risks, and learns where new profitable lines of business lie. As a result, it will likely continue to provide financing after the PFM is phased out – provided the mechanism is well designed. Technical assistance and capacity building are critically important to achieve this objective. As the CFI gains market experience, it rolls out new climate finance products across its branch and subsidiaries. As this experience is made public, more CFIs may be encouraged to enter the market.

Programme evaluation methods can be used to assess these indirect impacts, for example, measuring the volume of transactions participating CFIs undertake after programme support as ended, the number of new CFIs entering the market, the numbers of CFIs and climate businesses receiving training, and increases in business activity market wide.

1.3.2 PFMs and the Chain of Financing

Since the main role of PFMs is to mobilise commercial capital flows, the chain of financing through which they channel and leverage support is a critical element of mechanism design and the key to building commercially sustainable markets and market actors.

PFMs are most frequently operated by DFIs, but a number of other institutional models are also being used, including national investment authorities, energy management agencies and public-private investment companies. All of these entities use public grant monies, either directly or blended with more commercial investment instruments, to provide softer terms and/or to accept greater risks; grant monies are also used for technical assistance, capacity building and programme operating costs. These entities often channel their support through CFIs, who in turn provide adapted financial products to climate mitigation

Box 2: Combining Finance Supply and Demand Strategies – The CORFO Experience

The Chilean Economic Development Agency (CORFO) has since 2005 been offering credit lines to commercial banks for on-lending to RE projects. These credit lines offer banks a 30 month grace period and repayment terms of up to 12 years, allowing them to on-lend up to USD5 million (soon USD13 million) to individual projects. To ensure the uptake of this bank financing, CORFO also offers project preparation matching funds for early stage project development activities such as resource assessment, feasibility and environmental studies, and CDM documentation. Advanced project development activities are eligible for cost-sharing up to a maximum of 5 percent of the estimated investment. To date over 100 project developments have been supported with 15 projects now in construction or already operational.

Box 3: India Renewable Energy Development Agency (IREDA)

IREDA is a Government-owned company incorporated in 1987 that provides debt financing to RE and EE projects. IREDA has built up is own staff capability to originate clean energy project investments - projects as small as USD200,000 and as large as USD25 million. IREDA invests mainly as a senior lender, lending up to 80 percent of a project's investment cost on terms up to 10 years with up to two year grace periods. IREDA also makes technical assistance funding available to help prospective project sponsors and build up the pipeline of prospective investments. Funded projects total over USD1 billion and have included wind, hydro, bio-mass cogeneration, industrial waste heat recovery power plants, industrial process efficiency. It has received international credit lines from the World Bank, ADB and KfW, amongst others, as well as grant support from the GEF. About one third of its capital is now raised domestically, both through bank borrowing and the issuance of tax free bonds. In India, State governments are now authorised to establish energy conservation funds; IREDA, as a national entity, has potential to replicate its capability by supporting development of such State funds.

investments in their respective markets.
The typical chain of financing can be depicted simply as follows:

Public monies → DFI → CFI → projects

Public monies are typically provided as grants from a funding body to the DFI; the DFI provides the PFM to the CFI; the CFI provides structured adapted financing to the projects. The sequence in the chain will vary for different mechanisms, applications and circumstances. For example, DFIs could invest directly in projects, which is common for larger grid-connected renewables, for example. In addition, a wider range of development actors including UNEP are now focusing increasing efforts on mobilising climate investment, mostly through different forms of finance sector engagement and institutional strengthening activities.[2] But, the general point remains: the design of successful PFMs needs to plan for the full chain of financial intermediation, including the last step, where the actual project investment occurs and is managed on the ground.[3]

An example analysis of the chain of financing and resulting leverage is illustrated in Box 4. This example illustrates several principles behind the design and operation of PFMs:

- the catalytic role of public funding in assuming extra risks within the investment structure and to fund the costs of programme operations, technical assistance and capacity building;
- the role of the DFI or other public finance entity to provide a tailored PFM (guarantees in this case) to local CFIs and combine this with technical assistance to structure transactions, turn individual transactions into replicable financial products, create marketing relationships between the CFIs and the technology vendors, and hence to develop a commercially viable business line for the partner CFIs;
- the "branching" effect, which means that the DFI works with multiple FIs and each FI can offer a series of financial products to various market segments;
  the leveraging of the public monies through the chain of financing.

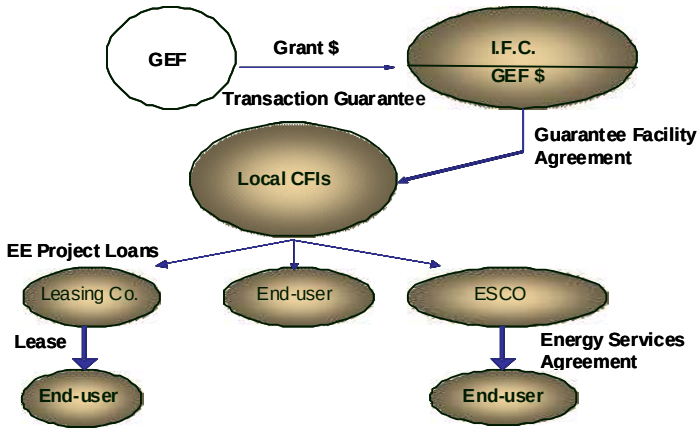
[2] UNEP finance industry engagement platforms include the Sustainable Energy Finance Initiative and the UNEP Finance Initiative. An example institutional strengthening programme is the Capacity Development for the CDM (CD4CDM) initiative.

[3] When discussing various aspects of PFMs, it is important to locate which level or step in the chain one is addressing; using this discipline and framework will aid dialogue on these matters.

Box 4: IFC Partial Credit Guarantees –
Mobilising investment through the chain of financing

IFC has been operating EE finance programmes using partial credit guarantees (PCGs) in 7 countries. These programmes employ the following chain of financial intermediation:

(1) The GEF provides grant funding to IFC. These funds are used (i) as reserves backing a portion of IFC guarantee liabilities, and (ii) for technical assistance and programme operating costs.
(2) IFC provides guarantees to local FIs (although one local FI is shown, multiple FIs are participating).
(3) Local FIs use the risk sharing support from IFC to provide financing to various EE market segments, including residential, commercial, industrial, municipal, energy supply and distribution. Multiple financial products have been used.
(4) Over time, the guarantees from IFC can be phased out as familiarity with these sectors improves and risk perceptions decrease. When effectively structured, one dollar in GEF funds can directly leverage USD12−15 of commercial investment into EE projects and indirectly catalyze long term growth of financial commitments to the sector.



Guarantee Structure & Leveraging: Example

		Program	Notes
1	Public funding for Guarantee Reserves	$20,000,000	
2	DFI Guarantee Commitment	$100,000,000	5:1 ratio; (typical)
3	Total Guarantee Capacity (maximum)	$120,000,000	
4	Ratio of DFI to Public Funding	5	ratio line 2 to 1
5	Average Guarantee Percentage, offered to CFI	50%	
6	Max. Loans CFI can offer with the guarantee	$240,000,000	
7	Average ratio of Debt in each Project Financing	80%	
8	Total Maximum Project Financing Supported	$300,000,000	
9	Ratio of Public funding to total project investment	15	ratio line 8 to 1

Box 5: End user financing within a broader strategy – The Prosol Experience In Tunisia

The Tunisian Prosol Solar Water Heating Loan programme brought together households with local industry (to sell and service systems); commercial FIs (to provide the financing); the electric utility (loans repaid through utility bills); the energy ministry (to correct a subsidy distortion); and UNEP and the national energy management agency (to manage the PFM). This partnership of financial supply side and demand side actors were able to increase the Tunisian solar water heating market by 800 percent over 3 years. Similar approaches are now being taken in 11 other countries.

1.3.3 More than just money – the importance of capacity building and technical assistance

PFMs organise and systematically deliver project development services and financing to implement multiple projects in a specific target market. Access to finance is necessary, but alone is not sufficient to get clean energy or other low-carbon projects implemented and to scale-up these new climate markets. Successful mechanisms typically combine (i) access to finance with (ii) technical assistance programmes designed to help prepare projects for investment and build the capacity of the various actors involved.

Many examples exist of finance facilities that were created, but did not disburse because they failed to find and generate sufficient demand for the financing. Successful PFMs actively reach back into the project development cycle to find and prepare projects for investment; that is, they work on both the *supply* and the *demand* side of the financing equation. Strategies to generate a flow of well-prepared projects for financing can involve partnerships with many market actors such as utilities, equipment suppliers and project developers, end user associations, and governmental authorities. This is the important final step in the chain of financial intermediation, where the low carbon investments get made, the market learns by doing, and the Public Finance Mechanism begins to achieve its objectives.

1.4 Selecting PFMs to fit the local context

The selection and design of the most appropriate PFMs for a given context requires the evaluation of (i) the level of technological maturity, (ii) the characteristics of the target market segment and (iii) the country conditions, including the macro-economy, institutional structures and the maturity of the financial system. The following sub-sections examine how PFMs can be selected against these three broad areas of criteria.

1.4.1 Selection Characteristics Based on Level of Technological Maturity

Figure 4 presents the innovation pathway discussed in Section 1.2 with some of the common financing gaps and barriers shown that hinder private investment mobilisation. The figure also shows what financing is typically available through commercial sources and some of the PFMs that can be used to fill the gaps.

During the pre-commercialization stages the principle funding gap arises as technologies move out of the laboratory, creating a 'valley of death' that hinders technology innovations from getting to the deployment stage. Although at this stage the technologies are advanced enough that their application can be demonstrated, business risks are significant because of high costs of production and low market demand.

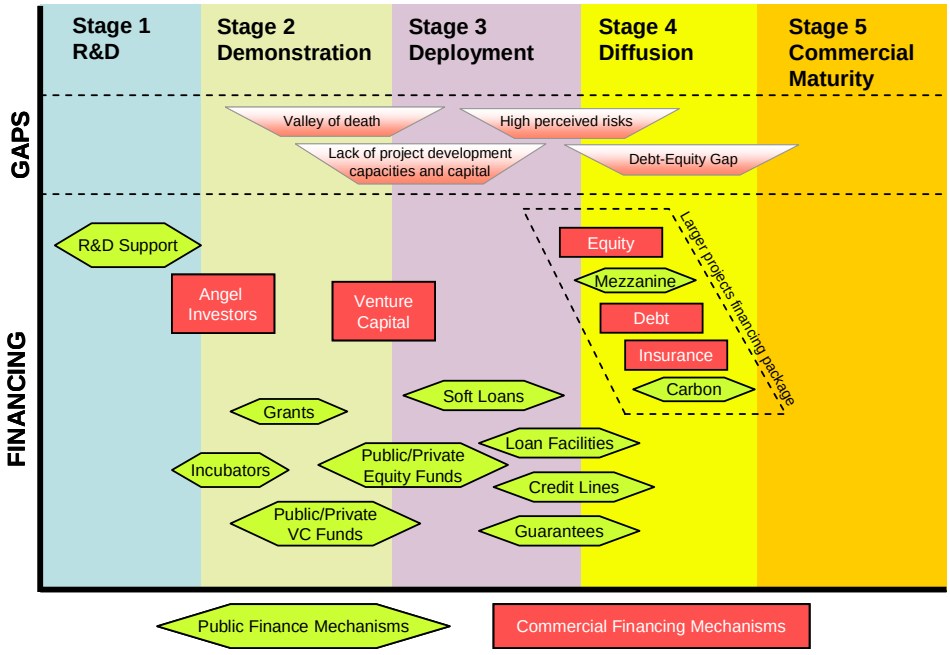


Figure 4: Positioning PFMs to Address Financing Gaps

A broad range of public interventions can be used to address the pre-commercialization valley of death financing gap. Technology incubators, public venture capital and private equity funds, innovative uses of grant and soft loan funding and new instruments such as inducement prizes can all be instrumental in addressing this pre-commercialisation gap. In mature financial markets the right mix of regulations, carbon pricing mechanisms and fiscal policies may enable most capital needs to be provided by the private sector and to drive demand for their products. In less mature financial markets, including most developing countries, public funding mechanisms are absolutely necessary, both to make up for a lack of private capital providers and to compensate for imperfect and evolving policy environments. Private investors seeing the commitment of national governments or multilateral institutions will then often follow suit and join a project or nascent market, knowing that some of the early policy and commercial risks will be shared by other players.

Once commercially proven, public finance instruments then shift from being technology focused to supporting projects or enterprises in deploying and diffusing low carbon technologies. PFMs are needed to assist project preparation activities particularly with small developers who lack project development capital. PFMs can play a role in helping developers make it to financial closure by cost-sharing some of the more costly and time intensive project development activities such as permitting, power purchase negotiations, grid interconnection and transmission contracting. These PFMs can be on a grant, contingent grant, or soft loan basis and must be carefully structured to target the right projects and align interests on project development.

Within the full financial structure of projects, PFMs are also required to address the widening debt-equity gap, the lack of dedicated risk management options and in some countries the pure lack of liquidity or capacity amongst CFIs to provide financing to climate projects. While the gaps vary according to the local financial market conditions, the financial position of the project developers, and the size of projects, they are commonly characterized

by high up-front capital costs and often long-term financing needs. PFMs in the form of credit lines, guarantees and project equity can be structured to close this gap.

1.4.2 Selection Characteristics Based on Market Segment

The clean energy sector consists of a diverse set of sub-markets. For financing purposes, projects can be simplistically categorised as i) large scale or ii) medium, small and micro scale.

Large scale grid-connected Renewable Energy and Industrial Energy Efficiency projects. Large scale RE and EE projects in the range of USD20-100+ million can sometimes access commercial debt financing in middle-income countries when the policy and market conditions are right, e.g., concerning feed-in tariffs, power purchase terms, transmission/grid access, permitting procedures, site access, etc. These projects are sufficiently large that they can be financed on a single one-off project finance basis and may be attractive for CFIs to finance on purely commercial terms. However, various market barriers still exist that hinder investment.

Barriers and gaps associated with large-scale projects include lack of project sponsor equity, lack of long-term local currency financing options, foreign exchange risks for foreign currency loans, lack of appropriate instruments to manage commercial and political risks, and high transaction costs and timing uncertainties all along the project development cycle. Commercial market barriers to large-scale project finance are not as significant as those faced by medium and small- scale RE and EE projects, however, they can still be significant enough to keep investment from being mobilised.

Box 6: FIDEME – Kick-Starting the Renewable Energy Market In France

In 2003, the French environment agency ADEME and the French commercial bank Natixis launched FIDEME, a EUR45 million public-private mezzanine fund aimed at addressing the debt-equity gap that was preventing the start-up of wind and other RE sectors in France. EUR15 million of FIDEME's capital was provided by ADEME as a subordinated tranche within the public-private fund. The fund then provided subordinated financing to projects helping sponsors to fill the debt-equity gap and in so doing attract senior lenders. This double leverage structure allowed ADEME to mobilise over 20 times the public funding contribution it provided. Since inception, FIDEME has financed 30 RE projects for a total capacity of over 300MW and ~EUR330 million mobilised, accounting for one third of France's wind farm capacity up to 2006. Natixis is now planning their second FIDEME fund, but this time on a fully commercial basis as the renewable market in France has matured beyond the need for ADEME public finance support.

Box 7: Barriers to Investment

Market barriers to commercialisation and deployment of clean energy and other climate technologies largely result from the size of the projects and the "newness" of the technologies. Medium and small-scale clean energy technology markets consist of large numbers of small, dispersed projects. These projects have relatively high transaction costs for investment preparation and financing. A project-by-project approach to project financing and development is often inadequate; programmatic approaches are needed, either commercially based or publicly motivated, which aggregate markets in ways that can accelerate deployment and achieve economies of scale. Because these markets are so diverse, financing structures must be adapted to each market segment. Furthermore, there is typically a lack of experience in financial institutions with these new technologies and markets, and high perceived and real risks to be addressed, making it difficult to create creditworthy commercial financing structures.

Moreover, without political stability, regulatory certainty and administrative simplicity, the perceived risk level can undermine incentives for investing in projects that have significant up-front costs. These soft costs and risks can make economically viable projects unviable financially. Credible long-term national policies can significantly reduce the risks of investing, but no single policy can ensure that the technology will overcome the many hurdles to be faced between the demonstration and scaled up diffusion stages. This paper does not attempt to address all these barriers, rather it focuses on financial instruments that can reduce risk, build experience amongst financial actors and in so doing ensure that capital is increasingly available for new climate mitigation ventures and in the forms needed to successfully deploy and scale up these technologies.

DFIs are active in this market with their standard investment products and have important roles to play mobilising commercial finance, providing long-term funds and sharing risks. The participation of public finance in private equity and subordinated debt facilities can help close the debt-equity gap. Local currency bonds and currency hedging instruments can be used to help investors and developers manage foreign exchange risks. Commercial fuel supply risks can be covered by alternative risk transfer products like weather derivatives. Political risks and some commercial risks can be covered by Export Credits Agencies, Multilateral Investment Guarantee Agency (MIGA) or national guarantee agencies.

Medium, small and micro-scale RE and EE. The medium and small-scale RE and EE market consists of a diverse range of end-user sectors: residential, commercial, industrial, public and institutional, agricultural, transport and power. Each sector has its own institutional and credit characteristics which must be considered when seeking and structuring financing. Single project investment costs range from the micro scale to USD5−20 million, e.g., for an industrial biomass cogeneration system. These markets consist of a very large number of small, dispersed projects in a wide diversity of market segments and face common financing challenges. In aggregate, they offer huge potential for climate change mitigation.

A special subset of the clean energy market is "energy access": delivering energy services in off-grid and underserved communities and rural areas which presently lack access to modern energy services. Technologies include small-scale RE systems such as solar home systems, pico hydro, biogas and similar energy systems which may be integrated with water, health, education, productive enterprise, information and communication technologies.

These projects are too small to make any direct contribution to GHG emissions reductions; but they are critical to poverty alleviation and have essential roles to play in meeting the Millennial Development Goals.[4] Further, by making rural economies viable, they help stem rural-to-urban migration, which over time can indirectly help reduce GHG emissions growth.

Barriers and gaps associated with medium and small scale RE and EE projects include many of the issues cited above for large-scale projects, as well as some others that are specific to these smaller transactions. An additional gap is the lack of early-stage capital needed to help innovators develop their business models, raise market awareness, and take the risks associated with new product/service offerings. Associated with this is the lack of appropriate financial intermediaries to channel the right sort of financing and technical support to these young innovators. Once businesses begin to grow, patient and growth capital is needed to adapt technologies to local market conditions, test out new business models and build up local service infrastructure. Even companies that manage to raise financing for their operations often deal with customers that require financing themselves to purchase the clean technology. Suggested public finance interventions to address the financial needs of clean-energy businesses range from business development grants to early-stage risk capital instruments such as seed capital financing, publicly-backed private equity funds to provide growth capital and project equity contributions, and credit support instruments to help local banks provided end-user financing for these small scale but still capital intensive projects and technologies.

1.4.3 Selection Characteristics Based on Country Conditions

Country market conditions vary widely between middle income countries and the Least Developed (or International Development Association) countries. Design of appropriate PFMs must be matched with conditions of the given market - both the country conditions and the credit and institutional characteristics of the target market segment.

Middle income countries are often characterised by maturing financial and capital markets, with available liquidity, reasonable costs of borrowing and perhaps the sorts of medium and long-term financing needed for infrastructure projects like wind-farms or geothermal plants. Finance institutions in these countries, however, typically still have risk adverse credit practices that can slow their engagement in new sectors and increase costs. Beyond the financial markets, middle income countries have reasonably stable macroeconomic environments and some quickly developing policy environments for clean energy and other climate sectors. Amongst industry they have good capacities for engineering, equipment supply and turnkey construction, but sometimes lack experienced project developers in the relevant sectors. Mobilising these domestic resources, along with addressing risk, transaction costs, project preparation and market aggregation are the main barriers that need to be addressed.

Least Developed Countries are often characterised by poorly developed financial markets, lack of sufficient liquidity for financing medium and long-term projects; higher borrowing costs; highly risk adverse financial institutions that have less experience with project finance structures and face higher foreign exchange risks when sourcing international funds. These countries have greater country market risk due to less stable macroeconomic conditions. Their industry actors have some capabilities for turnkey engineering and construction, but perhaps limited equipment operations and maintenance expertise and a greater need for

[4] See, for example, REN 21 Renewable Energy Policy Network. Energy for Development: The Potential Role of Renewable Energy in Meeting the Millennium Development Goals, Worldwatch Institute, 2005.

technology transfer support. Providing access to capital, building local industry capacities, assisting with project development from an early stage, and demonstrating the economic viability of climate technologies through implementation of initial projects, are typical tools to address barriers in these country markets.

1.5 Scaling-Up - Strategies for the Design of New and Expanded PFMs

Many effective PFMs, transaction structures and market aggregation models have demonstrated effectiveness at mobilising investment in clean energy and other areas of climate mitigation. The potential to scale up these efforts is therefore strong. The challenge is that implementing each model in each respective target market takes sustained attention and capacity building. Scale-up does not imply blind replication, but rather adaptation and application of good transaction structuring and programme design principles. Methodologies for doing so exist and can be learned and applied. In many ways, scale-up is a challenge for institutional development and human resources.

"Development and operation of energy efficiency investment delivery mechanisms is an *institutional development issue*…Lack of domestic sources of capital is rarely the true barrier; inadequate organisational and institutional systems for developing projects and accessing funds are actually the main problem. Therefore, mechanisms to capture the opportunities for energy efficiency investment need to be created and strengthened. This entails sustained effort over years…" [World Bank, 2008].

There is a substantial body of experience with PFMs that organise and deliver financing and project development services to implement multiple projects in specific target markets. Given the urgent need to scale up investments in climate mitigation, it is important to assess this experience to be able to share effective methods and define and implement scale-up strategies that will capture the economic and environmental potential of different climate technologies.

1.5.1 Design Principles

Within the context of the current UNFCCC negotiations, substantial new public monies are being considering for climate mitigation investment in developing countries. The following principles are suggested when designing the application of such public monies.

Leverage – what is the strategy for using the new public monies to mobilise commercial finance and how much commercial capital will be leveraged per dollar of new public monies?

Effectiveness – how will the new public monies be deployed? New public monies are typically deployed as grants to DFIs, to support PFMs; what PFMs will be used and will they effectively target resources at the best projects in a cost-effective manner and aim to build a financially sustainable market upon their completion?

Fairness and equity – does the mechanism address the priorities of recipient countries? Is it adapted to market conditions and implemented in ways that maximise social and economic development co-benefits?

Coordination – are the uses of the several sources of new public monies being coordinated pursuant to a coherent strategy?

Box 8: Sharing Approaches to Public Finance – the SEFI Public Finance Alliance

The SEF Alliance is an international coalition of public and publicly-backed sustainable energy financing organisations. The aim is to improve the effectiveness of member organisations to finance and transform clean energy and climate markets within their own countries, and to assist other governments in establishing similar programmes.

The 2008 founding member funds are the U.K. Carbon Trust; the California Energy Commission; Sustainable Development Technology Canada; Sitra, the Finnish Innovation Fund; and Sustainable Energy Ireland. Each member finances the development of sustainable energy and carbon markets in its respective region, and fund managers use this platform to exchange best practices, pool resources, and launch joint projects. The SEF Alliance is under the remit of the Sustainable Energy Finance Initiative (SEFI) of the United Nations Environment Programme (UNEP) but is governed directly by its members and pursues activities according to their interests.

It has been found that at any scale PFMs can be made most effective and efficient if they:

- Accurately *assess technology market barriers* and financial market conditions;
- Target market segments where the project *economics are compelling*;
- Take a *programmatic approach* to financial mechanism design;
- Use and *strengthen existing capacities* throughout the chain of financial intermediation;
- Address the *lending or investment criteria* of commercial financial actors;
- Define *project responsibilities* based on a complete roles and risk analysis;
- Include marketing and *market aggregation* plans; and
- Develop plans for public or donor-supported *technical assistance programmes* to build capacities, fill gaps, and take on any roles or risks not assumed by commercial parties.

1.5.2 Institutional Development

A few recommendations can be derived for DFIs and other entities focused on investment mobilisation. These are not new ideas and implementation of many of them is underway. However due to the imperfect nature of these markets, DFIs must continue to refine their approaches and terms of engagement with financial intermediaries. DFIs and other relevant actors could:

- *expand* staffing and strengthen the institutional placement of climate, carbon and clean energy finance programme offices within their organisations to assist development and commercial practitioners to adapt and apply appropriate finance programme models to their markets;
- *collaborate* on the development of knowledge management tools such as information toolkits and through the establishment of a wide range of advisory services;
- *devote* a portion of profits to work alongside donor funds, allowing these contributions to be used as equity in higher risk positions and in combination with their investment funds to implement finance programmes on an expanded scale, working with local commercial FIs and other market actors;
- *incorporate* lessons learned from clean energy finance programmes into the design and operations of any new climate finance instruments planned within the context of the UNFCCC.

1.5.3 Country-based programmes

The institutional framework to deploy the resources of any new funding mechanism should be established to a large extent on a country basis. If the design and scale-up of climate finance programmes is agreed as a priority, and the international community devotes new resources to support such programmes, then an institutional structure is needed, both within the development community and the countries being assisted. Much of this institutional infrastructure already exists, but it requires designation and capacity building to take the next steps. In the case of clean energy or carbon finance programmes that will blend funding from grant resources, DFIs and local CFIs, a logical country-based coordinator could be each country's national development bank, investment authority, or similar institution. The local lead agency, with support from international agencies, would become the focal agency to conduct market research, define investment priorities, develop programme designs, liaise with CFIs and other market actors and provide programme operations oversight, along with the international donors and investors.

1.5.4 Supporting financial regulation policies

National banking and financial system regulation often prescribes commercial bank loan portfolio limits and sets loan portfolio targets. For example, the maximum percentage of a bank's assets which can be loaned out at terms longer than one year is generally prescribed, as it is in China at 30 percent. Loan underwriting guidelines are also often set, and rules are defined that set risk weightings for certain types of assets. To promote lending in socially important areas, such as housing, agriculture, rural economic development and even clean energy and other "green" investments, bank regulators (a) often set targets for these priority types of lending as a percentage of a bank's portfolio, and (b) may differentiate reserve requirements for lending in different sectors as a function of risk. India has an extensive system of "priority sector lending" to assure adequate flow of credit to priority sectors of the economy. For Indian banks, priority sector lending policies prescribe targets for a full 40 percent of bank lending. In the United States the Community Reinvestment Act promotes bank lending for housing by requiring lenders to invest a minimum portion of their portfolio in the communities wherein their operations are located. In China "green credit" policies carve out certain types of lending, for new green buildings, for example, from certain lending restriction limits.

Clean energy, climate or carbon financing by CFIs could similarly be promoted domestically as a new area of priority sector lending, based on the benefits for the national macro-economy, energy security, economic development and environmental public goods. Such policies can be very effective to assure the attention of CFI senior management to this type of lending, and provides additional motivation for expanded lending in this socially important area.

Part II Presenting Public Finance Mechanisms

2.1 Introduction

PFMs seek to mobilise and leverage commercial financing, build commercially sustainable markets and increase capacity to deliver clean energy and other GHG mitigation projects. They include:

- ***Credit lines*** to local CFI for providing both senior and mezzanine debt to projects,
- ***Guarantees*** to share with local CFIs the commercial credit risks of lending to projects and companies,
- ***Debt financing*** of projects by entities other than CFIs,
- ***Private equity funds*** investing risk capital in companies and projects,
- ***Venture capital funds*** investing risk capital in technology innovations,
- ***Carbon finance*** facilities that monetize the advanced sale of emissions reductions to finance project investment costs,
- ***Grants*** to share project development costs,
- ***Loan softening programmes,*** to mobilise domestic sources of capital,
- ***Inducement prizes,*** to stimulate R&D or technology development,
- ***Technical assistance*** to build the capacity of all actors along the financing chain.

Key features of the PFMs are summarised in the table on the following pages and a short description of each mechanism then follows with a number of examples included in text boxes.

PFMs	Description	Financial Barriers Addressed	Financial Market Characteristics	Applicable Market Segment	LP	Example
1. Credit line for Senior debt	Debt facilities provided to commercial FIs for on-lending, and usually on a full-recourse basis. Typically meets 50–80% of project cost. Can also be offered on limited or non-recourse basis depending on FIs willingness to take project risks.	(i) lack of funds among FIs; (ii) shortage of long-term funds; (iii) high interest rates.	Underdeveloped financial markets where there is lack of liquidity and borrowing costs are high.	(i) large scale and medium scale RE and EE (iii) wholesale loans for energy access markets	L to M	Thailand Energy Efficiency Revolving Fund; CORFO credit line programme
2. Credit line for Subordinated debt	Debt provided to CFIs for on-lending, in combination with senior debt to improve security for senior lender. Typically meets 10–25% of project cost. Can take other legal structures such as convertible debt or preferred shares.	(i) lack of available equity among project sponsors; and (ii) restrictive debt-to-equity ratio	Lack of liquidity in both equity and debt markets	(i) medium and small scale	M to H	E+Co CAREC Fund, FIDEME Fund
3. Guarantee	A risk management tool shares in the credit risk of project loans which commercial FIs make with their own resources. Typically covers 50–80% of outstanding loan.	(i) high credit risks, particularly perceived risks	Existence of guarantee institutions & experience with credit enhancements	(i) large- scale and grid-connected RE (ii) medium scale RE and EE (iii) energy access markets	M to H	IFC/GEF Hungary Energy Efficiency Co-Financing Programme
4. Project Loan Facility	Debt facilities organized by entities other than commercial FIs and providing direct financing to clean energy projects on a project finance basis. Can be combined with commercial financing or can be provided as credit lines to small CFIs for on-lending.	(i) lack of experience with clean energy project finance; (ii) unwillingness or inability to underwrite loans on a project finance basis; (iii) lack of long-term lending capacity.	Strong political environment to enforce contractual obligations and enabling laws for special purpose entity	(i) medium and small scale EE and RE	L to M	India Renewable Energy Development Agency; Bulgaria Energy Efficiency Fund
5. Soft Loan Programmes	Provide debt capital at concessional interest rates	(i) financing gap during project devlp stages	Lack of liquidity or interest in the target sectors	(i) medium and small scale EE and RE	L to M	Massachusetts' Sustainable Energy Economic Development Initiative
6. Equity Fund	Equity investments in clean energy companies and/or clean energy projects. Can be targeted at specific market segments, or full range.	(i) lack of long term capital; (ii) restrictive debt-to-equity ratio requirements	Highly developed capital markets to allow equity investors an exit from investees	(i) large scale grid-connected RE (ii) energy companies	M to H	(i) ADB Clean Energy Private Equity Investment funds (ii) FE Clean Energy Group

7. Venture Capital	Equity investments in technology companies.	Lack of risk capital for new technology development	Developed capital markets to allow eventual exits.	Any new technology	M to H	China Environment Fund, Carbon Trust VC Fund
8. Carbon Finance	Monetisation of future cash flows from the advanced sale of CERs which can be used to finance project investment costs or enhance project revenues. Can also be in the form of carbon delivery guarantee to minimize the risk of under-delivery of carbon credits.	(i) lack of early stage project development capital (ii) lack of cash flow to provide additional security to project lenders (iii) uncertainty in the delivery of carbon credits	Developing countries, or emerging markets	(i) large scale and grid-connected RE (ii) medium -scale RE and EE (iii) programme of activities such as in energy access markets	M to H	ADB Asia Pacific Carbon Fund
9. Project Development Grants	Grants that are "loaned" without interest or repayment until projects demonstrate financial viability.	(i) lack of sufficient capital during project development stage; (ii) costly development process	Developing countries, or emerging markets	(i) large-scale grid-connected RE considered high risk with lengthy project preparation cycle	M to H	Canadian Green Municipal Funds
10. Loan softening programmes	Grants to help CFIs begin lending their own capital to end-users initially on concessional terms.	Lack of FI interest in lending to new sectors; limited knowledge of market demand.	Competitive local lending markets	Medium and small scale EE and RE	M	MNRE/IREDA SWH interest subsidy programme, UNEP Indian Solar Loan Programme
11. Inducement Prizes	"Ex-ante prizes" to stimulate R&D or technology development. Still needs to be proven in the climate sectors.	High and risky technology development costs and spill-over effects	Sufficient financing availability to deploy winning technologies	Any technology sector	M to H	X Prize
12. Grants for Technical Assistance	Funds aimed at building the capacities of market actors. Technical assistance programmes include: (i)market research and marketing support; (ii) transaction structuring support and development of new financial products; (iii) staff training and business planning; (iv) establishment of technical standards and engineering due diligence, and (v) market aggregation programmes to build deal flow.	(i) lack of investment ready project (ii) lack of skills and knowledge among market actors	Developing countries, or emerging markets	(i) all segments in the supply side of the market (ii) demand side (iii) FIs	H	GEF, WB, ADB, UNEP, UNDP TA Programmes

****Notations**: **LP** ~ Leverage potential, **L** ~ Low, **M** ~ Medium, **H** ~ High

2.2 Debt Focused PFMs

2.2.1 Credit lines to CFIs for Senior debt

The provision of credit lines to CFIs for on-lending is an effective and necessary Public Finance Mechanism. The main purpose of this mechanism is to address the lack of liquidity to meet medium to long-term financing requirements of clean energy or other climate projects. In markets where high interest rates are seen as a barrier, credit lines can be offered at concessional rates to induce borrowing and direct credit to target sectors and projects. And when the credit risk of such projects is high, credit lines can also be structured on a limited or non-recourse basis so that the DFI shares in the risk of the loans on-lent by the FIs.

Credit lines work well with both large-scale grid-connected RE and medium-scale RE and EE projects. It typically funds a defined portion including the long-term component of project loans, e.g. 50-80 percent, with the balance of funding coming from the CFI's own resources.

While credit lines can be effective, they are relatively resource intensive as a PFM, that is, the amount of commercial financing leveraged by a given amount of public funding is relatively low, generally in the 2–4 times range. Technical assistance is also generally required by the CFI to develop its clean energy line of business.

Two examples of PFMs in the form of credit lines are the *Thailand Energy Efficiency Revolving Fund* (see Box 1) and the *CORFO credit line* programme (see Box 2).

2.2.2 Credit lines to CFIs for Subordinated Debt

A particularly innovative form of credit line is one that allows CFIs to offer subordinated (also termed mezzanine or junior) debt to projects. "Subordination" refers to the order of or priority for repayment. Subordinated debt is structured so that it is repaid from project revenues after all project operating costs and senior debt service has been paid. The senior lender gets paid first, and then the subordinated lender.

Subordinated debt can substitute for and reduce the amount of senior debt in a project's financial structure thus addressing the debt-equity gap and reducing risk from the senior lender's point of view. Subordinated debt can also substitute for and reduce project sponsor equity requirements set by senior lenders. It is typically in the range of 10-25

Box 9: *Bulgarian Energy Efficiency and Renewable Energy Credit Line (BEERECL)*

The BEERECL is an EBRD facility helping seven Bulgarian banks on-lend to private sector industrial energy efficiency and renewable energy projects. Besides the credit line, development assistance is also provided for project development services including energy auditing, financial analysis, risk assessment, formulation of loan applications and deal structuring, The facility is partly supported by the nuclear power plant Kozloduy International Decommissioning Support Fund (KIDSF). An innovative component is that the project sponsors (borrowers) receive an incentive grant from the KIDSF upon successful project commissioning, 15% of the loan for efficiency projects and 20% for renewables.

percent of a project's sources of funds, and mostly intended to support small scale (<15 MW) RE projects.

Subordinated debt facilities achieve a moderate level of fund mobilisation by supporting and leveraging senior debt. Subordinated debt can also be structured in a different form such as convertible debt or preferred shares. The *E+Co Central American CAREC Fund* and the *FIDEME Public-Private Mezzanine Fund* (see Box 6) are two examples of PFM using subordinated debt financing instruments.

2.2.3 Guarantees

The use of guarantees is appropriate when CFIs have adequate medium to long-term liquidity, yet are unwilling to provide financing to clean energy or other climate projects because of high perceived credit risk (i.e., repayment risk). The role of a guarantee is therefore to mobilise domestic lending for such projects by sharing in the credit risk of project loans the CFIs make with their own resources. Guarantees are generally only appropriate in financial markets where borrowing costs are at reasonable levels and where a good number of CFIs are interested in the targeted market segment.

Typically guarantees are partial, that is they cover a portion of the outstanding loan principal with 50-80 percent being common. This ensures that the CFIs remain at risk for a certain portion of their portfolio to ensure prudent lending. The responsibility for taking remedial action in events of default remains with the CFIs.

Guarantees can be effective in addressing credit risks of large scale grid connected RE and medium and small scale EE and RE projects, including the energy access markets. Guarantees can achieve low to high leverage depending on how they are structured, and depending on their target market segment. The following table describes the five different guarantee structures used with clean energy financing.

Guarantee Structure	Description	Market Segment	Leverage
Pari passu	Recovered monies are proportionately shared by the CFI and the guarantor	Large scale grid-connected RE	Medium
Subordinated recovery	CFI has the first right on all recovered monies before any amount is repaid back to the guarantor	Large scale grid-connected RE	High
Portfolio guarantee	Guarantee reserves that cover first and second losses on portfolio of CFI; ratio of reserves to portfolio principal = about 10-20 percent	Small scale RE and EE; energy access market	High
Loss reserves	Guarantee reserves that cover first losses on portfolio of CFI	Small scale RE and EE; energy access market	High
Liquidity support	Guarantee reserves that can be drawn down to keep loans current, avoiding final default and loss.	Large scale grid connected RE; medium scale RE and EE	Medium

The impact of a guarantee in mobilising financing for clean energy projects was previously shown for the IFC Partial Credit Guarantee in Box 4. Other good examples include the *IFC/GEF Hungary Energy Efficiency Co-Financing Programme (HEECP), the IFC Senior Loan Guarantee for EE/RE Projects in the Czech Republic* and the *West Nile Bullet Loan used with the Hydro plant in Uganda.*

2.2.4 Project Loan Facilities

Project loan facilities fill gaps where CFIs are unwilling or unable to provide such financing themselves. As opposed to credit lines which operate within the conventional lending practices of CFIs, loan facilities are created by governments or DFIs as special vehicles to provide debt financing directly to projects, typically on a project finance basis.

Since the objective of PFMs is to engage CFIs to finance clean energy and climate projects, it is important to assess whether the financing gap can be better and more quickly filled by credit lines and/or guarantee instruments before jumping into the creation of loan facilities. The goal of having CFIs fund projects and using some of their own resources to do so is always the first priority. This analysis requires careful assessment of CFI capacities in the market to determine the most appropriate strategy.

Loan facilities are warranted in situations where there are large numbers of economic projects that are unable to make it to financial closure because local CFIs lack the capacity or liquidity to provide the needed financing. The leverage potential of loan facilities is medium. The availability of project finance capital can greatly improve access to other forms of financing for clean energy projects. The *Bulgaria Energy Efficiency Fund* and *India Renewable Energy Development Agency* are two entities offering direct debt financing to a range of EE and RE projects.

2.2.5 Soft Loan Programmes

Soft loans can be used to bridge the financing gap during the pre-commercialization stages and during actual project preparation. Project development which spans from pre-feasibility to financial structuring is a lengthy process that requires sufficient capital reserves, however like early-stage technology innovation, it does not immediately generate positive cash flows in order for the project developer to service debt. The development risks are thus high and loans from the CFIs are difficult to access.

Run by quasi-public entities, soft loan programmes provide debt capital at concessional interest rates. Generally they do not require collateral although matching funds are often needed to ensure strong commitment from the developers. Soft loan programmes allow deferred repayment until such time that the ventures reach the operation and revenue-generating stages. In most cases, debt is forgiven if the ventures do not materialize. Soft loan programmes give confidence to technology innovators and project developers by sharing some of their costs and in doing so, they can leverage commercial financing by demonstrating to the CFIs the viability of technologies and projects.

The State of Massachusetts' Sustainable Energy Economic Development (SEED) Initiative is a soft loan facility which can be accessed by companies during the pre-commercialization stages of their innovation activities. The Green Municipal Investment Fund (GMIF) which is run by the Federation of Canadian Municipalities and the Connecticut Clean Energy Fund

Pre-Development Program are examples of soft loan facilities designed to help move clean energy projects through the development pipeline by supporting preparation activities.

2.3 Equity Focused PFMs

2.3.1 Private equity funds

PFMs can also be in the form of equity funds that make both project and corporate equity investments. Equity funds invest in projects and companies such as equipment manufacturers, project developers and ESCOs, project specific special purpose companies, independent power producers, and energy utilities. Typically these funds are set up to invest equity in private transactions (i.e., in companies those are not listed on public stock exchanges), termed private equity.

Companies usually seek equity to start up or grow their businesses, activities that can seldom be bank financed. For projects, equity is generally needed to increase the level of investment to a level that meets lender debt-to-equity requirements. More equity means a lower risk of loan default. Compared to project loan facilities, equity funds assume significantly higher risks by assuming an ownership stake and taking a subordinated position in profit distribution (only after creditors and preferred shareholders). The leverage potential of equity funds is medium to high.

Equity funds may specialise in one technology sector or pursue a full range of climate mitigation investments opportunities. They can invest regionally or focus on specific countries. A DFI's role in the operation of private equity funds can be either as the fund manager, directly investing in projects or companies, or as a fund of funds, whereby they pool their monies alongside other investors in an externally managed fund. Either way, the funds can be structured to provide a range of financial products, from venture capital for new technology developments, to early stage equity for project development activities, to late stage equity for projects that are already fully permitted and ready for construction. Some funds also invest partially or exclusively in public equities, but this is considered a fully commercial activity not in need of PFM support. An example of a DFIs investing in a private equity fund is the *ADB Clean Energy Private Equity Investment Funds*. The *Global*

Box 10: Berkeley Sustainable Energy Financing District

The City of Berkeley, California is preparing to establish a Sustainable Energy Financing District in which it will issue bonds and use the proceeds to provide loans to property owners for the installation of solar PV systems and EE improvements. The program is being developed in response to "Measure G" ballot initiative passed in 2007 which sets GHG emissions reduction targets for the City. Loans to property owners will be on 20 year terms, allowing loan payments to be matched with the energy savings. The City bears the credit risk of the loans, but, in an important innovation, will collect loan payments on the property tax bill. This tax assessment belongs to the property rather than the individual end-user, who effectively sells it with the property if they move on. The City is negotiating a private placement of the bonds with a green investment fund. In addition, a loss reserve fund is being raised to help cover the City's credit risk exposure. The program design is applicable to funding EE measures as well. This mechanism is being followed closely by many interested governments in the USA and, given its integration with property tax collections, has great replication potential.

Asia Clean Energy Services Fund is an example of a commercial private equity fund that has been investing public and private monies in several market segments.

2.3.2 Venture Capital Funds[5]

Venture capital, whether public or private, is especially suited to supporting the development of technology, taking it from the end of the R/D phase up to the demonstration phase. Incentives for private investors, however, have created market failures leading to several financing gaps. Public venture capital can be effective at opening bottlenecks in deal flow, whether this is the early-stage bottleneck globally or the venture-capital bottleneck in the developing world. It can also support companies that take longer to get returns and would not attract private investment, but have a net benefit to the world. The *China Environment Fund* and the *UK Carbon Trust Venture Capital Fund* are two examples of publicly backed funds in this area of activity.

2.4 Carbon Focused PFMs

Carbon finance refers to the monetisation of future cash flows from the advanced sale of CERs generated by clean energy projects. These funds can be used to meet project investment costs or enhance project revenues of all clean energy market segments. In large-scale grid connected projects the revenues from the advanced sale of CERs may be able to cover some portion of the investment costs, but in small-scale projects or programmes its impact can be extremely significant. In this case carbon finance may be able to substitute for early stage project development capital.

Another innovative way of structuring public funds for carbon finance is through carbon delivery guarantees which are aimed at minimizing the under-delivery risk of CERs to developed country buyers. Thus, carbon finance also addresses the risk of purchasing forward CER contracts. In addition, the revenue stream arising from the sale of CER also enhances the security of the project from the point of view of lenders.

Box 11: Addressing the post 2012 Gap – World Bank Carbon Partnership Facility

With the long-term framework for the post-2012 period not expected to conclude before 2009 at the earliest, there is a period of uncertainty regarding the future international climate regime. Moreover, the short-term, compliance-driven buying interests in the current market do not support large, cleaner investments in energy and infrastructure that have long-term emission reduction potential. The current project-by-project approach under the Kyoto Protocol incurs high transaction costs and is unlikely to generate the kind of transformation in emission-intensive sectors that large-scale programs can produce. This challenge along with the lack of regulatory framework has created a limited demand for post–2012 carbon assets.

As a response to these challenges, the World Bank's newly proposed Carbon Partnership Facility is designed to develop emission reductions and support their purchase over long periods after 2012. Its objective and business model are based on the need to prepare large-scale, potentially risky investments with long lead times, which require durable partnerships between buyers and sellers. It is also based on the need to support long-term investments in an uncertain market environment, possibly spanning several market cycles.

[5] The SEF Alliance has recently released a report on Public Venture Capital funds. See www.sefalliance.org

The leverage potential of carbon finance is medium to high. In the present seller's market, carbon funds buying CER are also increasingly becoming involved in offering project finance especially project equity in order to be competitive, and as a means to secure rights to purchase the CER from the project developers. World Bank's *Carbon Facility Partnership* (see Box 11), ADB's *Carbon Market Initiative* and *Asia-Pacific Carbon Fund* demonstrate the innovative use of public funding for carbon finance. Many other carbon financed PFMs have been developed and deployed in recent years which unfortunately are not covered in any detail in this report.

2.5 Grant-Focused PFMs

2.5.1 Project Development Grants

PFMs are needed to assist project preparation activities particularly with small developers who lack project development capital. PFMs can play a role in helping developers make it to financial closure by cost-sharing some of the more costly and time intensive project development activities such as permitting, power purchase negotiations, grid interconnection and transmission contracting. These PFMs can be on a grant, contingent grant, or soft loan basis and must be carefully structured to target the right projects and align interests on project development.

Contingent grants can be targeted at various preparatory activities and then repaid in part or in full when the project has reached the operation and revenue-generating stages. They can also be combined with loan instruments to shift the focus from early stage "prospecting" to later stage project engineering and development. The contingent grant (all or part) becomes a loan and must be repaid *if the project succeeds*, as determined by close of construction financing or other milestone, thus allowing the donor to replenish its funds and support further projects. If the project fails to proceed to implementation and financial closing, then the funding becomes a grant and does not have to be repaid. In some cases, the grant becomes a loan and must be repaid *if project fails* but the grant component is kept by the recipient if the project proceeds to implementation. This approach is designed to give the enterprise strong incentives for success.

The leverage potential of contingent grants is considered medium to high. By covering some of the costs during the highest-risk development stages, it increases investor confidence and, in so doing, leverage highly needed risk capital. Contingent grants are, however, criticized for lack of business discipline and creating disincentives for success by forgiving the funding in event of failure. The *Corfo Project Preparation Matching Funds* the *Canadian Green Municipal Funds, Connecticut Clean Energy Fund Pre-Development Programme*, and the *Massachusetts Pre-Development Financing Initiative* provide examples on the use of grants and contingent grants for project development activities.

2.5.2 Loan Softening Programmes

These grant based programmes are similar to soft loan programmes but only provide an incentive to CFIs, not the financing itself which is expected to be provided by the CFI usually in the form of consumer loans or microfinance. Most typically the incentive comes in the form of an interest subsidy or can also be provided as a partial guarantee or a combination of the two. Either way, the benefit of the support is expected to be passed on to the CFI's customers in the form of lower interest rates, lower front end deposits and extended loan repayment periods. Germany has used low interest loans to promote renewables domestically. The Indian Ministry of New and Renewable Energy has used this

Box 12 Incubator Example – UK Carbon Trust Incubator Programme

The UK Carbon Trust Incubator Programme provides strategic and business development consultancy, advice on corporate finance, management team recruitment and mentoring, market research and engagement and guidance on intellectual property protection. The Carbon Trust provides up to GBP60,000 of advisory support per accepted start-up/spin-out company, paid directly to incubator partners for services provided to the company being incubated. The selection process is competitive and rigorous, and has both entrance and exit criteria; success is determined by meeting designated milestones over time. Entrance criteria include commercial, technical and management team criteria, to screen candidates for entry into the incubator. There are also criteria for exit from the incubator, and companies are expected to make continual progress whilst in the incubator, and to work with the incubator partner to meet agreed milestones.

approach to help Indian banks lend for solar water heaters. UNEP has used this approach for a number of programmes, including in Tunisia (see box 5) for solar water heating and India for solar PV. KfW has used this approach in Germany to promote a range of renewable energy technologies.

2.5.3 Inducement Prizes

An inducement prize is a competition that awards a cash prize for the accomplishment of a feat, usually of engineering. Perhaps the most famous IPC was the Longitude prize, awarded to John Harrison for his highly-accurate marine chronometer. Inducement prizes are distinct from recognition prizes, such as the Nobel Prize, as they are forward looking. They have been extremely effective in pushing the advancement of technology although have yet to be tested in a climate sector. This will soon change as IFC and the GEF are preparing to launch a biofuels prize, to be developed as part of the Earth Fund.

2.5.4 Grants for Technical Assistance

In mobilizing commercial financing for clean energy projects, finance is necessary but by itself is not sufficient to deliver the necessary investments. Other than mobilizing commercial financing to finance clean energy projects directly, public finance mechanisms must also build the capacities of market actors, including FIs, to conduct business on a purely market basis. Grant financed technical assistance programs are essential to achieve these two goals.

Technical assistance programs remove barriers other than financial barriers. They address the development of commercial FI capacities, project development and preparation, need for aggregation of projects to assemble attractive financing volume, education of energy users to get them "decision-ready" to buy EE/RE and ESCO services, preparation and structuring of transactions on sound project finance principles. By building the capacities of market actors, technical assistance programs ensure systematic project development to generate a pipeline of investment ready and creditworthy projects. Technical assistance programs thus have the potential to generate high leverage of commercial financing in the medium to long term.

Key components of technical assistance programs to support FIs in clean energy finance business include: 1) market research and marketing support, 2) transaction structuring support and development of new financial products, 3) staff training and business planning 4) establishment of technical standards and engineering due diligence, and 5) market aggregation programs to build deal flow.

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Annex A - PFM Examples

This annex provides a listing of some examples of clean energy PFMs.

Debt credit lines: senior debt

1. Thailand Energy Efficiency Revolving Fund (http://www.dede.go.th/dede) [see box 1]
2. Chilean Economic Development Authority (CORFO) Credit Lines [see box 2] (http://www.corfo.cl)

Debt credit lines: mezzanine debt

3. E + Co Central American CAREC Mezzanine Finance Fund (http://www.eandcocapital.com/)
4. FIDEME Public Private Mezzanine Fund [see box 6]

Guarantees and other forms of risk sharing

5. IFC/GEF Hungary Energy Efficiency Co-Financing Programme (HEECP) (http://www.ifc.org/ifcext/enviro.nsf/Content/EnergyEfficiency)
6. IFC Senior Loan Guarantee for EE/RE Projects in Czech Republic

Project Loan Facilities

7. Bulgaria Energy Efficiency and Renewable Energy Credit Line (BEERECL) [see box 9] (http://www.beerecl.com)
8. India Renewable Energy Development Agency (IREDA) (http://www.ireda.in/) [see box 3]
9. New Zealand Crown EE Loan Scheme (http://www.eeca.govt.nz/government/crown%2Dloans/)
10. Korean Fund for the Rational Use of Energy (http://www.ase.org/content/article/detail/1269)

Private equity funds and funds of funds

11. ADB Clean Energy Private Equity Investment funds (http://www.adb.org/Documents/RRPs/REG/41922-REG-RRP.pdf)
12. FE Clean Energy Group (http://www.fecleanenergy.com/)

Early stage financing vehicles and facilities

13. UNEP/ADB/AfDB Seed Capital Assistance Facility (http://scaf-energy.org/)
14. E+Co Managed Account Financing Vehicle (http://www.eandco.net)
15. Chilean Economic Development Authority (CORFO) Project Preparation Matching Funds [see box 2] (http://www.corfo.cl)

Innovative uses of carbon finance

16. India Compact Fluorescent Lamp Programme of Activities
17. Carbon Partnership Facility (http://www.carbonfinance.org/cpf) [see box 11]

Contingent grants

18. Canadian Green Municipal Funds (http://www.fcm.ca)
19. Connecticut Clean Energy Fund Pre-Development Programme (http://www.ctcleanenergy.com/)
20. Massachusetts Pre-Development Financing Initiative (http://www.masstech.org/renewableenergy/index.html)

Pre-commercialisation finance

21. The China Environment Fund (http://www.cefund.com/)
22. The UK Carbon Trust (http://www.thecarbontrust.co.uk/carbontrust) [see box 12]
23. Sustainable Development Technology Canada (http://www.sdtc.ca/)
24. Massachusetts Sustainable Energy Economic Development (SEED) Initiative (http://www.masstech.org/SEED/)
25. Connecticut Clean Energy Fund (http://www.ctcleanenergy.com/)
26. Centre for Energy & Greenhouse Technologies in Victoria, Australia (http://www.cegt.com.au)
27. California Clean Energy Fund (http://www.calcef.org/index.htm)
28. Australian CVC Renewable Energy Equity Fund (http://www.cvc.com.au/)
29. UK Department of Trade and Industry Revenue Support (http://www.berr.gov.uk/)

Energy access finance

30. UNDP Philippines (Palawan) Solar Home Systems Finance Programme
31. UNEP India Solar Loan Programme (http://www.unep.fr/energy/activities/islp/)
32. Revolving Fund for Small Hydro Schemes in Peru (http://www.solucionespracticas.org.pe/)

Utility-based clean energy investment programmes

33. PacifiCorp "Energy Finanswer" EE Finance Programme for Commercial & Industrial Sector (http://www.pacificpower.net/Navigation/Navigation925.html)
34. UNEP/Tunisia PROSOL Solar Water Heating Equipment Finance Programme [see Box 5] (http://www.unep.fr/energy/activities/medrep/tunisia.htm)
35. Agriculture Demand Side Management in India

Small & medium enterprise finance

36. India Small & Medium Enterprise Industry Cluster Programme

Pooled procurement

37. Berlin Energy Agency (http://www.berliner-e-agentur.de/)
38. Cambridge Energy Alliance (http://www.cambridgeenergyalliance.org/)
39. Berkeley Sustainable Energy Finance District [see box 10] (http://www.ci.berkeley.ca.us/mayor//GHG/SEFD-summary.htm)
40. Pooled Mini-Hydro Development & Finance Programme

Vendor finance programmes

41. IFC programmes in Russia, Hungary and Czech Republic

Housing finance

42. IFC Hungary "Retail Gas" Programme (http://www.gefonline.org/projectDetails.cfm?projID=1316)
43. Financing Energy Efficiency for Low Income Blockhouses in Central Europe

Annex B Potential Sources of New Funds[6]

i) Increasing the Scale of Existing Mechanisms

- The Convention Funds
- The CDM and Other Possible Crediting Mechanisms

ii) Additional Contributions by Developed Countries

- New Bilateral and Multilateral Funds
  - Cool Earth Initiative
  - International Climate Protection Initiative
  - Clean Investment Funds
  - Global Climate Financing Mechanism
- Proposals Funded by Defined Contributions from Developed Countries
  - Convention Adaptation Fund, Technology Fund and Insurance Mechanism
  - Multilateral Technology Acquisition Fund
  - Mechanism for Meeting Financial Commitments under the Convention
  - Efficiency Penny
- Proposals Funded by Contributions from Developed and Developing Countries
  - World Climate Change Fund
  - More Stringent Commitments by Developed Countries
- Auction of Assigned Amount Units
- Nationally Appropriate Mitigation Actions

iii) Other Sources of Funds

- Extension of the 2 percent levy on CDM to other Market Mechanisms
- International Air Travel Levy
- International Maritime Emission Reduction Scheme
- Auction of Allowances for International Aviation and Marine Emissions
- Funds to Invest Foreign Exchange Reserves
- Access to Renewables Programmes in Developed Countries
- Tobin Tax
- Donated Special Drawing Rights
- Debt-for-clean-energy Swap

6 Modified from Haites, 2008

An estimated USD200-210 billion in additional investment will be required annually by 2030 to meet GHG emissions reduction targets. Parties to the UNFCCC are currently assessing how to respond to this capital mobilisation challenge. Discussions focus on new financing resources and vehicles to support the development, deployment, diffusion and transfer of climate-friendly technologies in developing countries. Key questions include: What should be the scale of new financing by governments? How can public monies mobilise and leverage sufficient commercial capital to achieve emissions reduction objectives? In other words: how can the most be made of those new financing resources?

This report provides an overview of public finance mechanisms that mobilise and leverage commercial financing, build commercially sustainable markets, and increase capacity to deliver clean energy and other climate-mitigation technologies, projects and businesses. It suggests ways in which public finance mechanisms can be used nationally and internationally, and offers scale up and replication strategies.

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