



Publicly Backed  
**Guarantees**

As Policy Instruments to Promote  
**Clean Energy**

a **SEF Alliance** publication

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Publicly Backed Guarantees  
As Policy Instruments to Promote  
Clean Energy



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Assisted by Kristina Johnson and John MacLean



## About this Report

This is the fourth publication of the Sustainable Energy Finance (SEF) Alliance of the United Nations Environment Programme (UNEP). The SEF Alliance is a coalition of public and publicly backed organisations that finance clean energy markets and technologies in various countries. More information can be found at [www.sefalliance.org](http://www.sefalliance.org).

This report is the second in the financing mechanisms series of SEF Alliance studies, each of which looks in-depth at a specific type of public finance instrument used for building clean energy markets. The first in the series looked at public venture capital as a clean energy-financing tool, performed by New Energy Finance in 2008. The SEF Alliance Steering Committee agreed that the next study should focus on investment guarantees. The Alliance Secretariat therefore commissioned this report from Wolfgang Mostert, assisted by John MacLean and Kristina Johnson, to assess the advantages and disadvantages of using different types of publicly backed guarantee structures at the various stages of product and technology innovation and deployment. The work was jointly funded by the 2009 SEF Alliance member organisations and UNEP.

This study examines the experience of public financing agencies and relevant lessons learned. The main intended audiences are programme designers and implementers, as well as programme strategists and policymakers. The subject of investment guarantees may overlap at least in part with other financing structures, including loans and public/private funds.

## Acknowledgements

Thanks to the following people who have provided valuable assistance and input to this report:  
Benoit Amouroux, Kim Behnke, Jamie Brown, Philippe Germa, Dr. Sonja Hammerschmid, Dr. Volker Handke, Søren Høgenhave, Dr. Samuele Furfari, Kaare Jarl, Matthew Kennedy, Sean Kidney, Rolf Kjærgaard, Ken Locklin, David Harris Kolada, Lars Kolte, Benoit Mary, Jessica Morey, Sami Tuhkanen, David Vincent, Unto Väkeväinen.

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## Abbreviations and Acronyms

ABS	Asset Backed Security
BA	Business Angel
CC	Cost of Capital
CIP	Competitiveness and Innovation Framework Programme 2007-2013
DFI	Direct Foreign Investment
EE	Energy Efficiency
EET	Energy Efficient Technology
EIF	European Investment Fund
EPC	Energy Performance Contract
ESCO	Energy Service Company
EU	European Union
FI	Finance Institution
FMO	Netherlands Development Finance Company
GEF	Global Environment Facility
GHG	Green House Gas
ICTF	Incremental Cost of Transactions Fee
IRP	Incremental Risk Premium
IDB	Inter-American Development Bank
IFC	International Finance Corporation
LDC	Least Developed Country
LRF	Loss Reserve Fund
LSA	Loss Sharing Agreement
MFI	Multinational Finance Institution
MIF	Multilateral Investment Fund (under IDB)
MIGA	Multilateral Investment Guarantee Agency
PBG	Publicly Backed Guarantee
PCG	Partial Credit Guarantee
PG	Public Guarantee
PFM	Public Finance Mechanism
PRG	Partial Risk Guarantee
RE	Renewable Energy
RET	Renewable Energy Technology
RFP	Request for Proposals
R&I	Research and Innovation
SME	Small & Medium Enterprise
SMEGF	SME Guarantee Facility (managed by EIF)
SSRE&EE	Small Scale Renewable Energy and Energy Efficiency
TA	Technical Assistance
VC	Venture Capital
VCF	Venture Capital Fund

# INTRODUCTION

This report reviews experiences with the use of publicly backed guarantees (PBGs) as a policy instrument for the development and market promotion of new renewable energy (RE) and energy efficient (EE) technologies.

The Executive Summary is written for policy makers. It gives a high-level overview of where and how PBGs are used and recommendations for the design, preparation, and implementation of PBG programs. It then directs readers to the chapters where more specifics can be found.

The report consists of three sections. The first covers general macro-level issues:

- Chapter 1 places PBGs in the context of the finance continuum and of public finance programs that promote the penetration of RE&EE.
- Chapter 2 introduces the economic justification for PBGs.
- Chapter 3 provides a survey of PBG typologies.

The second section moves to the micro level, providing detailed examples of how PBGs are used as instruments in RE&EE policy. The objective is to provide inspiration to policy makers and practitioners for concrete new initiatives; it is therefore structured by specific sub-policy area.

- Chapter 4 reviews how PBGs are used as “technology push instruments” in business finance to support the efforts of Small and Medium Sized Enterprises (SMEs) in developing and commercializing new RE&EE technologies.
- Chapter 5 reviews how PBGs for project finance are used to accelerate investments in larger-scale projects with high technology risks and RE-facilitating infrastructure, and to facilitate finance for investments in smaller-scale, grid-connected RE power plants.
- Chapter 6 shows how PBGs are used in asset finance and in market aggregation strategies to expand the market for RE&EE technologies.
- Chapter 7 reviews how PBGs are used to promote RE&EE technology transfer to developing countries by promoting foreign direct investments as well as national company investments in both power projects using RE and in firms providing RE&EE services.

The final section, Chapter 8, gives recommendations for how PBG programs can be designed, prepared and implemented. Among other issues concerning the structuring of PBGs, it discusses how to achieve leverage, price PBGs, and account for the contingent liabilities of PBGs in the public budget.



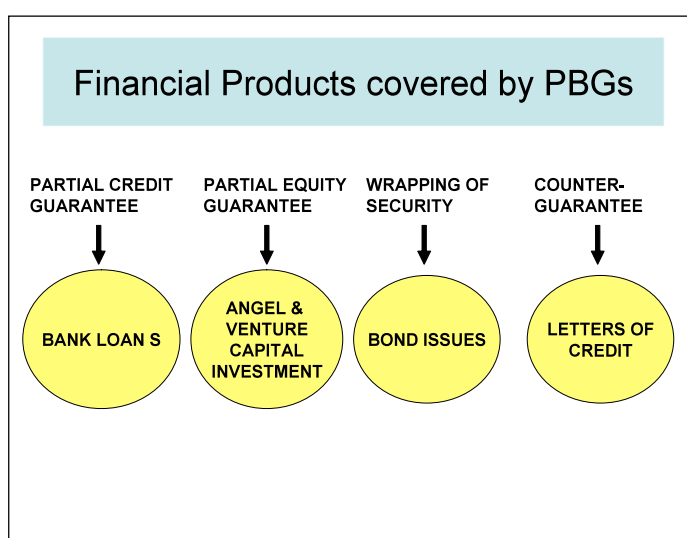
# EXECUTIVE SUMMARY

## *What is a Publicly Backed Guarantee (PBG)?*

A PBG is a contractual obligation by which a government (institution), against payment of a fee, assures compensating payment to a lender or an investor in case of default on an obligation that another party is committed to. Whereas insurance involves two parties, guarantees involve interlocking contracts between three parties. In the case of partial credit guarantees (PCGs), the contracts are between lender and borrower (loan agreement) and between guarantor and lender (guarantee agreement). In the case of partial risk guarantees (PRGs), the contracts are between guarantor and investor/lender and between guarantor and the host country government (for example, a commitment to pass a law introducing feed-in-tariffs).

Since risks are an inherent feature of financial transactions, PBGs, as shown in chapter 1, are applied in all phases of the finance continuum to improve access to, and the terms of, financial products that without PBGs would be under-supplied. Depending on the situation and the specific objective, the critical product in need of a guarantee can be:

- risk capital (equity or mezzanine finance);
- bank credits;
- bond and security issues;
- or letters of credit.



## *Public finance mechanisms as instruments for climate policy*

Whenever governments need to achieve public good objectives (such as tackling climate change), it is necessary to design appropriate public policy interventions to shoulder the initial transitional risk and accelerate the pace of transition. The 2020/50 climate policy targets pose a particular challenge for policy. The transformation of national economies to low-carbon intensity must take place within a short time frame and be achieved with technologies that by themselves are not “intrinsically transformational” – that is, they provide in most cases the same service to consumers, unlike IT technologies, which are self-penetrating because they provide new services to end-users that transform business practices and create new consumer wants. Deployment, therefore, of clean energy technologies at a level and speed remotely resembling the spread of IT technologies requires an intelligent mix of demand-pull and technology-push instruments.

To understand the role of publicly backed guarantees within policies to accelerate the development, commercialization, and large-scale deployment of renewable energy (RE) and energy efficient (EE) technologies, it helps to distinguish between the following:

- i. Instruments that establish the *overall economic framework conditions for investments* in RE&EE. Carbon taxes, cap-and-trade schemes, renewable portfolio standards, and feed-in-tariffs change the relative prices in favor of low-carbon technologies; regulations, information, and public awareness campaigns enforce behavioral changes towards lower carbon technologies and consumption.
- ii. *Specific barrier removal instruments*. The most important are the so-called “public finance instruments” that seek to reduce specific barriers in the finance continuum that prevent the flow of private equity and debt finance from reaching the desired level (from the initial R&D to the commercial market phases of new technologies). Public finance instruments include investment grants, interest rate subsidies, dedicated credit lines, investments in private equity or venture capital funds, and publicly backed guarantees (PBGs) and insurance schemes.

Expressed allegorically, “framework instruments” provide fuel to the private investment engine; “public finance instruments” are lubricants that make individual parts in the engine run more smoothly.

The economic justification for the use of public finance instruments is that they reduce the cost to the national economy of achieving a given policy target; the cost of a well-designed public finance intervention is more than offset by savings on the “general framework instruments” side. To overcome specific barriers to RE&EE investments through adjustments in general framework instruments is inefficient: a 100 US-dollar per ton carbon tax can make specific finance barriers melt away, but would wreak havoc on the national economy. The case for public finance instruments in climate policy is reinforced by the need for speed (barriers put a break on development) and by the signal weakness of the main “general framework instrument,” the cap-and-trade mechanism: namely, that the market price of ERUs and CERs reflects the present day balance between demand and supply, which can guide short term fuel switching decisions; yet the price is too low to serve as an incentive for high-cost, low-carbon technologies that have a lifeline of more than 20 years and may take several years to implement. Although investors expect an increase in carbon prices over time, the size of the increase is subject to high uncertainty.

The direct aim of public finance instruments is to trigger a significant increase in private investment, in this case in RE&EE. How they do it depends on the type of instrument: some affect primarily the demand for investment finance, others, primarily the supply of finance:

- Investment subsidies, e.g. investment grants and interest rate subsidies to RE&EE, *increase the financial rate of return on investments*. The primary effect is to lift investor demand for investment; yet, the improvement in cash flows also eases investors’ access to debt finance. Investment subsidies are used when private investment finance as such is not the main problem, but rates of return on targeted investments are insufficient to motivate sufficient private investments. They are the deluxe public finance instruments - imposing the highest direct costs on taxpayers.
- Revolving funds for EE, refinance facilities for EE&RE loans, and public investments in private equity and venture capital funds (which specialize in high-tech RE&EE start-ups) *inject special purpose public finance into the commercial finance system*. Finance injections are used when lack of liquidity in the finance sector is a major constraint for private finance to political priority sectors, or when finance institutions need long-term credits to provide loans with longer tenor.



- PBGs and insurance schemes *use risk mitigation to steer the flow of private funds towards priority investments*. In its search for the exploitation of arbitrage opportunities, the finance industry transfers finance between sectors from sunset industries to sunrise industries, within sectors from stagnating to growth companies, and within firms to those projects that provide the highest risk-adjusted rate of return for the financial community. By reducing risks linked to priority investments, PBGs can steer private finance towards these. PBGs are employed when elevated risk perceptions block the flow of finance to activities of high value to the economy and public sector risk sharing can lift investments to the levels desired by society.

The incidence of PBGs relative to annual financial flows is small because they are tools to impact allocation decisions in the financial sector only at the margin. In 2002, annual domestic credit provided by the banking sector in high-income countries averaged 168% of GDP; in middle-income countries 83%; and in low-income countries 49%. Measured by outstanding guarantees relative to GDP, the median size of PBG schemes (covering all sectors, not just energy) in developing countries is 0.30% of GDP and 0.21% in developed countries. The region with the highest use intensity is Asia, where the median size is almost 5% of GDP; South Korea tops the list at 9% of GDP.

### *What is the comparative advantage of PBGs compared to other public finance instruments?*

PBGs can assist beneficiaries in: (i) providing them access to finance, (ii) reducing their cost of capital, (iii) expanding loan tenor or grace periods to match project cash flows. In some cases, these qualities make PBGs complementary to other public finance instruments; in others, PBGs are the least-cost alternative. For example, greater investment in R&D for RE&EE technologies can significantly reduce the cost of achieving carbon reduction targets. Governments can induce investments in R&D either (i) by increasing their grant funding of R&D projects, or (ii) by investing in venture capital funds specialized in RE&EE or (iii) by making PBGs available to business angel (BA) and venture capital (VC) funds for investments in innovative RE&EE SMEs. Whether, in this case, the PBG is the least-cost instrument or is most cost-effectively used in combination with one or two of the others, depends on the context.

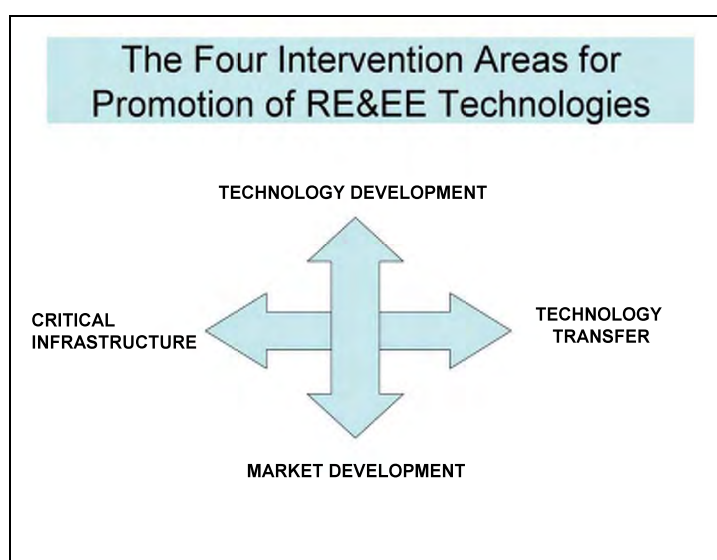
Yet, a few conclusions can be drawn. First, guarantees can be essential for emerging or higher risk technologies. Either lenders won't lend without PBGs (e.g. next-generation ethanol), or only against payment of a high premium: for example, in 2003, interest rates on loans to off-shore wind farms in Europe carried a risk premium of 400 basis points compared with loans to on-shore wind farms. Second, in asset finance, PBGs can help bring down bank costs of transactions in dealing with mass requests for end-user finance. Third, PBGs are useful when policies require speed of implementation but uncertainties for projects are above average. Fourth, guarantees are particularly valuable during times of tight credit and market uncertainty when banks aren't lending, as they provide the grease that can open up the "credit valves."

At the political-ideological level, supporters of PBGs often point to the government hands-off aspect of these instruments: the market makes all decisions; politicians do not pick "winners." Another attraction is the relatively low cost to the public budget. Because fees for guarantees can be set at levels that cover the cost of expected losses, they can, in principle, leverage private finance per public dollar spent better than either grants or direct loans. The reverse argument against PBGs is that fees seldom cover the full costs of PBG programs and that it is their opacity which attracts politicians: they impose a contingent liability (since funds are required only when a guaranteed loan fails), which may lead to payment from the public budget first during somebody else's term.

## How and where are PBGs applied in RE&EE policy?

Most countries use PBGs for a few niche applications only; yet, across countries, a remarkable variety of creative PBG schemes can be found (see table 1 at the end of this summary). As tools for achieving RE&EE promotion targets, PBGs are applied in four areas:

- (i) PBGs for *business finance* accelerate the development and introduction of new RE&EE technology by enabling innovative start-up SMEs to access risk and debt capital.
- (ii) PBGs for *RE project finance* support the implementation of large-scale projects with above average technology risks, accelerate investments in RE-facilitating infrastructure, and solve specific debt and equity finance problems in small scale project finance.
- (iii) PBGs for *asset finance* enable the aggregation and standardization of small-scale RE&EE loans to end-users as well as the financing of RE&EE investments made by ESCOs and low-income households.
- (iv) PBGs assist the *transfer of RE&EE technology* by reducing the risks in developing countries for foreign investments in RE&EE projects and in subsidiaries, and by facilitating the involvement of local banks in RE&EE business and asset finance.



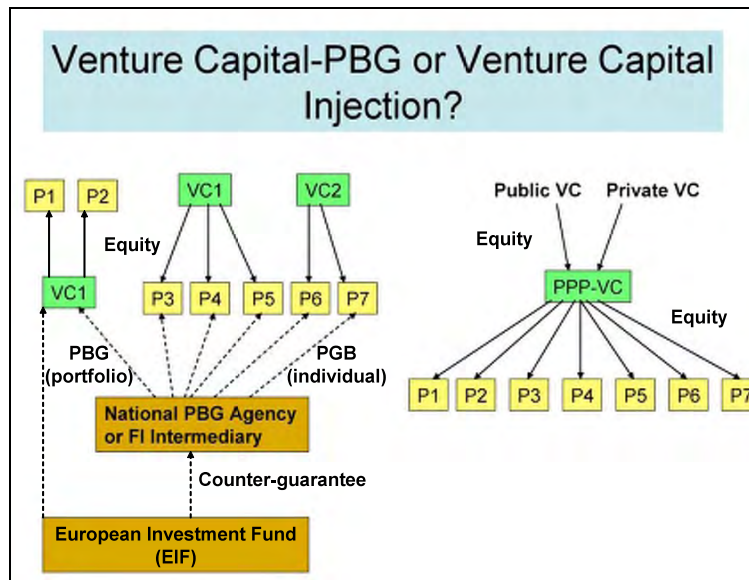
## PBGs to business finance for high-tech SMEs (Chapter 4)

Business finance is a challenge for start-up, high-tech SMEs. Lending risk is high, because start-up SMEs have high failure rates, no business track record, and typically lack acceptable collateral. Transaction costs are high relative to the size of required loans, further moving the risk-return relationship against small borrowers. Therefore, high-tech SMEs either are unable to access sufficient finance, or face stiff charges based on the following pricing formula for capital:

$$\text{"SME Cost of Capital (CC) = Blue chip corporate CC + SME Incremental Risk Premium (IRP) + SME Incremental Cost of Transactions Fee (ICTF)"}"$$

Within the public arsenal of "technology push instruments," the role of PBGs is to assist high-tech start-up SMEs in accessing capital. Depending on the stage of development of the SME, different types of finance are supported by PBGs.

Start-up SMEs have little access to bank credits, making them dependent on *risk capital* for their survival during their so-called pre-seed, seed, and venture capital phases of development. For high-tech SMEs under three to five years old, several governments make PBGs available that provide partial risk cover to share capital and mezzanine finance investments undertaken by business angels (BAs) and venture capitalists (VCs). The design of the PBG depends on the size and sophistication of the national BA and VC community. In countries with “underdeveloped” communities, PBGs are designed to expand the pool of national BA/VC investors as well as the pool of risk capital. Countries with well-developed BA/VC communities may opt to directly expand the pool of risk capital through public investments in BA/VC funds specialized in RE&EE investments.



The follow-up step is to help high-tech SMEs that have some track record and a capital base to access *commercial bank loans*. This can be done in stages, starting with PBGs that are given simultaneously to a mezzanine loan by a VC and a senior loan by a commercial bank. Later, once an SME starts getting revenue from sales of its product, the SME, or its bank, can apply for the partial credit guarantee offered to qualifying SMEs in general.

The third step in the finance chain is to help high-tech SMEs, which have reached the growth capital stage, with their *initial entry to the capital market*. An example is the Austrian AWS’s profit sharing bond scheme.

Some business finance PBGs solve special finance problems: e.g. PBGs for mortgages on laboratory buildings that would be difficult to sell in case of a company’s bankruptcy.

### *PBGs for project finance (Chapter 5)*

Projects employing leading edge technologies that have few reference projects establishing a track record either cannot access project finance or face the following pricing formula for their capital:

$$\text{“Leading Edge Technology Project Cost of Capital = Conventional Project Cost of Capital} \\ \text{+ Technology Risk Premium”}$$

Banks charge high-risk premiums on loans to projects using RE&EE technologies with demonstration project characteristics. In 2003, for example, interest rates on loans to off-shore wind farms in

Europe carried a risk premium of 400 basis points compared with loans to on-shore wind farms. Because RE-investments are capital intensive, these risk premiums are a heavy barrier to the introduction of leading edge RE&EE technologies. PBGs for loans to *projects with above average technology risks* contribute significantly to accelerating the market penetration of new RE&EE technologies. Project examples include second and third generation biofuels, plasma technology for biomass power, superconducting transmission lines, and wave energy projects.

*“Critical infrastructure” projects* emerge in RE&EE because of the speed of implementation required to achieve ambitious policy targets for the switch to low-carbon economies. Typical candidates for infrastructure PBGs are “collective RE systems” that are capital intensive, have long pay-back periods, and confront technical, marketing, or regulatory risks that the private sector either cannot evaluate or will not bear. Examples are exploration drilling for deep geothermal reservoirs, offshore hubs for collecting and transmitting power to shore, investments in “smart grids” to accommodate a large-scale penetration of distributed RE generation and to promote EE, municipal PBGs for biogas and waste energy plants feeding energy into district heating or cooling grids, and charging infrastructure for electric cars. Depending on the type of project, project-finance PBGs can be given by national, state, or municipal governments.

Municipalities in several countries offer municipal PBGs for credits for RE projects that feed energy into *collective energy systems*, such as district heating, that serve the local population.

PBGs to support project finance of *small-scale, grid-connected RE projects* in the 0.5 to 15 MW size range typically address either initial FI resistance to entering a new field of finance or investor difficulties in securing sufficient equity finance. The investments are too small to interest professional investors, such as utilities or large scale RE project developers. Entrepreneurial type investors, on the other hand, find it difficult to raise sufficient equity finance to enable financial closure. Some countries have addressed this barrier by giving tax benefits to project finance composed of multiple small-scale investor certificates, some have made joint public-private mezzanine finance available for such projects, others have introduced PBGs for mezzanine finance.

### *PBGs for asset finance (Chapter 6)*

The technologies for the end-user market comprise customer-sited RETs, such as photovoltaics, solar hot water, and wind energy, EETs for retrofitting existing building stock and construction of affordable multifamily EE housing. Market segments are diverse and dispersed, including public sector buildings, occupant-owned houses, occupant-owned apartment buildings, tenant-occupied buildings, commercial buildings, manufacturing industries, rural enterprises, etc. Individual loans are relatively small, and the transaction costs for investment preparation and financing are relatively high.

The high costs of transactions for banks in processing small-scale heterogeneous loans are the main issue in end-user financing. Credits for end-user investments in RE&EE face the following cost of capital:

*“End-User Finance CC = Corporate balance sheet finance CC + Costs of Transactions Premium”*

In market aggregation strategies to mitigate the problem of small loans and high transaction costs, PBGs are used to achieve four objectives:

- (i) Assisting market entry of new business concepts, such as ESCOs.
- (ii) Facilitating “standardization” of bank finance for RE&EE projects.

- (iii) Addressing problems of energy poverty by enabling low-income consumers to find finance for EE-improvements of their residences.
- (iv) Enabling the securitization of small loans to increase the flow of funds for RE&EE investment.

The diversity of problems that are addressed in market aggregator schemes gives rise to a large variety of PBG schemes. Different PBG schemes support ESCO services for private industry, occupant-owned residential housing, municipal buildings, and ESCO-energy utility demand side management partnerships. Other PBG schemes support direct loans for EE investments in low-income housing, SME and agricultural enterprise investments in RE&EE. Yet another category is PBGs to support the securitization of small RE&EE loans as a means to make more capital available for such investments.

### *PBGs for technology transfer (Chapter 7)*

Transfer of technology to developing countries is achieved through (i) direct foreign investments in large scale RE projects and in the creation of subsidiaries and (ii) national investments in RE&EE projects and in the creation of companies offering RE&EE products and services. PBGs assist both channels.

*PBG protection for technology transfer* is fairly well developed. National export promotion agencies provide *export guarantees* for investments in developing countries, the World Bank provides *partial risk guarantees* (PRGs) and *public backed credit guarantees* (PCGs) to facilitate direct foreign investment; in 2009, the first *private insurance* facilities for RE&EE projects in developing countries were introduced: “*insurance4renewables*”(created by Munich Re, RSA Insurance Group, and CarbonRe); “*Renewco Underwriting*” (created by Lloyd’s insurer Ascot Underwriting) “*Ace Renewable Energy*” (launched by Ace European Group). Some countries provide PBGs for investments in foreign subsidiaries in developing countries. A potential option, which is not yet exploited, is PBGs for loans and equity investments by SMEs in projects demonstrating leading edge RE&EE technologies in developing countries.

A number of PBG structures *facilitate finance for investments in RE&EE by local investors in developing countries*, e.g. PBGs for bond issues by state power companies on the international market, PBGs to increase loan tenor, PBGs for risk capital investments in SMEs, and PBGs for mezzanine finance in project finance.

### *How to structure PBGs (Chapter 8)*

PBGs are not coarse instruments like, for example, tax rebates; rather, they are fine-tuning instruments. Thus, their design requires careful reflection.

PBGs, particularly for end-user finance, are normally part of a complex package of policy instruments and interventions. Getting the package right is the most important challenge when developing PBGs.

A basic recommendation is to base the introduction of new PBGs on careful *market studies* with the dual aim of (i) establishing the objective needs for the PBG and confirming its cost-effectiveness vis-à-vis alternative public finance instruments, and (ii) marketing its advantages to the finance industry.

The identification of the appropriate *risk sharing formula* involves several reflections. First is the level of leveraging, as high leverage is a key success criterion for public finance instruments. Yet, whereas

a low risk sharing percentage (50 percent) increases the leveraging of private finance per guaranteed amount, it reduces total off-take. A favorable ratio may hide a less than optimal absolute level of leveraging. A technical issue related to this is whether the most leverage can be achieved through a PBG for mezzanine finance or for senior loans. Other design issues include how to structure a PBG if a key barrier to loans is demands from FIs for collateral that the target group cannot fulfill. The most effective risk formula to reduce demand for collateral is to offer a combined first order loss guarantee and a subordinated recovery guarantee.

In the *pricing of PBGs*, one must clarify whether full-cost pricing is the aim, or whether under-pricing can be justified by increased off-take and its associated external economic benefits. Two general recommendations are that (i) the level of risk must be reflected in the level of the fee, and (ii) the pricing formulas of “risk capital PBGs” must provide the guarantor with a share in upside gains.

A PBG establishes a contingent claim on the public budget – if the PBG is underpriced. The political issue related to this is *how the contingent liability of a new PBG scheme is to be accounted for in the public budget at the time when it is adopted*. This involves the technical issue of deciding on the appropriate methodology for correctly calculating the size of the contingency.

**Table 1: Examples of PBG-Schemes Described in the Report**

NAME of PBG	PURPOSE	PBG TOOL
<b>PBGs for Business Finance for Technology Development</b>		
<i>Sowalfin (Belgium)</i>	Attract new BA investors & new BA investments	Guarantees to subordinated loans or capital increase investments made by BAs
<i>SME Guarantee Facility, SMEGF (EU)</i>	Increase in FI mezzanine finance and FI guarantee cover for equity	Portfolio and counter guarantees to FIs involved in SME mezzanine finance or equity guarantees
<i>Sofaris (France)</i> - <i>Développement Technologique pour les FCPI/FCPR Fund</i> - <i>SME Performance Guarantee</i>	- Increased investments by VC funds in high-tech unlisted SMEs under seven years old - Encourage corporations to entrust new projects to innovative SMEs	- Guarantees to VC-Funds (counter guaranteed by the EIF) - Counter guarantees to bank guarantees for pre-payments made by large firms for service and product deliveries by SMEs
<i>AWS (Austria)</i> - <i>Equity guarantee</i> - <i>Double Equity guarantee</i> - <i>Technology Finance</i> - <i>Profit sharing bonds</i>	- Attract new entrants into the BA finance business - Provide FI loan finance to SMEs without collateral - Attract joint VC-FI finance for innovative firms with growth p. - Capital for expansion projects + introduction to capital market finance	- Guarantee for third party seed equity investments - Guarantee to subordinated loans by FIs - 100% guarantee for FI subordinated loan, 50% guarantee for VC investment - Guarantee for bonds registered at the unregulated secondary market at the Vienna Stock Exchange
<i>Emerging Technology Fund, ETF (Massachusetts)</i>	Enable bank mortgage finance of special-purpose laboratory buildings in depressed market	PBG for commercial mortgages for specialized buildings used by bio-tech firms
<b>PBGs for Project Finance</b>		
<i>US Dept. of Agriculture Business &amp; Industry Loan Guarantee Program</i>	Promote investments in starch-based ethanol plants	Up to \$25 million in loan guarantees
<i>US DOE guarantee program 2009</i>	Promote investments in leading edge RE demonstration plants, transmission for RE-connected power and smart grids	Partial credit guarantees
<i>Structured finance facility EIB</i>	Pursue EIB equity financing and guarantee operations in favor of large-scale infrastructure schemes	Guarantees for pre-completion and early operational risk, subordinated loans, and mezzanine finance
<i>Geothermal Energy Development Fund GEF/World Bank</i>	Increase investments in exploration of geothermal resources	Partial risk guarantee against the short-term up-front geological risk of exploration and/or the long-term geological risk of facing a lower than estimated temperature, higher than estimated mineralization, or difficult re-injectivity
<i>Resource Risk in Deep-Geothermal Exploration Drilling, KfW, German Ministry of Environment</i>	Increase investments in deep-well drilling for exploration of geothermal resources	Ministry of Environment partial counter guarantee for KfW loans to project developers
<i>Municipal Guarantees for private investments in collective energy supply (Denmark)</i>	Enable investments in RE-based energy supply for district heating systems	Local municipal guarantee to loans given by Danish Municipal Bank to private investments in RE-based energy plants connected to local collective energy system
<i>Renewable Energy and Energy Efficiency Guarantee Program, CORFO, Chile</i>	Enabling project finance by FIs for small-scale grid connected wind, hydro, and geothermal power plants	50% pari-passu guarantee to long-term project loans by FIs



<b>PBGs for Asset Finance</b>		
<i>Bulgarian Energy Efficiency Fund, BEEF</i> - ESCO portfolio guarantee - Residential portfolio guarantee	- Enable ESCO access and get better interest rates on loans from FIs - Enable collective finance of EE improvements in residential buildings	- Portfolio guarantee to ESCO for consumer payment defaults + to cover disruptions in flow of receivables - Portfolio guarantee to loans made by FI to individual condominium owners, each covering his pro-rate share of EE investment in residential building block
<i>Hungary Energy Efficiency Co-Financing Program, HEECP, IFC/GEF</i>	Promote FI involvement in EE finance through leasing, end-user finance, and ESCO finance modalities	First loss guarantee by GEF to IFC's involvement in pari-passu, subordinated recovery, portfolio guarantees, and first loss guarantees to FIs providing EE loans
<i>Phase II China Energy Conservation Project ESCO loan guarantee program, GEF/World Bank</i>	Promote entry of ESCOs by enabling these to access bank loans for their project finance	90% guarantee to commercial banks that make loans to ESCOs for the financing of qualified EE projects.
<i>OTP-Bank PBG-scheme for ESCOs (Rumania) GEF/IFC</i>	Provide ESCO services for public sector clients	First-loss facility for OTP-bank loans to EE projects in municipal buildings
<i>Energy Efficiency Community Challenge (City of Bellingham)</i>	Enable FIs to offer longer terms and lower interest rates on finance for EE investment by residential and small commercial sector	Loan Loss Reserve Fund established by municipality to support FIs making EE project loans
<i>Energy Efficient Mortgage program, EEM, Federal Housing Administration, FHA</i>	Allow low-income households to purchase or refinance a residence and incorporate the cost of EE improvements into the mortgage	Mortgage insurance by HUD of mortgage loans to borrowers who would not otherwise qualify for conventional loans on affordable terms
<i>US Federal Energy Efficiency Finance Facility, FEEFF (proposal)</i>	Increase EE finance by developing a secondary market for numerous small and disaggregated loans for EE&RE (securitization)	Credit enhancement of bond issues through federal loan repayment guarantee
<i>FOGIME (France)</i>	Promote EE investment by SMEs	70% guarantee cover for FI loans to SMEs for EE investments up to €750,000
<i>Rural Energy for America Program, REAP</i>	Promote EE in agricultural operations	60-85% guarantee cover for FI loans for EE investments up to up to USD 25m
<b>PBGs for Technology Transfer and RE&amp;EE Market Penetration in Developing Economies</b>		
<i>FASEP managed by OSEO (France)</i>	Foster the growth of French companies wishing to expand by creating subsidiaries abroad	Guarantee covering economic risk of failure of successful implantation
<i>Multilateral Investment Guarantee Agency, MIGA</i>	Promote foreign direct investments	Insurance against political risks (war and civil disturbance, expropriation, currency transfer risks, and breach of contract)
<i>Leyte-Luzon geothermal power plant project (Philippines) World Bank</i>	Help government energy company access bond finance at low interest rates on the international capital market and with longer loan tenor.	PCG to the bond issue structured as a put option for principal repayment at maturity
<i>West Nile Rural Electrification Company, WENRECO (Uganda)</i>	Expand loan tenor on commercial bank loan from 7 years to 14 years	Option for bullet payment of rest-debt payment at year 7 guaranteed through a zero coupon bond with 7 year maturity
<i>Central American Renewable Energy and Cleaner Production Facility, CAREC</i>	Provide risk finance for investments in grid-connected RE up to 5 MW and creation of clean energy service enterprises	Loan guarantee facility to private sector debt to the CAREC fund
<i>Solar Home Systems Financing Program in Palawan, (Philippines) UNEP/GEF</i>	Enable FI lending to household purchases of solar home systems	Loss reserve fund to support FI loans for household purchases of solar home systems
<i>Joint Implementation Project for EE in residencies in Eastern and Central Europe</i>	Reduce interest rates	Guarantee carbon revenues for lenders who acquire entitlements to carbon credits in return for providing low-interest loans.



# 1 PBGS IN THE FINANCE CONTINUUM FOR RE & EE

## 1.1 Typology of ‘Transformational Technologies’

Some new technologies are *intrinsically transformational*. Because modern information and communication technologies (ICT) hugely improve productivity across sectors, they transform existing services, create a long range of new ones, and drive outsourcing and networking to new heights. Mobile phones replaced public phone booths; the Internet changed information search (Google replaced public libraries) and written communication (emails replaced letters). The market for such transformational technologies develops rapidly without Government support<sup>1</sup> because they provide ‘transformational benefits’ directly to end-users.

The switch to a low-carbon energy sector is a *policy-driven transformation*. Market forces, left on their own, cannot achieve the politically-economically optimal penetration of new energy efficient and renewable energy technologies (EETs & RETs) on the market. One reason is that existing carbon-intensive energy technologies provide high quality energy to end-users already and that EETs & RETs do not provide ‘transformational benefits to users’: an energy efficient car does not provide a better commuting service for the user than a less energy efficient car, and returns from investments in energy efficiency (lower operating costs) compete with alternative investment options such as bonds and equities. The other is that the transformational benefits in terms of reduced CO<sub>2</sub>-emissions and global warming are a public good. The government, therefore, supports the development of new EETs & RETs and their market penetration with a mixture of ‘command-and-control’ and ‘economic incentive’ instruments. Due to the interlocking nature of obstacles to market development, effective frameworks consist of packages of complementary and mutually reinforcing instruments. This report focuses on how publicly backed guarantees (PBGs) are used in combination with other public finance instruments along the innovation pathway for new RETs & EETs from R&D to market maturity.

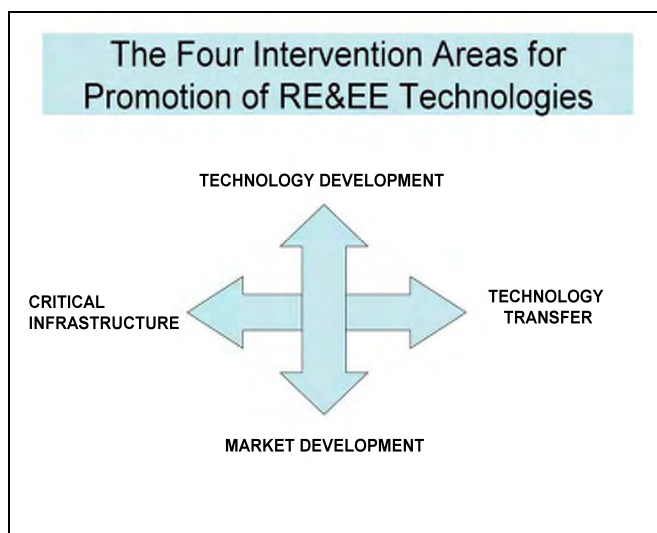


Chart 1: Four Intervention Areas for Clean Energy

<sup>1</sup> The perfect example is Somalia, where efficient mobile phone service exists despite the absence of Government.

The international efforts to promote low-carbon energy comprise the four focal areas of (i) RE&EE technology development, (ii) RE&EE market expansion, (iii) strategic infrastructure for RETs, and (iv) RE&EE technology transfer to developing countries.

## 1.2 PBGs in the Finance Continuum for the Introduction of New Technologies

### 1.2.1 Definition of guarantee

A *guarantee* is a contractual obligation by which one person assumes the responsibility of assuring payment or fulfillment of another's debts or obligations: to pay a debt, to perform a service, or to otherwise compensate for an obligation that another (the primary debtor) is committed to with a third-party (i.e. a lender), in the event that the primary debtor defaults.

### 1.2.2 From business finance to asset finance

Using the “linear model of innovation” as simplification, the so-called “finance continuum chart” identifies major private finance gaps during the development phases of new technologies from the R&D stage to the mature market phase, and shows the resulting composition of private and public finance instruments during the development stages.<sup>2</sup> Along the finance continuum from the R&D stage to the commercial market phase, the volume of public support per unit of investment goes down while the source of grant finance changes from “tax payer paid instruments” (investment grants, tax credits) to “consumer-paid subsidies” (feed-in tariffs, renewable energy portfolio standards, DSM-obligations on energy suppliers). PBGs feature in all phases, but perform different roles along the continuum.

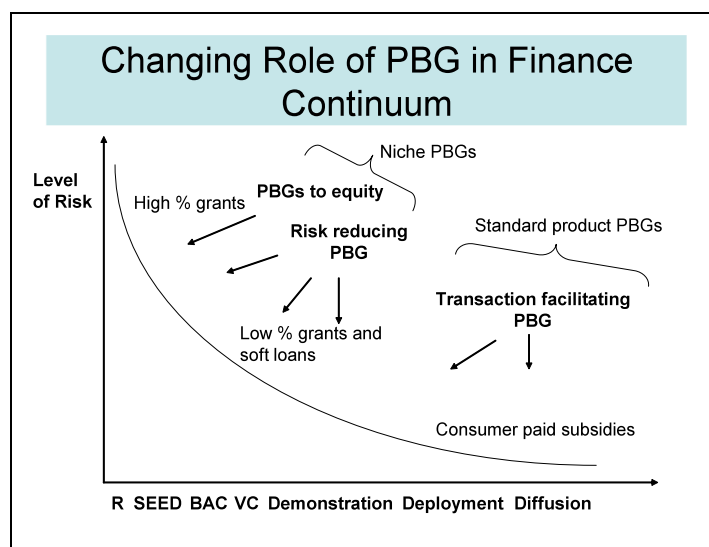


Chart 2: Changing Role of PBGs Along the Finance Continuum

<sup>2</sup> The UNEP SEFI website (<http://sefi.unep.org/>) has a number of publications about public finance instruments for new RE&EE technologies, which present the finance continuum chart. The first one is UNEP SEFI (2005).

In the early phases, PBGs are given to risk capital investments, and in later phases, PBGs are credit guarantees. PBGs for 'RE&EE technology development' are *technology push instruments* that support *business finance* during the R&D, pre-seed, seed, angel capital, and venture capital phases. PBGs for "RE&EE market expansion," "strategic RE&EE infrastructure," and "RE&EE technology transfer to developing countries" are *demand-pull instruments* that support *asset finance* of RE&EE technologies in the deployment and diffusion stages.

### 1.2.3 Effects of PBGs on capital access and on product demand

PBGs *facilitate access to capital* and can *increase the market demand* for eligible technologies.

The risk cover provided by PBGs increases the *supply of capital* to RE&EE investments because it reduces lenders' risks and their transaction costs in providing smaller scale loans (SME loans and household investments in EE). By reducing the requirement for collateral, due diligence costs go down.

PBGs affect the *market demand for supported EETs and RETs* (i) by reducing the overall cost of capital, and (ii) by providing greater flexibility in the structure of project finance, for example, through increases in loan tenor or in grace period.

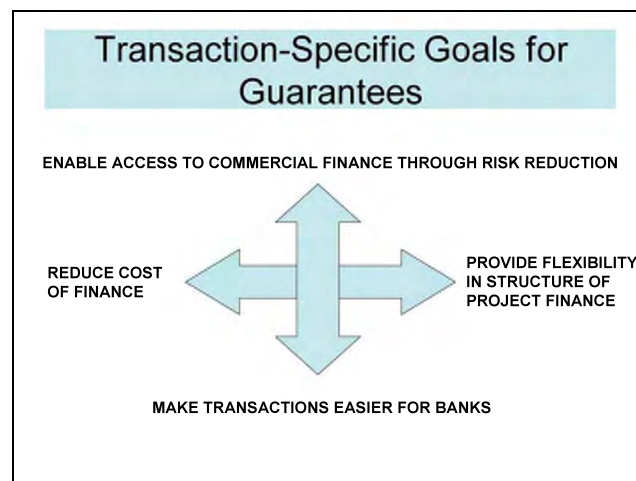
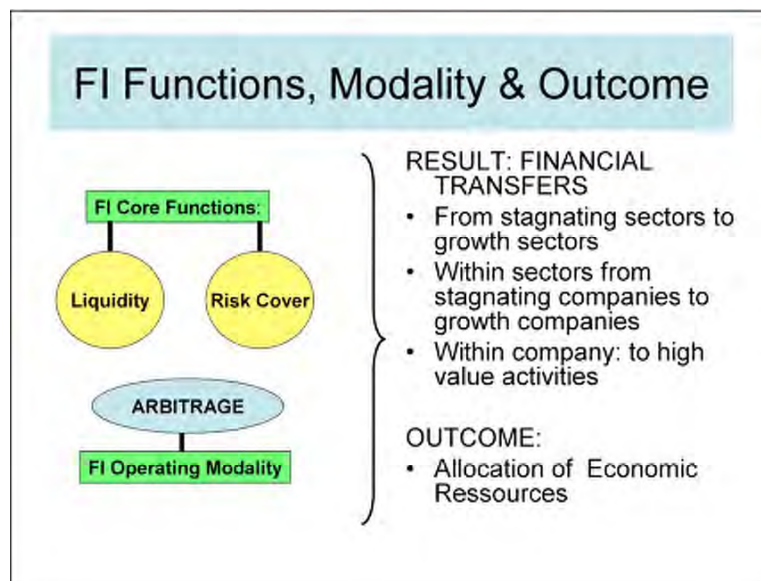


Chart 3: Transaction specific goals for PBGs

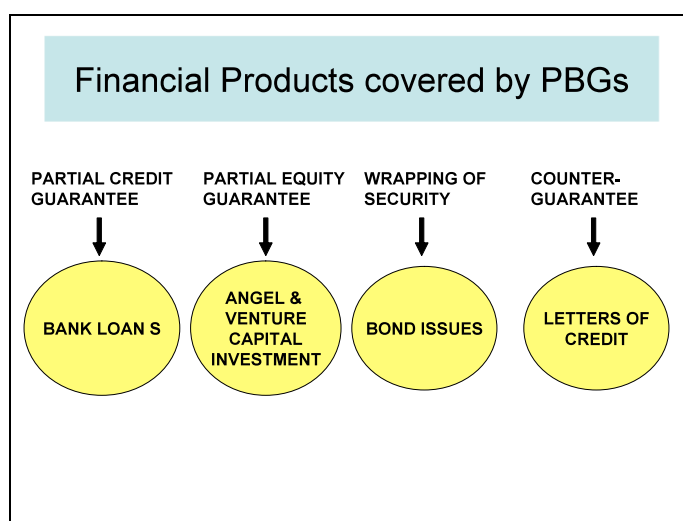
### 1.2.4 Use of PBGs within the chain of commercial finance products

The role of the financial sector is to cover here-and-now demand for *liquidity*, to provide *risk cover* against uncertainties of the future and to *direct private economic resources to their most productive allocation*. In its constant search for the exploitation of *arbitrage* opportunities, the finance industry transfers finance between sectors from sun-set industries to sun-rise industries, within sectors from stagnating to growth companies, and within firms to those projects that provide the highest rate of return. The outcome for national economies is an allocation of resources that is as optimal as possible provided that market inefficiencies are addressed by public finance instruments (see chart 4). The objective of PBGs is to bias the arbitrage opportunities of financial institutions towards finance in RE&EE. PBGs influence the allocation of financial resources within the finance system by addressing either lender liquidity preferences or concerns with risk.



**Chart 4: Financial Sector Functions and Operating Modality**

Since risks are an inherent feature of financial transactions, PBGs are applied in all parts of the finance chain: to equity investments in privately held companies, to credits, to security issues, to guarantees issued by commercial guarantee institutions, and to letters of credit as security for contractual undertakings.



**Chart 5: Financial Products Covered by PBGs**

The financial sector has during the last 20 years seen a non-stop stream of new finance products and public finance instruments. PBGs have had to adjust to the changes in order not to become irrelevant.<sup>3</sup> An example is securitization. The securitization of mortgages, credit card loans, and bank loans spread rapidly, since the technique offloaded risk from the primary generating institutions and satisfied their liquidity preferences. Therefore, steps were taken to introduce PBGs for the securitization of small-scale RE&EE loans as well. To some extent, new public finance instruments are “imitative” of commercial market trends rather than “innovative” per se.

<sup>3</sup> Outright grants and low-interest rate loans never become irrelevant, households and industries will always love free gifts, but PBGs have to adjust to changes in the finance market because they operate within the system.

## 1.3 Prevalence of PBG Use in EE & RE Support Programs

The USA uses PBGs more frequently as an instrument in energy policy than any other country.<sup>4</sup> Whereas EU-countries implement broad EE&RE initiatives without including PBGs in the package of measures, it is difficult to envisage a program proposal from US-DOE without PBGs. The higher use of PBGs in US energy policy is due to three factors: (i) The more sophisticated the financial markets is, the more potential applications can be identified for PBGs, and the easier it is to influence the flow of funds through subtle changes in arbitrage opportunities; (ii) Pro-market ideology: PBGs have more “market flavor” than direct grant finance; (iii) Habit-formation: once a subsidy product like a PBG has entered the market, very soon neither the providers nor the off-takers can imagine life without it.

However, many OECD countries make extensive use of PBGs to support high-tech SMEs during their high-risk start-up phases. The creativity and comprehensiveness of European and Canadian PBG-instruments for SMEs matches what is seen in the USA. These support programs are part of general technology and SME support policies that SMEs involved in EE&RE can access.

Because energy is used in all sectors, RE&EE technologies are supported by a plethora of public programs initiated by different ministries and agencies. Table 2 (next page) gives an overview of EU finance schemes of relevance for RE&EE, arranged by focal policy area. The last column checks whether or not PBGs are part of their instrument portfolio.

The table indicates that the EU does not make use of guarantees as “demand pull” instruments in support of asset finance. The SMEGF is a conventional PBG for SME support facility. In addition, the EU uses PBGs for strategic infrastructure projects and to support technology transfer.

The above EU example reflects the average situation in OECD countries fairly well. Only a few energy programs include PBGs in their portfolio of instruments.

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<sup>4</sup> Some East Asian countries use PBGs much more than the US, e.g. South Korea. But they use PBGs as subsidy instruments in industrial policy.

**Table 2: PBG Use in EU Programs Providing Support to RE&EE**

PROGRAM AND IMPLEMENTING INSTITUTION	PUBLIC FINANCE INSTRUMENT AND APPLICATION AREA	PBG
<b>1. Technology Push</b>		
SMEGF (SME Guarantee Facility) operated by EIF on behalf of EU Commission	Counter guarantees, co-guarantees for guarantee schemes, direct guarantees for FIs for loans, micro-credits, securitization	X
GIF (High Growth and Innovative SMEs Facility) under EIF	GIF1 for seed and start-up (venture capital funds, funds for incubators, sector specific funds, business angel funds). GIF2 for expansion phase (quasi-equity or equity)	
EIP (Entrepreneurship and Innovation Programme) + ECO-Innovation	Grants	
RSFF (Risk Sharing Finance Facility) under 7 <sup>th</sup> Framework Program and EIB	Grants	
RDI (Research, Technological Development, Demonstration and Innovation) 7 <sup>th</sup> Framework Programme	Grants	
<b>2. Demand Pull</b>		
IEE (Intelligent Energy Europe Programme)	Grants to market replication projects of innovative techniques, products, processes practices	
ICT (Policy Support Programme)	Grants to EE in public buildings and social housing	
EEFF (Energy Efficiency Finance Facility) under EBRD, ECDB, EIB, KfW	Grants, loans to EE investments in EU-2 + accession countries	
JESSICA (Joint European Support for Sustainable Investment in City Areas)	Urban Development Funds for housing	
JEREMIE (Joint European Resources for Micro to Medium Enterprises)	Grants and loans	
ERDF (European Regional Development Fund)	Grants and loans	
ESF (European Social Fund)	Grants	
<b>3. Strategic Infrastructure</b>		
LGTT (Loan Guarantee Facility for Trans-European Networks, Transport: TEN-T)	EIB guarantee co-funded by EU-Commission	X
TEN-E	EIB guarantee co-funded by EU-Commission	X
EARDF (European Agriculture and Rural Development Fund)	Grants and loans to bio-energy projects	
JASPERS (Joint Assistance in Supporting Projects in European Region)		
Ad-hoc support program	Investment grants to CCS demonstration projects	
<b>4. Technology Transfer</b>		
NIF (Neighbourhood Investment Facility)	Guarantees to public sector projects (wind farms, concentrated solar power plants, inter-connections), North Africa, previous Soviet Union countries (not EU members)	X
GEEREF (Global Energy Efficiency and Renewable Energy Fund)	Grants and loans to EE&RE projects in developing countries	

Source: EU (2009)

## 2 ECONOMIC RATIONALE FOR USE OF GUARANTEES

### 2.1 The Market for Commercial Risk Management Instruments

#### 2.1.1 Differences in risk aversion and in information

Project developers and lenders react to project risks and uncertainty by either (i) staying away from undertaking the activity, (ii) adjusting the risk-free rate of return upwards as compensation for accepting the risk, and/or (iii) taking insurance/hedging against the risk. The “*project risk-rate of return*” indifference curve (RR-line) shows how a project developer’s (lender’s) asked for rate-of-return on equity (rate of interest) varies according to the perceived levels of project risks and uncertainties. Higher risks are accepted if compensated for by higher potential returns. In the chart, IB is the RR-line for a *commercial bank*; it indicates the rates of interests it charges as a function of project risk. ID is the RR-line for a *commercial insurer*. A developer has submitted the red project, with a project rate-of-return of RRP, to the bank for loan finance. The bank either rejects the project, because the risk level of the project is close to its cut-off point for corporate *risk-tolerance limits* or insists on being paid the RRB rate of interest, which makes development of the project not commercially viable. Thus, the project faces a finance gap: a project which would be funded if the developer had enough own resources is not implemented because external agents will not provide required finance at levels equal to the project’s internal rate of return.

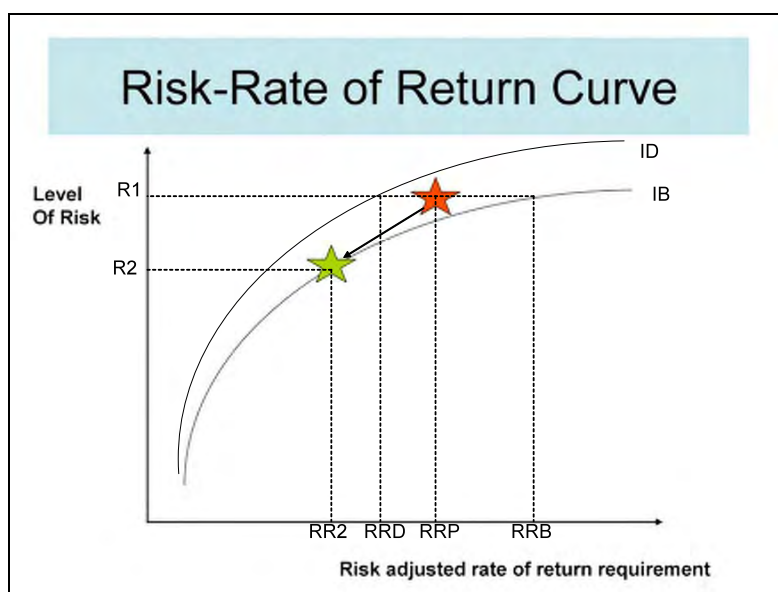


Chart 6: Project Risk – Required Rate-of-Return Curve

Risk insurance products like credit guarantees exploit the arbitrage opportunities arising from differences between actors with regard to their (i) risk-taking willingness or (ii) loss-surviving ability and/or (iii) access to information about the inherent risks of a proposed transaction. Better information about “true” project risks turns what is an uncertainty for one actor into a risk for another.<sup>5</sup> In the chart, the commercial bank can sell the unacceptable risk (e.g. foreign exchange risk, payment risk, fuel supply risk) to the guarantor/insurer at a price of RRD-RR2, reducing the risk level

<sup>5</sup> The difference is that probabilities can be assigned to risks, which enables risk insurance products to be priced.

for the bank to R2, the 'green position'. The bank can then offer the developer the rate RRD, which allows the investor to appropriate the incremental return of RRP-RRD. The 'red project' gets implemented.

Commercial risk instruments owe their existence to four "free-market" factors:

1. In many financial markets, gaps exist between perceived credit risks, as reflected in credit underwriting practices, and actual credit risks (facts are facts, perceptions are reality!). Risk specialists, such as insurance companies or hedgers, having better information on risk probabilities can *price risks more accurately*, and thereby *change what, for a commercial bank, is a project stopping uncertainty into a quantified risk*. The transfer of risks to specialists comes with a price tag for the lending institutions and/or project developers, and so the risk-transfer fees become part of the cost of capital for the loan taker. In the chart, the hedging fee RRD-RR2 is added to the commercial bank rate of RR2 to yield the total rate of RRD. But since specialists are more efficient at managing specific risks than the entity transferring it, and risk transfers take place at the margin, where a reduction in risk leads to a relatively large reduction in the asked for rate of return, the *cost of capital in a free and efficient capital market will go down or, as a minimum be unchanged*. Otherwise, risk management instruments would not be on the market.
2. *Portfolio investors* invest in assets with different RR-profiles: some high risk/high RR, some low risk/low RR. Adding a high risk/high RR asset is a profit-maximizing strategy as long as the total risk-RR profile of the portfolio is not pushed beyond the RR-line frontier.<sup>6</sup>
3. *Agents have different levels of risk aversion*: IB in the chart could represent a commercial bank, ID a development bank; the latter would finance the red project without need of guarantee.<sup>7</sup>
4. *Differences in the financial ability to survive risk events*: A fire that destroys an uninsured house can ruin a household, whereas the damage compensation for an insured house will not ruin the insurance company.

In principle, in a perfectly competitive financial market, the cost of the guarantee (hedging instrument) ought to be equal to the difference in interest yield between a low risk and a higher risk bond. In practice, this is not so: a guarantee often lowers the overall cost of capital. A study on loan pricing in the context of project finance finds that guarantees create significant value to the project: whereas the mean spread over LIBOR in the sample loans was 100 basis points, a loan that had a guarantee benefited from a reduction in spread of 45 basis points.<sup>8</sup> In line with CAPM-theory, the

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<sup>6</sup> Seen from this point of view, a *partial credit guarantee fund* is a *risk transfer and risk diversification mechanism*. It lowers risks to the lender by transferring part of the risk of the counterpart to the PCG issuer; and helps diversifying risk by guaranteeing loans across different sectors and geographic areas.

<sup>7</sup> According to Stiglitz and Weiss, credit rationing, rather than increasing the rate of interest, is rational lender behavior. A financier may be willing to provide financing to some projects/debtors by increasing the risk premium charged, but at some point this approach can backfire due to the *adverse selection problem*: as the risk premium required by lenders rises, so does the riskiness of the pool of interested borrowers. This is reinforced by the *moral hazard problem*: whereas an entrepreneur can be tempted to engage in a project with a lower probability of success, but higher payoffs when successful, a lender does not share in the upside. For these reasons, the expected return by the bank may increase less rapidly than the interest rate; and, beyond a point, may actually decrease. The higher the interest rate, the lower its usefulness and reliability for creditors as a device for sorting out the good borrowers from the bad ones becomes. Faced with this risk, lenders will use non-price criteria (credit rationing) to screen debtors/projects rather than increasing the risk premium.

<sup>8</sup> Source: Study by Kleimeier and Megginson quoted in Seidmann (2005).



value of a guarantee increases with the volatility (or risk) of the underlying asset or credit, the size of the investment, and the time to maturity.<sup>9</sup> According to another study, guarantee values of 15 percent of the underlying debt (gross value before deduction of the guarantee fee) are not uncommon and can often be much larger in risky and long-maturity situations.<sup>10</sup> In the chart, therefore, the total cost of capital including the cost of the guarantee goes down from RRB to RRD.

Not surprisingly, there is a close correspondence between the fee structure of loans and partial risk guarantees (see table 3 showing IBRD loans and PRGs as example).

**Table 3: Correspondence Between Fee Structures for IBRD Loans and PRGs**

IBRD-Loan	IBRD Partial Risk Guarantee
front-end fee	front-end fee
commitment fee	standby fee
lending spread on IBRD loans	guarantee fee

## 2.1.2 Market for guarantees arising out of regulatory arbitrage

The free competitive market demand for guarantees is reinforced by the existence of regulatory rules. Guarantees exploit regulatory arbitrage when the guarantor is not subject to the same regulatory requirements as the lender.

The most important are the Basel II rules for bank capital. The lender (or lessor or bond issuer, as the case may be) is normally a regulated financial institution with capital adequacy ratio and statutory loss provisioning requirements. Under Basel II, guarantees from a triple-A rated guarantor reduce the lender's risk weighted loss provisioning requirements and count toward capital adequacy ratios (statutory loss provisioning and capital requirements). Enabling banks to lower the reserves they need to set aside for a loan results in a higher return on equity for the beneficiary financial institution (FI). Guarantees and loss reserves from public entities, rated governments, and development FIs qualify.<sup>11</sup> As an example: FIs benefiting from EIF (European Investment Fund) guarantees are able to allocate regulatory capital at a reduced rate of 20% in accordance with the EIF's classification as a Multilateral Development Bank under the European Community's solvency ratio directive.

Prudent investment rules for institutional investors, such as pension funds, put a lid on permissible levels of risk. Portfolio guidelines for institutional investors lead these to invest in investment grade bonds and to restrict investments in lower-grade bonds to specified minima. This leads to an over-demand for higher grade, e.g. triple-A bonds. Use of guarantees to raise rating of debt to higher levels thus increases the net-return to an issuer. In this case, the target is not access – the borrower is creditworthy – but to optimize the cost of finance. This type of guarantee is most common for bond

<sup>9</sup> As example to illustrate numeral orders of magnitude: For a 10-year loan and a given risk-free rate of interest, the value of the guarantee is 3.7 percent of the value of the new investment when the standard deviation of asset values is 0.15, rising to 35.4 percent when the standard deviation is 0.35.

<sup>10</sup> Source: Seidman (2005). Bland and Yu estimated the cost of borrowing minus the guarantee fee for 445 insured and 694 uninsured bonds offered in 1985 and found the net gain to be positive and inversely related to credit ratings.

<sup>11</sup> Basel II qualifies most guarantee societies as guarantors if their guarantee product is in line with the regulatory requirements.

issues and securitizations of loan portfolios sold on the capital markets.<sup>12</sup> Commercial guarantee companies such as AMBAC and MBIA in the USA provide these types of guarantees.

## 2.2 Justification for Publicly Backed Guarantees

### 2.2.1 Size of the market for publicly backed guarantees

Publicly backed guarantees are a subsidy instrument because they give beneficiaries access to capital on more favorable terms than the market can provide. They are a popular policy instrument: measured by outstanding guarantees relative to GDP, the median size of schemes in developing countries is 0.30% of GDP versus 0.21% in developed countries. The region with the highest use intensity is Asia, where the median size is almost 5% of GDP; in Korea they it amounts to 9% of GDP or almost 10% of total outstanding credit in the private sector.<sup>13</sup> The intensive use in Korea reflects the country's state dirigist style of economic development policy. In EU countries the use of PBGs is limited to niche applications: according to the internal market rules on State aid, public organizations cannot insure risks that private insurance companies are able to insure in a normal market situation.

### 2.2.2 Economic rationale for PBGs

Private financial markets offer a large and diversified range of risk mitigation products in developed economies. Despite this, a number of factors justify the complementary existence of PBGs in developed economies:

- i. market failures (e.g. incomplete markets, incomplete information)
- ii. market imperfections (e.g. imperfect competition, "infant industries" operating below their minimum efficient scale, early mover disadvantages<sup>14</sup>)
- iii. imperfect distribution of endowments (e.g. up-start firms versus large established firms)
- iv. externalities (e.g. nonexistence of markets, public goods)
- v. policy-dependent investment outcomes (e.g. regulations, public support schemes)
- vi. economic downturns

State-sponsored guarantee agencies have a natural cost advantage in guarantee pricing: once they have been endowed with initial capital, it is sufficient for them to earn a net rate of return on their equity equal to the rate of inflation in order to stay in business.

The next sections give practical examples of factors that led Governments to introduce recipient-specific PBGs. Yet, one can also already introduce the cynical explanation for PBGs: that loan

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<sup>12</sup> "Wrapped bonds" are bonds issued for projects that are wrapped (insured, guaranteed) by an entity with a stronger credit rating than the project. When scheduled payments of principal and interest are guaranteed by a very creditworthy monoline insurer, the bonds are themselves rated AAA/Aaa,

<sup>13</sup> Source: Beck/Klapper/Mendoza (2008)

<sup>14</sup> Early movers face the disadvantage of steep learning curves before information is gathered that also benefits late-comers. A bank that starts lending to a risky group of borrowers bears all the costs in case of default, while facing fierce competition in case of success: its best borrowers are then able to switch to other FIs, because they by then have established a good credit history. The early mover barrier could be reduced if private FIs were to pool resources for the creation of new customer-tailored guarantee schemes, but coordination problems may prevent that.

guarantees can be done with very little budget appropriation and much less oversight than occurs for direct spending. When claims on PBGs are made, the outlays occur many years into the future, beyond the political horizon of current decision makers.

### 2.2.3 Business finance PBGs for start-up SMEs

All countries have introduced PBG programs for loans to start-up SMEs. SMEs face capital shortages because their debt requirements are too small for corporate bond issues and banks are reluctant to lend to SMEs for three reasons:

1. The *problem of asymmetric information* (investors knowing their projects and risks better than bankers) is particularly relevant for new SMEs, particularly when a business plan concerns the promotion of a new concept or a new technology. Thus, banks' risk perceptions are high.
2. Compared with larger established firms, start-up SMEs suffer under *unequally distributed endowments* with regard to collateral and to successful track records and credit history. Due to asymmetric information and high risk perceptions, banks primarily conduct collateral-based lending rather than cash-flow analysis when working with SME borrowers; collateral requirements can in developing countries exceed 150% of the value of the loan.
3. *Transaction costs are high* relative to lending volumes.

As a consequence, in the absence of a PBG-program for SMEs, the *economy suffers deadweight losses* from under-lending to SMEs: not all projects having a positive net present value are able to find funding. Restrictions on the growth of new SMEs are of particular concern to policy makers; because of their importance for jobs - just over two thirds of all private sector jobs in the EU are in SMEs - and because it is believed that the long-term economic growth prospects of an economy depend on the entrepreneurial dynamism of new start-up firms. The existence of positive economic externalities allows the state in well-targeted programs to price PBGs below their full cost and yet achieve a positive net outcome on the state budget as the result of increased tax revenues from economic growth.<sup>15</sup>

A report prepared for the EU Commission confirmed that "even in our highly developed financial markets, four types of company often have difficulty gaining access to credit"<sup>16</sup>; in particular:

- micro-companies with fewer than 10 salaried employees have difficulty finding financial products that suit their specific circumstances;
- "gazelles" (i.e. SMEs in a high-growth and/or transfer phase) have to manage, simultaneously, the need to both increase their equity capital and secure medium-term financing;
- innovative SMEs have difficulty financing intangible acquisitions with a view to supporting their R&D or using new technologies; and
- SMEs' investments in eco-technologies or sustainable development (e.g. in order to reduce CO2 emissions) are regarded by banks as having an abnormal risk profile.<sup>17</sup>

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<sup>15</sup> Source: Bradshaw (2002). The California State Loan Guarantee Program guaranteed small business bank loans to carefully selected firms that could not otherwise obtain credit. The study tracked the actual change in employment at 1,166 firms that received 1,515 loan guarantees from 1990 to 1996 during the depths of the California recession. The study found that employment in firms receiving loan guarantees increased by 40% among all firms and 27% among non-agricultural firms. The program also increased state tax revenues by \$25.5 million, well in excess of the \$13 million the state spent on the program.

<sup>16</sup> Source: BEST (2006)

In order not to break EU internal market rules against state aid, the EU has so-called “de minimis” definitions of which SMEs qualify for PBGs: companies having fewer than 250 employees.<sup>18</sup> A guarantee to a single beneficiary may not incorporate more than EUR 200,000 of State aid within three years.

## 2.2.4 PBGs for sector transformation

When a government introduces a transformational policy, such as a shift of the national economy towards a less carbon-intensive path, a number of new and commercially immature technologies are introduced whose success depend on the timely implementation of support programs and regulatory innovations.

- Since the market for the new products and services depends on the government’s regulatory and policy performance, it is reasonable that the government shares in the risks on the *supply side*. Well-targeted PBGs can secure finance for investments in new technology firms and service industries and in strategic infrastructure investments at a speed and volume commensurate with policy priorities.
- On the *demand side*, PBGs for asset finance can expand the market by reducing the cost of capital.

## 2.2.5 Economic crisis management

The use of PBGs as an economic crisis management instrument has been highlighted by the US\$280 billion in top-rated bonds backed by a guarantee of the Federal Deposit Insurance Corporation that have been issued by the US banks (and General Electric).<sup>19</sup> Similar debt guarantees were introduced in other OECD countries.

But more mundane short-term exceptions also emerged. Examples from Finland’s public finance company Finnvera illustrate the diversity of the use of PBG as a countercyclical finance instrument.

- According to the EU rules on state aid, Finnvera – as a public export credit agency – cannot insure risks that private insurance companies are able to insure in a normal market situation. Because the global financial crisis, which started in autumn 2008, reduced the risk-taking capacity of private credit insurance companies, Finland filed an application with the European Commission for temporary permission to offset the market failure arising in the provision of short-term credit insurance. The European Commission granted Finnvera temporary permission to guarantee export transactions in EU member states and in other western industrialized countries when the payment term is less than two years. The permission is valid until 31 December 2010. Finnvera can only insure export transactions that private providers of credit insurance do not cover. According to the decision of the EU Commission, Finnvera must charge insurance premiums that are at least at the same level as market prices. The exporter must always first apply for insurance from a private provider of credit insurance.

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<sup>17</sup> *Ibid.*

<sup>18</sup> EU Directive 1998/2006 of 15.12.2006 concerning application of articles 87 and 88.

<sup>19</sup> Source: Financial Times, 20.09.2009. The programme was introduced November 2008 and will end October 2009.

- In March 2009, Finnvera introduced products for counter-cyclical financing: counter-cyclical loans and guarantees can be granted to enterprises with at most 1,000 employees that have encountered financial difficulties because of the recession.

Small R&D-intensive companies are particularly susceptible to changes in the supply of risk capital, because they have often-substantial cash needs in their early phase of development. Because a cost-effective attainment of national 2020 emission target depends on the early introduction of promising new low-carbon technologies, a case can be made for specific PBG-programs to protect investment levels in these during cyclical downturns.

## 2.3 PBGs for the Transformation of the Financial Sector

### 2.3.1 Quality of financial system and performance of PBGs

Credit guarantees seek to influence the flow of finance within the arteries of a financial system towards targeted investments and credit seekers. When used as stand-alone instrument, their capital mobilizing function is best performed in financial systems that have

- (i) sufficient liquidity (strong flows),
- (ii) a well developed financial market infrastructure (many arteries),
- (iii) market interest rates that are reasonably attractive (that is, have rates not so high that they represent prima facie a deterrent to borrowing), and
- (iv) local currency loans (so borrowers need not face any foreign exchange risk).

Where such financial market conditions are not found, PBGs are used as elements in complex public finance packages that target the opening of new financial arteries in the finance system.

### 2.3.2 Indirect transformation: learning curve function of PBGs

By reducing market-entry risks for lenders contemplating new products, PBGs reduce aversion to new types of lending. By bringing young technology firms in early contact with debt finance, PBGs assist these in establishing banking relationships.<sup>20</sup> Governments hope that FIs change their practice over time from the industry knowledge they acquire. Borrowers build a successful track record with the banks, which facilitates future access to capital: once a bank has gained experience managing a portfolio of loans to RE&EE projects, it is in a better position to evaluate true project risks and to identify good borrowers. The process of making new loans forces banks to build internal risk assessment abilities and loan monitoring skills, prepare new credit guidelines, conduct evaluations of new types of collateral, and establish internal databases and systems that allow for greater efficiency and more comprehensive analyses of new types of borrowers. In this sense, PBGs help FIs in learning how to provide loans to a new group of borrowers.

Guarantees are most effective in achieving this when they address elevated banker perceptions of risk. Over time such PBGs can be eliminated.

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<sup>20</sup> Seidmann (2005) p. 164

PBGs will not be eliminated when they address a problem that is long-term systemic rather than temporary/solvable. The inherent cost disadvantages of start-up SMEs when securing loans do not disappear as a result of the introduction of a PBG.

Also, because PBGs perform best in sophisticated financial environments, their ability to achieve *financial sector deepening* through learning curve effects is lowest in weak settings, such as in low-income countries.

### 2.3.3 PBGs for direct structural transformation of the finance industry

Some PBG programs target financial deepening directly, aiming to (i) add new arteries to the financial system, (ii) expand the diversity of financial products, and (iii) increase liquidity and tenor.

One example is support for the *development of a national business angel (BA) community*. BA investments in Europe are estimated to be less than 10% of those in the United States.<sup>21</sup> The failure to develop seed and start-up investments prevents new enterprises from reaching a size where they can attract expansion capital. Some countries provided PBGs to equity investments by angel-investors with the specific intention of building up a larger local professional angel investor industry.

Another example is assistance to *capital market deepening by developing securitization*. Securitization transactions allow financial institutions to diversify their funding sources and/or to achieve economic and regulatory capital relief via credit risk transfer. The EIF has been mandated by the European Commission to participate in securitizations using EU funds from the “Competitiveness and Innovation Framework Programme (CIP) 2007-2013”. The EIF provides guarantees to senior and mezzanine tranches of risk in different forms: wraps, bilateral guarantees to note holders, credit default swaps. Whereas EIF guarantees senior and/or mezzanine tranches of risk, typically with a minimum rating equivalent to BB/Ba2, asset-backed securities wrapped by EIF are assigned its AAA/Aaa rating.

## 2.4 Institutional Economics: Information Function of PG Agencies

PBGs are public-private partnership (PPP) arrangements that provide strategic information to involved public agents as well as to participating private FIs and to borrowers.

The public guarantee institutions specialize in market segments that are under-served by private FIs. Their specialist expertise can supplement the financial and quantitative analysis of proposed business plans and asset investments, which is undertaken by bank staff, with the qualitative evaluation of technical industry-specific issues in project and financial analysis. If the guarantor firm has more information than the lending bank with regards to the type of the borrowing firm's investment project, a loan guarantee issued by the guarantor firm signals to the private FI the quality of the investment project of the borrowing firm.

The direct involvement of PG agencies in retail guarantees gives them exposure to loan taking firms as well as to the financial community, deepening the public sector's understanding of both. That helps

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<sup>21</sup> COM(2006) 349. The lack of seed investors is partly due to low returns that make such investments unattractive. The 10-year return on overall venture capital investments was 6.3% in Europe compared with 26% in the US. These low rates of return clearly cannot generate the levels of private investment that Europe needs.

later in designing effective government programs, not only in the form of PBGs but (through the PBG agency's involvement in working groups) also for refinancing, direct lending and grant support programs.





## 3 TYPOLOGY OF PUBLICLY BACKED GUARANTEES

### 3.1 Credit Guarantees

#### 3.1.1 Ad-hoc project guarantees

The term “*ad-hoc project guarantee*” refers to guarantees given to single, major projects considered to be of major strategic importance for energy policy.

#### 3.1.2 Retail guarantees: individual guarantees and portfolio guarantees

The term *retail guarantee* is applied to “mass market PBGs” that guarantee primary lenders’ loans to individual borrowers (EE&RE end-users and project developers). Depending on the degree of the guarantor’s involvement in the loan approval process, a distinction is made between *individual guarantee schemes* and *portfolio guarantees*.

In an individual guarantee (also called loan level guarantee) scheme, the guarantor is heavily involved in each individual transaction, appraising the eligibility of the applicant borrower for the guarantee in parallel with the primary lender’s due diligence to determine eligibility for a loan. Some PBG-agencies use this procedure for PBGs to SME loans.

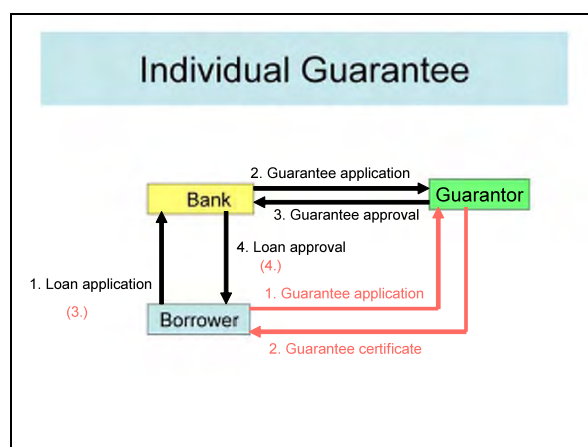
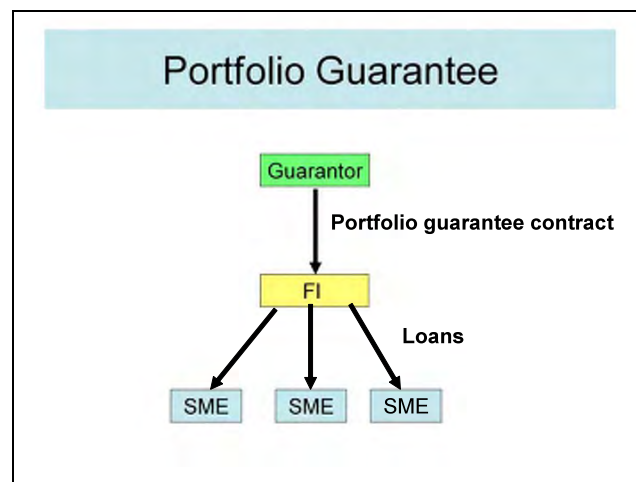


Chart 7: Individual Guarantee

The PBG approval process depends on the design of the scheme (see chart 7). Guarantees can be given either *ex-ante*, before a loan application is evaluated and approved by the bank, or *ex-post*, after the bank has approved a loan. The *ex-post* procedure starts with the developer’s loan application to the bank. The bank refers a potential borrower with insufficient collateral to the guarantee organization, which analyses the viability of the project and the credit-worthiness of the borrower before agreeing to provide a guarantee worth a certain percentage of the loan value. The borrower then pays a fee to the guarantor and the bank approves and disburses the loan. The *ex-ante* scheme starts with the developer’s guarantee application to the guarantor for approval, after which the developer submits a loan application to the FI together with his guarantee certificate.

Because the guarantor’s involvement leads to duplicate loan analysis, the total transaction costs for the processing of loans backed by an individual guarantee are higher than for loans not backed by a guarantee. If the guarantor provides specialist sector or technology knowledge to the due diligence process performed by the lender, for example by disseminating industry information on SME loan performance, the resource use of agency staff involvement provides economic value. Staff advice can also be of value for SME management: inability to credibly project future sales destroys chance of loan approval. But the direct involvement of agencies in individual guarantee schemes comes at a cost that may be higher than the economic value of the service.<sup>22</sup> The individual guarantee modality is best applied to larger scale strategic infrastructure projects, not to schemes involving a larger number of small loans. For these, the “portfolio guarantee approach” is more cost-efficient.

A portfolio guarantee guarantees all loans by the primary lender to a class of borrowers, that is, they are applied to portfolios of loans (see chart 8). The guarantor and lender agree on loan underwriting criteria in advance, and the lender can automatically include new loans meeting these criteria in the loan portfolio covered by the guarantee.<sup>23</sup> For PBGs to loans for final user investments in RE&EE, the portfolio guarantee approach will be used; some agencies also use it for SME loan guarantees.



**Chart 8: Portfolio Guarantee**

The portfolio model has lower transaction costs than the retail guarantee, but may increase the moral hazard problem of “adverse selection”: it allows lenders, at their discretion, to assign guarantees to high risk loans or target borrowers, e.g. SMEs, and inform the guarantor after the loan is approved or defaults. It also poses a “substitution risk”: that higher risk borrowers switch to FIs covered by a portfolio loan guarantee and are accepted.

One option for risk sharing formula is to provide a 50% or 60% cover on each individual loan in the portfolio. This resembles the procedure for individual loans, except that the guarantee percentage is

<sup>22</sup> By the late 1990s, operating costs of the Korea Credit Guarantee Corporation, which does carry out retail appraisals itself, equaled 7.7 per cent of the sums guaranteed; much lower operating costs can be achieved if retail assessment is avoided. Honovan (2008).

<sup>23</sup> A special technique for delegating PBG-decision-making to the lender, which is not an overall portfolio cover, is applied by BBMKB, a public service, which is dependent on the Ministry for Economic Affairs in the Netherlands. Annually, the government allocates a special budget to guarantee support. The total envelope is distributed amongst banks, which can provide the guarantee to credits which require a complementary cover, themselves. BBMKB manages the amount, collects information and intervenes as a controlling and paying agency. According to BEST(2006), this functions very well.

lower than the 60-80% for individual loan guarantees.<sup>24</sup> An alternative, and more elegant, solution is to distinguish between first and second losses on the whole loan portfolio and to give a *second loss guarantee*. The lender absorbs losses amounting to 3-5% of the average outstanding loan portfolio amount, calculated on an annual basis, as the lender's own risk; the PBG covers a fixed percentage of losses in excess of these. The first loss percentage is set somewhat higher than the FI's average historical loss rate, which is assumed to be the estimated default/loss rate.<sup>25</sup> Since the default rate is estimated through a statistical approach to credit risk for the portfolio as a whole, the loan portfolio being covered must preferably consist of a large number of smaller and relatively homogenous loans, for example EE in the residential sector or energy access financing in rural communities.

### 3.1.3 Wholesale guarantees

A *wholesale guarantee* guarantees a wholesale lender's loan to the primary lender, who uses the loan for on-lending to a target group of customers. It is applied when specialized FIs, e.g. SME lenders or micro-finance institutions, have too few funds to lend to all of their creditworthy borrowers.

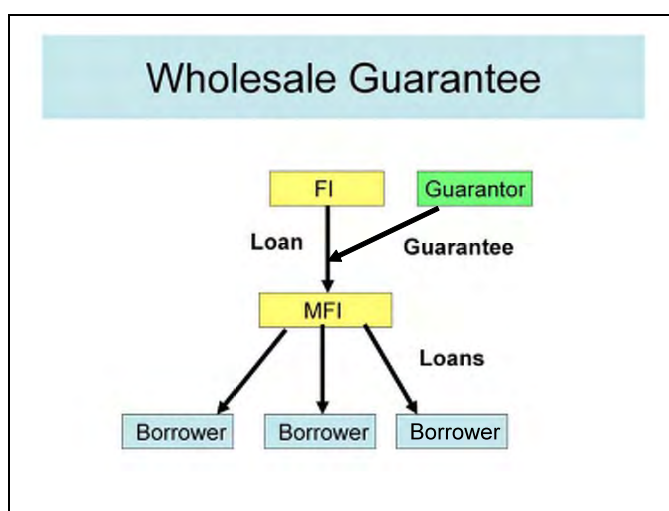


Chart 9: Wholesale Guarantee

The wholesale guarantee shares many of the characteristics of the portfolio guarantee: low transaction costs, moral hazard and the loss coverage formula in the form of second order loss coverage.

### 3.1.4 Liquidity support guarantee

A typical credit guarantee provides cover to third-party lenders for cases where the borrower defaults, whereas a *liquidity support guarantee* provides payments to keep the covered loan current! The point of a PBG structured as a liquidity support guarantee is to avoid loan default for borrowers who may experience liquidity problems but do not have a fundamental problem of insolvency. The average annual GWh-production of weather dependent RETs, such as wind farms and hydropower plants, fluctuates according to wind/water flow conditions throughout the years. In many countries,

<sup>24</sup> Because the guarantee fund screens all borrowers individually in a *retail ("individual") guarantee* scheme it can provide higher percentage cover in this than in a *portfolio guarantee scheme*.

<sup>25</sup> According to Deelen & Molenar (2204), the 5% is based on "the maximum loss rate that any official in a bank may run without jeopardising his/ her career – this may differ for different banks and countries."

a 30% decline, and vice-versa, in wind farm output from one year to the next is not uncommon. A liquidity support guarantee can be useful to counteract shortfalls of revenues in a bad production year.

## 3.2 Formulas for Risk Sharing

### 3.2.1 Procedures for losses and collections on collateral

When a default occurs, the lender faces three types of losses: (i) unpaid loan principal, (ii) unpaid interest, and (iii) the FI's collection costs to sell collateral. Usually, a PBG covers reasonable costs of collection, a fixed percentage of unpaid principle, and sometimes also of unpaid interest.

The FI makes a claim payment to the guarantor for the agreed portion of the loss.

### 3.2.2 Loss sharing ratios

To reduce moral hazard, the FI must remain at risk for a portion of its lending. The percentage guarantee of PBGs, therefore, is "never" 100%;<sup>26</sup> a partial credit guarantee is given. The *formula for risk sharing* in the case of a loss event can be structured in three different ways.

1. A *pro rata loss* basis: the loss between the lender and guarantor is shared according to a defined percentage, typically somewhere between 50 and 80 percent. The pro rata formula is the normal procedure for individual project guarantees and for counter guarantees. But it can be used for portfolio guarantees. The pro-rata percentage may be higher during the first period of a program, and lower during the second period. Such a "learning curve" formula is illustrated in chart 10.

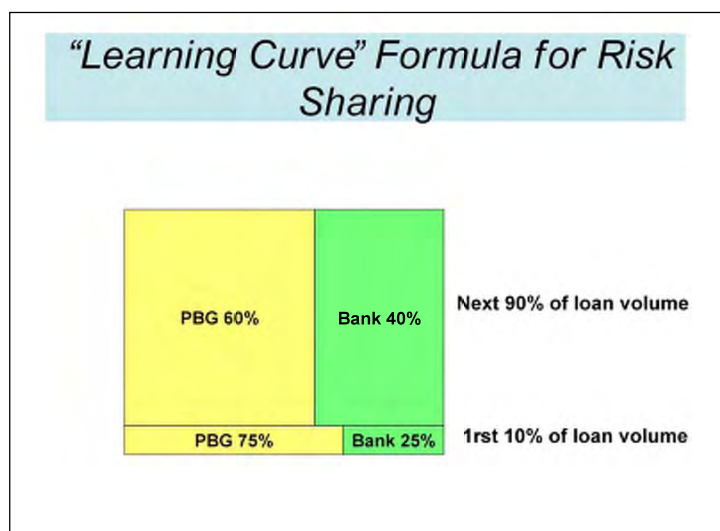


Chart 10: 1<sup>st</sup> and 2<sup>nd</sup> Order for Pro-Rata Risk Sharing

Let us assume that the participating bank is asked to enter, for the first time, into the area of EE finance for industries, e.g. the financing of ESCO-projects.<sup>27</sup> Since the bank needs to become acquainted with the new business area before it operates in a "fully professional

<sup>26</sup> Mutual guarantee funds sometimes guarantee up to 100% of loans and carry out all the responsibilities of the lender. The ownership structure of mutual guarantee funds allows them to guarantee a high percentage of loans without reducing the willingness to repay amongst borrower-members.

<sup>27</sup> For a description of a project case using the formula, see section 6.2.3.

mode,” the loss rate for the first projects, ceteris paribus, ought to be higher than the loss-rate for later projects. Or, the bank may a priori have a higher subjective perception of risks for the first projects than justified by subsequent experience. In any case, a dual learning curve is involved: one for the ESCO, one for the bank. To overcome bank hesitancy for lending, and to persuade the bank to test new waters, a partial credit pro rata guarantee for the total guaranteed loan volume can be divided into a first “learning volume” and a later “business-as-usual” volume. Guarantee coverage for the former would be higher than for the latter.

2. A *second loss guarantee* pays for losses that exceed the non-guaranteed portion of the loan. The principle idea of a second order loss guarantee is to cover incremental losses beyond the normal loss rate. Say a bank has an average loss rate of 1 percent on its loan portfolio. When asked to move into a new business segment, e.g. loans to new RE&EE SMEs, the bank would expect the average loss rate on this consumer segment to be higher. Since the guarantee is partial, the second order loss coverage would not start at 1 percent but at, say, 0.75 percent, and loss coverage can be higher than in a pro rata case since only incremental losses are covered, say 80 percent instead of 60 percent. The bank will be careful in assessing clients since it runs the first risk.
  
3. A *first order loss guarantee* pays for losses from the first loss incurred until the maximum guarantee amount is exhausted; the lender incurs losses only when the total loan loss exceeds the guarantee amount. By covering a large share of first losses and sizing the definition of first losses to be a comfortably high proportion of the loan portfolio, higher than the estimated default/loss rate, a first loss portfolio guarantee can provide very meaningful risk coverage to the FI, with low levels of total guarantee liability relative to the total size of the portfolio. This approach, therefore, has a stronger “collateral-substitution” effect than a second order guarantee.

Table 4 shows how the order of loss affects guarantee payments for a 60% loan guarantee on a \$500,000 loan that incurs an actual loss of \$200,000.

**Table 4: Comparison of Guarantee Payments Under Different Order of Loss Terms**

	Pro Rata Guarantee	First Loss Guarantee	Second Loss Guarantee
Loan amount	\$500,000	\$500,000	\$500,000
Guarantee percentage	60%	60%	60%
Order of loss paid	Pro rata	First	Second
Actual loss	\$200,000	\$200,000	\$200,000
Guarantee paid	\$120,000	\$200,000	0

Source: Seidmann (2005)

### 3.2.3 Sharing of recovered moneys

In an event of loss and payment on the guarantee by the guarantor to the FI, the FI will subsequently undertake recovery actions from the defaulting borrower. Depending on the dispositions of recovered monies (from legal action, from liquidation of collateral, etc.) one distinguishes between pari passu recovery and subordinated recovery:

- In a *pari passu* arrangement, recovered monies, net from an appropriate allowance for the FI's collection costs, are distributed between lender and guarantor in the same proportion that the loss was shared at the time of default. Because the FI must share recovered monies proportionally with the guarantor, the FI will want to have a "second way out" of a defaulted loan; therefore it will require full security for the loan, in addition to the guarantee.
- In the case of a *subordinated recovery* guarantee the FI can apply monies collected, *first* to recover the FI's own losses of principal *before any* remaining monies are repaid back to guarantor. With subordinated recovery guarantees, a lower guarantee percentage can be used to provide the same or even greater level of risk protection to an FI and therefore achieve greater leverage. This approach, therefore, is preferred when lack of sufficient collateral is a major obstacle for loan access.

## 3.3 Counter Guarantees

Counter guarantees are issued to guarantee intermediaries that guarantee loans by primary lenders to targeted categories of borrowers, e.g. SMEs, and/or that issue guarantees covering equity investments in SMEs.

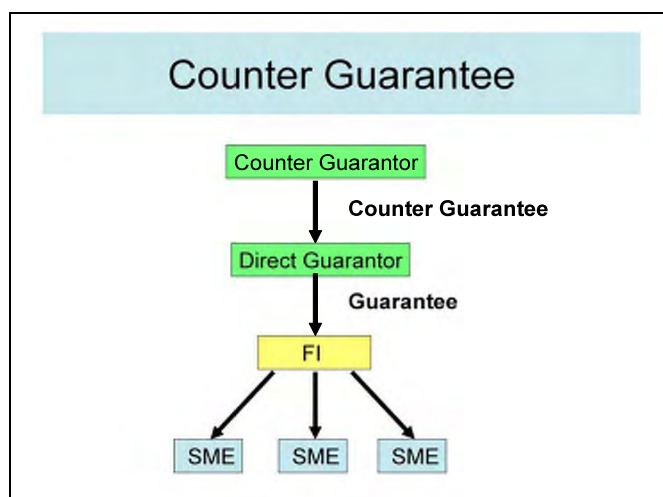


Chart 11: Counter Guarantee

Payments by counter guarantees are capped at a pre-set amount, which is a percentage (called the "cap rate") of the total amount covered by the guarantee. The cap rate is based on the expected cumulative net losses incurred by the intermediary.

## 3.4 Capital Market Guarantees

### 3.4.1 Equity guarantees

Equity-PBGs are given to risk capital investments in high-tech SMEs during their seed and venture capital (VC) phases, that is, to investments in privately held companies. Their aim is to improve the financial structure of supported SMEs and to attract more business angels and VC investors into the area of high-tech SME financing. Equity guarantees are partial guarantees and may be conditional on a matching non-guaranteed VC-investment, which is incremental to already-committed outside risk capital (see chart 12).

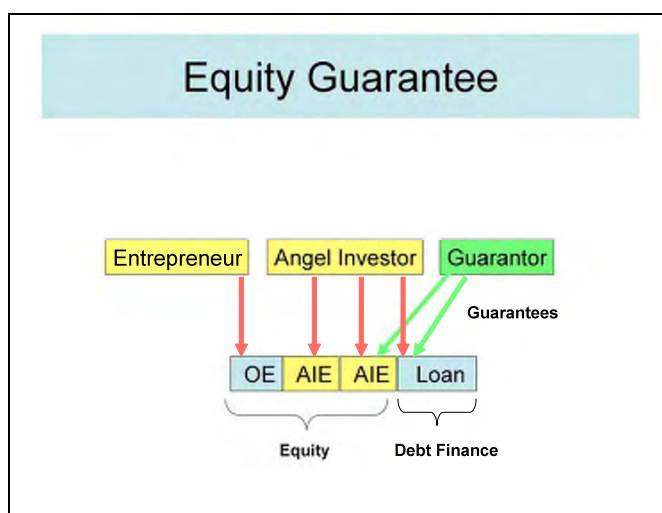


Chart 12: Equity Guarantee

Usually, a loan either provided or guaranteed by an angel investor is the only source of loan finance for up-start firms in the earliest phases.<sup>28</sup> The combination shown in chart 12 of an equity guarantee with a credit guarantee given to the same angel investor is rare. It is included to make the point that the guarantee to a business angel investor can also be given to a loan from his side.

### 3.4.2 Wrapped bonds

When project debt issues are “wrapped,” the scheduled payments of principal and interest of underlying financial assets are guaranteed by an entity with a stronger credit rating than the project. When the EIF guarantees senior and/or mezzanine tranches of risk, typically with a minimum rating equivalent to BB/Ba2, asset-backed securities wrapped by EIF are assigned its AAA/Aaa/AAA rating.<sup>29</sup> Wrapping is a process to increase placement ability of issued bonds and securities.

<sup>28</sup> Note, however, the example in section 4.1 of PBGs to bank mortgage loans for high-tech laboratory buildings that because of special purpose construction have limited market demand if the SME defaults.

<sup>29</sup> EIF has been mandated by the European Commission to participate in securitizations using EU funds from the CIP - Competitiveness and Innovation Framework Programme 2007-2013. EIF guarantees on Asset Backed Securities (ABS) are provided in different forms, such as wraps or bilateral guarantees to the noteholders.

In the modern world of structured finance, where fee income replaces interest rate income as the main source of revenue for financial intermediaries, public finance is forced to follow trends.<sup>30</sup> In RE&EE deployment, wrapping of bond issues are used, inter alia, to enable SMEs to access capital market finance prior to an IPO (AWS's "micro-corporate bond" described in section 3.1.2) or to allow power companies in developing countries to place bond issues on the international capital market for the financing of RE-based power plants (the Philippines' Leyton-Luzon geothermal power project described in section 7.3.2). Concepts to facilitate the securitization of small-scale EE&RE loans are under development (FEEFF described in section 5.4.1).

The execution of securitization transactions allows unrated or low rated institutions, such as smaller banks, to gain access to capital markets and/or to achieve economic and regulatory capital relief via credit risk transfer. The aim of PBGs for *Secondary Market Refinancing of Loan Portfolios* is to increase new *Primary Market Loan Origination* for the target purpose/group.<sup>31</sup> The availability of a *secondary market* for the refinancing or securitization of portfolios of clean energy loans can motivate FIs to originate more loans, similar to the home mortgage market, and can thus drive the primary market by offering a ready defined refinancing method. The originating lender can also capture the present value of their financial spread at the time of refinancing; for longer tenor loans, e.g., 7-10+ years, this is a significant income opportunity. The PBG contract, however, does not rely on this economic incentive effect alone. In exchange for the wrapping of a bond issue of a portfolio of clean energy/SME loans provided for the benefit of the note holders, the originating lender commits in the PBG-agreement to create a new portfolio of medium- or long-term financing to clean energy/SMEs during an agreed period (known as the Additional Portfolio). The required size and composition of this portfolio depends on the size and the seniority of the PBG, typically it will be at least 50% of the portfolio that is securitized.<sup>32</sup>

Chart 13 shows a "true sale securitization," where a company (the originator) sells a pool of its assets (receivables generated in the ordinary course of its business) to a special purpose vehicle (SPV, purchaser or issuer).<sup>33</sup> To finance the purchase of the assets, the SPV issues debt instruments (e.g. bonds) into the capital markets.<sup>34</sup> In the chart, risk cover is provided to the SPV in the form of currency and interest rate swaps, while a PBG wraps the security issue by providing guarantees to the senior and mezzanine tranches of its underlying portfolio of assets and a first loss portion remains uncovered.

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<sup>30</sup> Well-known examples for securitization of financial assets are mortgages, car loans, credit card receivables.

<sup>31</sup> The term "*primary lending market*" refers to the origination of *new* loans.

<sup>32</sup> EIF condition. SME financing securitized with the help of EIF includes not just cash (SME loans) but also synthetic securitization transactions (SME loan guarantees). In a synthetic securitization, the originator does not sell any assets, but transfers the risk of loss associated with certain of its assets to an SPV or bank against payment of a fee.

<sup>33</sup> Source of chart: CIF website

<sup>34</sup> See Freshfields Bruckhaus Deringer (2005)



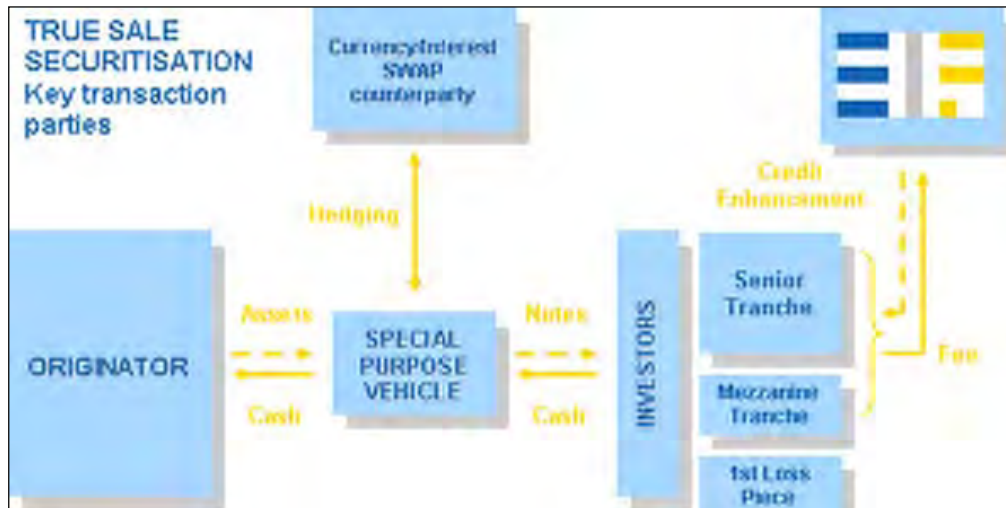


Chart 13: True Sale Securitization Wrapped by PBGs

### 3.5 Risk Guarantees

*Partial Risk Guarantees (PRGs)* provide coverage against well-defined risks related to government performance. Risks may include expropriation, currency inconvertibility or non-transfer, political violence, and breach of contract. These are referred to as political risks (“non-commercial risks”), as distinct from purely commercial or project-related risks.

### 3.6 Near-alternatives to Guarantees

#### 3.6.1 Alternative to portfolio guarantees: loss reserve funds

Public funds can establish a *loss reserves fund* (LRF) to provide risk coverage for a FI's losses on a portfolio of loans to eligible investments and borrowers. A key feature of LRFs is that *no guarantor is required*. A public agency can provide the LRFs directly to the lending institution or to a trustee or escrow agent who manages the LRFs. The size of the loss reserve is determined with reference to the estimated default risk; typically they are sized to be a margin above the estimated loss rate.

If the loss reserve equals 10% of the total original principal of a loan portfolio, \$1.00 in loss reserves can support \$10.00 in lending. If a portion of the loss reserves is contributed from the commercial parties involved, e.g., FI and vendors, then leverage of the public funds is increased.

Loss reserves provide risk coverage very similar to a first loss portfolio guarantee. They can be used when the loan portfolio consists of a large numbers of smaller loan transactions where a statistical approach can be taken to the credit structure of the loan portfolio as a whole.

- If the portfolio consists of 2000 equal size transactions, then a single default results in a maximum 0.05% loss. In that case, if the FI estimates the expected default rates at less than 10%, a reserve of 10% would be a meaningful credit enhancement instrument.

- In a portfolio consisting of five equal size transactions, a single default results in a 20% loss on the portfolio. In that case, a reserve of 10% would be “over-spent” in one default.

### 3.6.2 Alternative to partial risk guarantee: insurance

A *guarantee* is a three-party contract, e.g. between guarantor, contracting party and contracted party; an *insurance* is a two-party contract between an insurer and the insured. For an insured party, insurance operates very similarly to a risk guarantee: when a particular insured event happens, the insurer pays the insured according to well-defined formulas.

The difference can be subtle:

- Austria Wirtschaftsservice has an equity guarantee scheme, which gives risk reduction to Business Angel investors against capital loss; offering a 100 % guarantee for cash investments of less than €20,000 and a 50% guarantee for investments up to €1 million. The World Bank’s MIGA offers insurance to equity investments in infrastructure projects. The slight difference is that business angels are supposed to be temporary co-investors, whereas investors covered by MIGA are project developers and owners.
- The US Federal Housing Agency has a number of programs that insure mortgage loans; wrapping of bonds is performed by guarantees to the underlying portfolio.

As new EE&RE technology matures and project experience is gathered, it can increasingly leave the realm of PBGs and enter the realm of commercial insurance. When the market for a technology becomes a mass market, it becomes commercially viable for insurers to launch new tailor made products. The establishment in 2009 by three commercial insurance facilities specialized in RE insurance illustrates this evolution (see section 7.2.7).

## 3.7 Complementary Instruments to Guarantees

### 3.7.1 Equity-debt gap coverage: subordinated debt and preferred shares

Partial credit guarantees are not an effective instrument to attract a commercial bank loan to a project when the investor’s equity is insufficient to comply with the minimum equity requirement for eligibility. In those circumstances, a subordinated debt instrument (such as a mezzanine loan) is superior. Subordinated debt provides in the range of 10 to 25 percent of a project’s sources of funds, and is mostly intended to support small scale (<15 MW) RE and EE projects. As shown in chart 14, it can simultaneously (i) substitute for and reduce the amount of senior debt (improving the senior lender’s loan-to-value and debt service coverage ratios), and (ii) close an existing equity gap (allowing the project developer to preserve controlling ownership interests in their project or company).

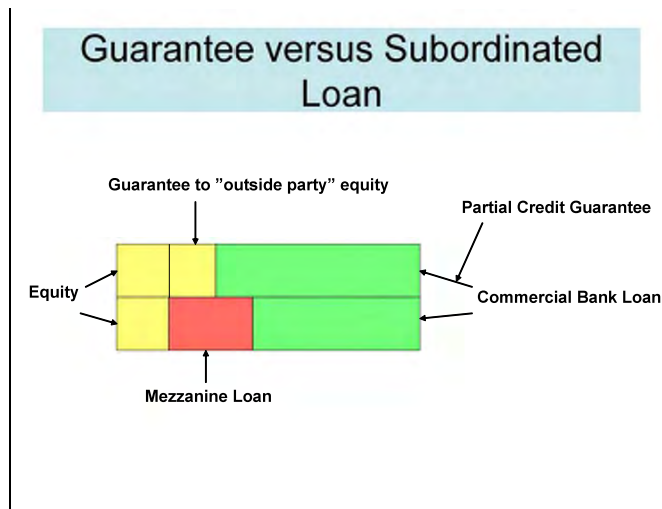


Chart 14: Guarantee versus Mezzanine Loan

In “*subordination*,” the subordinated party accepts a lower priority of repayment and/or security than the senior party. The *senior lender* gets paid first, *subordinated debt* is repaid from project revenues after all project operating costs and senior debt service has been paid. Subordinated lenders are compensated by a higher rate of interest on their loan, and, in some cases, by upside potential in the form of profit sharing or acquiring a project’s certified emissions reductions, as applicable. A *mezzanine loan* is unsecured debt, requiring no collateral to be put up; instead, lenders have the right to convert their stake to an equity or ownership in the event of a default on the loan. Mezzanine financing is a particularly appealing form of liquidity for owners of privately held companies because mezzanine financiers do not retain an interest in the company except in the event of a default.

The subordinated debt facility is provided by a public program but typically managed by the FI, which on-lends to projects in conjunction with senior project loans funded by the FI from its own resources.

When the objective is to *increase loan tenor* beyond the longest loan tenor of the FI, then subordination is effected by having all *sub-debt principal repayment deferred* until after the senior loan principal is fully repaid. Thus, the subordinated lender takes the long-term end of a project loan. For an example, see chart 19.

Subordinated debt facilities achieve a moderate level of fund mobilization by supporting and leveraging senior debt. The risk position of subordinated debt can be improved by *adding a loan provided on a “first loss” basis to the finance package* (see chart 13). This supports and leverages the subordinated debt, which in turn supports and leverages the senior debt. This concept has been applied by the European Union’s Patient Capital Initiative and the French agency ADEME, where concessional funds provide the higher risk tier of funding within a sub-debt facility.

This funding can also be combined with *technical assistance funding* that can assist the sub-debt fund and/or its partner senior lenders to market and prepare projects for investment, including aggregated investment programs.

As an alternative to subordinated debt, other legal structures can be used, such as *convertible debt* or *preferred shares*, which get paid dividends prior to profit distribution to common stock shareholders, but have lower voting rights.

## 3.8 Alternative Instruments for PBGs: Liquidity Shortage

### 3.8.1 Special purpose credit lines

When lack of liquidity, rather than project risks, is a major obstacle to investments in RE&EE, special purpose credit lines can be established. The structure of the credit line depends on the specific intermediary objectives (the final objective is increased EE&RE).

In 2003 the Thai Government established an *energy efficiency revolving fund* with revenues from a petroleum tax that provides loan capital to six Thai banks at below market interest rates. With the objective being to leverage a maximum amount of private finance with limited public funds, the fund initially provided up to 50% of a project's total loan requirements and later reduced this to 30%, resulting in a leverage ratio of over 4:1, including leveraged investor equity. Similar to an outright grant, this fund is a combined liquidity and subsidy instrument. But, as it can be reused, it needs a lower level of annual replenishment than a grant scheme.<sup>35</sup>

The Nordic Environment Finance Corporation (NEFCO)'s *Clean Production Fund* was established in 1997 to "promote technological investments in industrial projects in order to curb the emission of harmful substances into the environment."<sup>36</sup> The fund can finance up to EUR 350,000 or 90% of the investment cost for such projects in the form of subsidized loans; in recent years, primarily projects in Russia and Ukraine have been financed. The fund provides direct financing to investors because commercial banks are hesitant to finance upgrading of facilities and because *NEFCO loan repayments are directly tied to the savings realized from the projects* as a result of the energy efficiency measures as well as other resource saving measures. The fund, thus, is a liquidity, subsidy, and risk instrument.

### 3.8.2 Direct public investments in risk capital

When the obstacle to investment is shortage of business angel capital/venture capital, then public co-investments in private risk capital funds is a solution.

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<sup>35</sup> "There are some building categories (e.g., not-for-profits, historic buildings, affordable housing) for which publicly managed revolving loan funds (RLF) represent a good financing solution. But RLFs do not leverage private capital as efficiently as credit enhancement and are less likely to catalyze the development of private capital markets for efficiency." This verdict is made by Leeds & Duke (2009).

<sup>36</sup> NEFCO website <http://www.nefco.org/>

## 4 PBGs FOR BUSINESS FINANCE IN HIGH-TECH SMEs

### 4.1 PBGs for High-tech Entrepreneurial Start-ups

A report prepared for the EU Commission confirmed that “even in our highly developed financial markets, four types of company often have difficulty gaining access to credit; in particular:”<sup>37</sup>

- micro-companies with fewer than 10 salaried employees have difficulty finding financial products that suit their specific circumstances;
- “gazelles” (i.e. SMEs in a high-growth and/or transfer phase) have to manage, simultaneously, the need to both increase their equity capital and secure medium-term financing;
- innovative SMEs have difficulty financing intangible acquisitions with a view to supporting their R&D or using new technologies; and
- SMEs’ investment in eco-technologies or sustainable development (e.g. in order to reduce CO2 emissions) are regarded by banks as having an abnormal risk profile

Business finance is a particular challenge for start-up high-tech SMEs. Lending risk is high, because start-up SMEs have high failure rates, no business track record, and typically lack acceptable collateral.<sup>38</sup> Transaction costs are high relative to the size of required loans, further moving the risk-return relationship against small borrowers. Thus, high-tech SMEs either are unable to access sufficient financing, or face the following pricing formula for loans:

$$\text{“SME Cost of Capital (CC) = Blue chip corporate CC + SME Incremental Risk Premium (IRP) + SME Incremental Cost of Transactions Fee (ICTF)”}$$

Due to the importance of SMEs for employment<sup>39</sup> and for the dynamism of the national economy, all OECD-countries have PBG-programs to assist new SMEs in getting access to outside financing. To be eligible for PBG-support, the SME must be an entrepreneurial firm, that is, a start-up firm set up by an independent entrepreneur, and not a subsidiary of a larger corporation.<sup>40</sup>

Assistance to *high-tech start-ups* has particularly high priority. Because start-up high techs in their pre-seed and seed-capital phases are too far from commercial income to be able to access loans, several countries offer PBGs to risk capital investments in innovative firms under 3-5 years old. In countries with less sophisticated financial sectors, financial sector deepening becomes a separate policy objective for PBGs.<sup>41</sup> Because continental European countries have a much weaker business angel (BA) and venture capital (VC) investor community than the US, the strengthening of the BA/VC community is a subsidiary target for European PBGs to investments in high-tech start-ups.<sup>42</sup>

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<sup>37</sup> EIB (2008)

<sup>38</sup> Due to this, private risk capital and public support finance are awarded on the basis of the business plan and the quality of the management team.

<sup>39</sup> SMEs provide the majority of private sector employment in all countries.

<sup>40</sup> An established corporation can develop new technologies either within its existing legal structure or through a new subsidiary established for the purpose. The latter is a start-up company in a sense and a SME. But its access to equity and loan finance is different from entrepreneurially driven firms. This is why such companies are not eligible to assistance from public institutions specialising in providing guarantees to SMEs.

<sup>41</sup> The challenges for PBGs posed by the financial sector in developing countries are discussed in chapter 7.

<sup>42</sup> However, US federal and state governments also invest in VC-funds. In 1995, public venture capital initiatives invested \$2.4 billion in the United States, against \$3.9 billion invested by private venture funds. Source: Arping&Lorant&Morrison (2008)

Specific business finance programs for firms offering RE&EE products and services exist only in developing countries; in OECD countries, RE&EE SMEs access general PBG programs for SMEs. Since the portfolio of public finance products managed by SME-agencies is comprehensive, the arrangement seems to cover the needs of RE&EE SMEs for PBGs. A DFI-sponsored study about finance for low-carbon industries in the UK concluded, “there is no real evidence of a sector-specific funding gap.”<sup>43</sup>

## 4.2 PBGs for Risk Capital Investments in High-tech SMEs

During the pre-commercialization phases of “R&D,” “seed/incubation,” and “proof-of-concept,” high-tech start-up SMEs cannot access bank loans due to lack of evidence of a revenue stream capable of covering the costs of interest and payments on principal.<sup>44</sup> PBGs for these phases are given to risk finance: to mezzanine-type finance and equity investments by people other than the start-up entrepreneur. Since the investments are made by professional investors (business angels or venture capitalists), the advisory role of PBG staff towards the FI and the SME is close to zero.

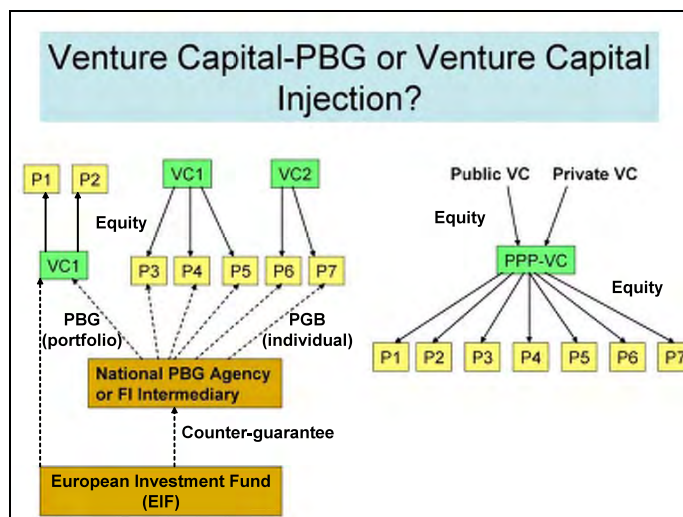


Chart 15: PBG to Venture Capital or Public VC Investment?

Chart 15 summarizes the main public finance approaches to support access to private risk capital. The existence of VC funds permits the use of portfolio guarantees as well as individual guarantees. The fundamental “system difference” is between use of equity PBGs (left side) and public equity capital investments in VC-funds (right side). The choice between the two public finance schemes depends on three factors.

- (i) One is belief in *what works fastest*. Public investments in VC-funds provide new risk funds directly, also from the private sector, since public funds are provided on a 50%/50% matching fund basis.

<sup>43</sup> Source: DFI (2006). The point is not that RE&EE SMEs face no commercial funding gaps: firms complain about insufficient funds for large scale demonstration projects or for business development (especially in internationalization). Hokkanen (2009) notes that RE&EE SMEs in Finland face liquidity challenges in growth phases. But SMEs in other sectors are confronted with such gaps as well

<sup>44</sup> Normally, start-up SMEs can access debt only if a business angel provides a mezzanine loan or gives a guarantee for a commercial bank loan to the SME.

- (ii) Whether the *development of a broad-based BA/VC community is a major side-objective*. The VC-industry in continental Europe is much less developed than in the UK, which again is far behind the VC-industry in the USA. Austria's AWS sees equity-PBGs as a good instrument to attract more individuals/firms interested in entering the BA-field.
- (iii) Whether there is a strong wish to *share in the upside potential of supported investments*. The potential for this is evident for public co-investments in VC funds. In PBG schemes, upside potential can be built in through success-dependent fee rates, but this does not allow for the "windfall profits" of VC-capital investments when a highly profitable technology is developed.

The following provides examples of structures used.

Sowalfin in Belgium gives partial guarantees to subordinated loans or capital increase investments made by BAs. The size of the guaranteed investment is minimum €25,000, maximum €150,000. The duration of the guarantee is five years; guarantee cover is a maximum 50% of the investments realized by the BA during years 1 to 3, 40% during year 4, and 30% during year 5. The guarantee is suppletive, meaning that it might only be called in the case of bankruptcy or liquidation of the enterprise. The BA is supposed to produce proof showing that it will not receive any potential dividend resulting from the bankruptcy or the liquidation. Annual fee payable during five years is at least 2% of the guaranteed funds. The demand for a guarantee needs to be made by the intermediary of a BA's network before the equity investment is made or the subordinated loan is granted. The network and the BA are supposed to have previously signed a convention with Sowalfin. Files are submitted twice a month to an investment committee. The decision-making process is prompt and there is no red tape for an enterprise.

The EU's SME Guarantee Facility (SMEGF) is financed by the "Competitiveness and Innovation Framework Programme 2007 to 2013 (CIP)," and is managed by the European Investment Fund, (EIF). EIF provides capped guarantees partially covering portfolios of financing to SMEs undertaken by banks, leasing companies, guarantee institutions, mutual guarantee funds, etc. SMEGF gives partial risk cover to equity or mezzanine financing granted by FIs to SMEs. Depending on the type of FI and its activity, EIF can issue *partial risk portfolio guarantees* to FIs that provide mezzanine finance directly to SMEs, or *counter guarantees* to FIs that issue guarantees covering equity investments or mezzanine financing for SMEs. The guarantee rate is 50% for both products. The cap rate for the portfolio guarantee is based on the expected cumulative net losses incurred by the FI. The maximum investment/financing amount that may be covered by its so-called EU Guarantee is EUR 500,000 per SME. No guarantee fees are charged, commitment fees may be charged. Maximum guarantee maturity is 10 years; the minimum is 1 year.

Sofaris in France manages various innovation funds.<sup>45</sup> Its '*Biotechnology*' Fund combines loans and equity guarantees. Its '*Développement Technologique pour les FCPI/FCPR*' Fund issues guarantees for VC funds (counter guaranteed by the EIF). Sofaris signs an annual framework agreement with VC-funds after analyzing their management teams, their investment targets (focus on innovation) and past performances. Each VC fund receives an annual portfolio PBG. Investment decisions are taken

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<sup>45</sup> Sofaris is a specialised financial institution, fulfilling a permanent mission of public interest: shareholders are the French State via BDPME (Bank for Development of SMEs) (58.3 %), banks, and financial institutions. Its aim is to manage loan guarantee schemes funded by the French State, Caisse des Dépôts et Consignation (CDC), the European Commission, and French local authorities. Fifty thousand guarantees are granted annually, representing an amount of financing of around EUR 400 million. This represents a part of around 20% of the loans granted by banks to SMEs in France, including 65% of SMEs in their early stage. Source: SEFI (2006).

independently by fund management.<sup>46</sup> Eligible investments are guaranteed until the maximum investment amount is reached. Eligible investments are financed in the form of shares, convertible bonds, or subordinated loans in under seven years old, unlisted SMEs, located in France. The guarantee covers 50% of the investment for 10 years and can be raised to 70% for under three year old enterprises. The guarantee fee is fixed as an annual percentage on the guaranteed financial investment plus a small share in capital gains made by the VC funds. The guarantee comes into play when the SME is declared bankrupt or, in the case of divestment with a loss, when the SME has lost more than 50% of its equity since the investment date. The advantages of this mechanism for the public are a controlled final risk thanks to the stop-loss technique and an important leverage on public money: when VC-funds achieve a positive IRR, the leverage increases dramatically. The advantages for VC-funds are simplified formalities, quick decisions, and a smoother 'J curve.'<sup>47</sup> This is particularly useful when trying to bring in institutional investors that are averse to highly volatile returns. In addition, the guarantee mechanism increases the amount of cash during the first years after the initial investment phase, thus allowing for second round financing or new investments.

Austria Wirtschaftsservice GmbH (AWS) manages a portfolio of public finance products, including development phase-specific PBGs, that together offers an impressive continuity of support throughout the finance continuum. Relevant products for high-tech SMEs are the "equity guarantee," "double equity guarantee," "seed-finance," "technology finance," and "micro-corporate bond" schemes.

- The *Equity Guarantee* scheme gives risk reduction to BAs against capital loss. It offers a 100% guarantee for cash investments of less than €20,000 and a 50% guarantee for investments up to €1 million. The guarantee covers only minority shares (< 50%) and is not applicable for investments made by relatives of the entrepreneur or the entrepreneur himself. AWS charges a 0.5% upfront handling fee, a minimum 0.5 % p.a. guarantee fee plus a success based fee.
- The *Double Equity Guarantee Scheme* guarantees subordinated loans to start up SMEs without collateral. The guarantee covers up to 80% of loan volume, max €2.5 million, and is conditioned on an incremental equity investment of an equal amount by a BA or VC investor. The latter must be non-dilutive (sales of equity shares are not allowed during the guarantee period). Tenor is up to 10 years including grace period; the payback schedule is flexible. The upfront handling fee is 0.5%, the guarantee fee is 1.0% per year plus a success based annual fee.
- The *Seed-Financing Program* provides subsidized start-up capital in the form of a mezzanine loan to innovative firms with fewer than 25 employees that have a high growth potential. The maximum loan amount is €727,000. The loan is paid out according to a milestone plan. Payment of interest is paid only in the case of profit and is capped at 8.5 % p.a. on a retrospective basis.
- The *Technology Financing Program* aims to leverage commercial bank loans jointly with equity capital from VC companies to young high-tech Austrian companies with a high growth potential. The scheme provides a 100% guarantee for additional (subordinated) bank loans subject to an equal amount of equity investment by the VC company. The latter receives a guarantee for up to 50%. Investments by BA are covered only as (minority) syndication

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<sup>46</sup> The stop-loss ceiling for payments is based on the portfolio composition. (Stop-loss insurance, also known as excess insurance, is a product that provides protection against catastrophic or unpredictable losses. It pays any claim that is more than the "deductible," that is, the amount that the company chooses to pay out-of-pocket.)

<sup>47</sup> The tendency of private equity funds to deliver negative returns in early years and investment gains in the outlying years as the portfolios of companies mature.



partners for the VC Company. The guarantee is for €200,000 to 1.8 million of investment. AWS charges a guarantee fee of 1% p.a. plus an additional success based fee.

- The aim of the *Profit-Sharing Bonds* (“*Micro Corporate Bond*”) scheme is to provide capital to expansion projects with capital needs of up to €2 million. AWS guarantees the nominal amount of a corporate bond having a tenor of minimum ten years. The bond is registered with the unregulated secondary market at the Vienna Stock Exchange. The effect for the SME is similar to “going public,” except that investors get a profit share, but no company shares. AWS charges an upfront fee of approximately 10% plus a success based fee plus a bank fee.

Small Business Investment Companies (SBICs) are privately owned investment companies that are licensed and regulated by the US Small Business Administration (SBA) to stimulate and supplement the flow of private equity and long-term loan funds to SMEs. *SBA provides public funds to SBICs to match capital raised from private investors.* VCs participate in the SBIC program to supplement their own private capital with funds borrowed at favorable rates through *SBA’s guarantee of SBIC debentures* that are sold to private investors.

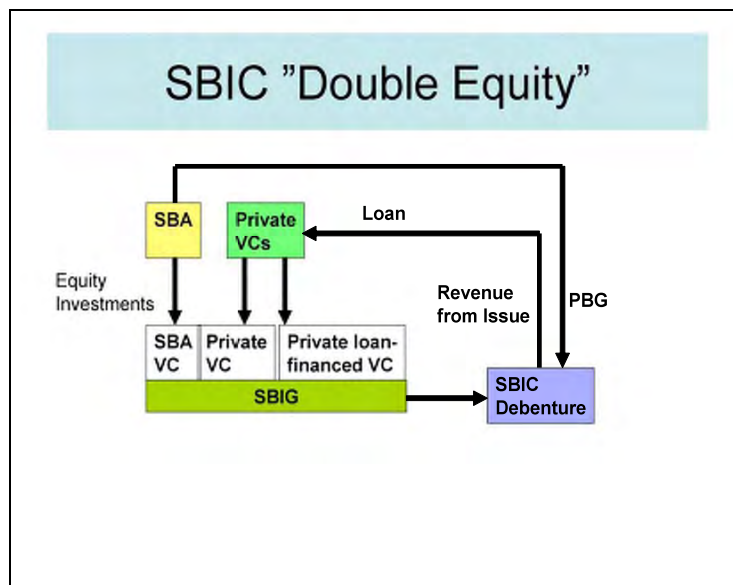


Chart 16: Small Business Administration’s Double Equity Scheme for SBIC

### 4.3 PBGs for Loans to High-tech Start-ups

Examples of business start-up products comprise:

- KfW’s *StartGeld Program* provides StartGeld loans via on-lending by local banks to entrepreneurs starting their business and small companies. KfW offers a partial exemption from liability of 80% for the on-lending bank. A counter guarantee by EIF shares the 80% liability on a 50% basis.

Examples of credit guarantees for growth companies comprise:

- *Vækstkaution, Denmark*, guarantees bank loans to companies with a high growth potential that are used for the development of prototypes, production methods, patent applications, and

market analysis. The decision making process is fewer than five days for loans ranging from €10,000 to €670,000. The guarantee premium amounts to 3% for the first and second years, then to 1.5% for the following years.

- The State of Massachusetts's *Emerging Technology Fund (ETF)* administered a PBG for commercial mortgages for specialized buildings used by bio-tech firms. Biotech firms require costly R&D laboratories to develop their products and even more expensive pilot production plants to manufacture products for clinical trials. Seeking to preserve expensive equity capital, biotech firms approached banks for loans to construct these facilities. Bankers, however, were unwilling to finance them given the uncertain future cash flows of the biotech firms. Furthermore, with large losses from real estate loans, bankers did not relish lending for very costly buildings that could easily lose value if the demand for lab and pilot production space declined. To solve the finance bottleneck, the state created a State Guarantee Fund of US\$30 million, administered by Emerging Technology Fund (ETF), to provide PBGs to bank loan for specialized real estate facilities (laboratories and plants). The ETF has to maintain a minimum reserve level equal to the greater of 30% of total outstanding guarantees, or two years worth of guaranteed payments for the facility.

#### 4.4 SME Performance Guarantees to Open Markets for SMEs

Sofaris may introduce counter guarantees to bank guarantees for pre-payments made by large-scale firms for contracted service and product deliveries by innovative SMEs. The aim is encourage large corporations to entrust delivery and implementation of innovative projects to innovative SMEs. The counter guarantee granted by Sofaris would enable an SME to get a bank guarantee for pre-payments. The bank guarantee would make the beneficiary SMEs become a less risky product or service provider.

## 5 PBGs FOR PROJECT FINANCE

### 5.1 PBGs for Innovative Projects with Above-average Risks

#### 5.1.1 Cost of capital for projects using unproven leading edge technology

Projects employing leading edge technologies that have few reference projects to refer to, either cannot get access to project finance or face the following pricing formula for loans:

*“Leading Edge Technology Project Cost of Capital = Conventional Project Cost of Capital  
+ Technology Risk Premium”*

Banks charge high risk premiums on loans to projects using RE&EE technologies with demonstration project characteristics. In 2003, for example, interest rates on loans to off-shore wind farms in Europe carried a risk premium of 400 basis points compared with loans to on-shore wind farms.

#### 5.1.2 Risk sharing instruments for investments in projects using leading edge technology

Due to their wish for a speedy introduction of new technologies that can reduce the cost of reaching CO<sub>2</sub>-reduction goals, governments have a strong interest in enabling the leading edge private sector – the early adopters and risk takers – to develop and gain experience of new, pre-commercial technologies and services. Early high risk can be taken in partnership with business before the market is ready and willing to take that risk.

The DOE’s loan guarantee program awarded a US\$158 million loan guarantee in late 2009 for the power utility NRG’s 112 MW Somerset Massachusetts plasma gasification project. It will repower the existing 108 MW plant with new Westinghouse Plasma gasification technology that will use solid biomass and coal feedstock. Heated to a very high temperature, the feedstock produces syngas that is then combusted in the plant’s boiler. The plant will use up to 35% eligible (that is, Massachusetts Department of Environmental Protection-approved) biomass and, if permitted, up to 100% eligible biomass.

The EU’s Risk Sharing Finance Facility (RSFF) was created to support debt financing of research, technological development, innovation and demonstration projects in Europe. The main objective is to improve access to debt financing for promoters of R&I investments by sharing the underlying risks between the EU’s 7th Research Framework Programme and the EIB. The RSFF will, through capital allocations and provisions of €1 billion each from FP7 and the EIB for the period 2007-2013, guarantee the risks borne by EIB when lending directly to the promoters or when guaranteeing loans made by FIs. It extends the ability of the EIB to provide loans or guarantees to projects with a low and sub-investment grade risk profile. The main targets of the loans are R&D projects (including infrastructure projects) that have a strong European dimension. Initially RSFF is likely to benefit mostly medium and large innovative companies and large-scale research undertakings such as European or national research infrastructures. However, RSFF is also open to SMEs, research organizations, and Public-Private Partnerships contributing to FP7 objectives.

Contingent grants, grants that are ‘loaned’ without interest and repayment requirements until the technology and intellectual property (IP) have been successfully exploited, can also leverage significant commercial investment. Contingent grants provided by Canada’s Technology Early Action Measures (TEAM) fund have leveraged several hundred millions of Canadian dollars in follow-on financing and achieved a 5:1 leverage ratio of further private financing and other investment.<sup>48</sup>

### 5.1.3 PBGs for biofuels

In the US, *starch-based ethanol plants*, being rural businesses, are eligible for up to \$25 million in loan guarantees under the US Department of Agriculture’s business & industry loan guarantee program. Meat, dairy, and poultry groups criticize this PBG facility for helping ethanol makers pay for high-priced corn, thereby violating free competition principles. Since the supported ethanol plants are commercially viable businesses, the critique makes sense in principle.

Yet, the economic justification for PBGs for *ethanol plants demonstrating the commercial viability of cellulosic ethanol production* is strong. First, the ethanol industry faces two major price risks. On the supply side, the price of corn is very volatile. On the demand side, sales prices are strongly correlated with heavily fluctuating gasoline prices. Fortunately for the industry, there has been a strong co-variance in the prices of corn and of crude oil during the last five years, yet volatility in gross and net revenue is a risk feature of the industry. Second, the fuel supply chain and the technology are both complex, and the technology is still in the developing stages. As of September 2009, only two or three small commercial cellulose ethanol bio-refineries are at or near the operational stage. Key issues for a successful commercial cellulosic ethanol industry are:

- developing efficient low-cost chemical and/or thermal conversion processes,
- developing the accompanying in-plant handling and pre-processing technology for the feedstock,
- developing suitable technology for farm and forest production, harvesting, handling, storage, and transport of the feedstock, and
- assuring an affordable long-term supply of feedstock for the plant through appropriate contracting procedures that will allow the feedstock to be competitive with its alternative uses and alternative uses of land.<sup>49</sup>

Government policy, on the other hand, asks for a fast build-up of plant capacity. The Energy Independence and Security Act of December 2007 (EISA) envisions that ethanol from various cellulosic feedstocks will play an increasing role in supplying U.S. automotive fuel in the next 15 years. The act mandates that, starting in 2010, 100 million gallons of cellulose-derived ethanol will be blended in the nation’s gasoline supply. To meet the EISA mandate for 2011, the nation would need 192 plants each with an annual capacity of 1.5 million gallons, or 46 commercial-sized plants with a capacity of 5.5 million gallons.

The mandated demand for an annually increasing supply of fuels makes investments commercially viable, eliminating any need for Government investment grants. But the high risks in technology and in organizing fuel supply make the financial sector hesitant to provide financing at the volume and speed necessary. This situation provides the perfect justification for a PBG.

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<sup>48</sup> Source: UNEP-SEFI-BASE (2006)

<sup>49</sup> See Wisner (2009)

The EPA Act authorizes \$650 million in loan guarantees to “leading edge biofuels projects”.<sup>50</sup> Criteria for eligibility are (i) it must be designed to produce transportation fuels from biomass and similar sources that substantially reduce life-cycle greenhouse gas emissions compared to other transportation fuels, (ii) it must be a new or significantly improved technology performing at the pilot or demonstration scale that is likely to become a commercial technology in order for the project to satisfy “reasonable prospect of repayment” requirement. The DOE would issue loan guarantees for up to four projects to demonstrate commercial feasibility of producing ethanol from biomass resources or municipal waste. Each project would produce at least 30 million gallons of ethanol per year and could receive a loan guarantee for up to 80% of its cost up to a maximum of US\$250 million.

## 5.2 PBGs for RE-facilitating Infrastructure Investments

### 5.2.1 Characteristics of PBGs for infrastructure investments

PBGs for investments in “critical” or “strategic” energy infrastructure are given as individual guarantees in an ad-hoc manner when a policy need for them arises:

- The US DOE gave loan guarantees to synthetic fuels producers in the late 1970s and early 1980s (which taxpayers were forced to pay for after falling oil prices made synthetic fuels production uncompetitive and producers defaulted on billions of dollars of loans) and plans to give conditional loan guarantees to investments in new nuclear reactors, under Title XVII of the Energy Policy Act of 2005.
- The German Government has guaranteed investments in the Russia-German gas pipeline through the Baltic Sea.
- Canada has during the last 20 years given PBGs to the development of three energy projects: the Hibernia Project for offshore oil in Newfoundland; NewGrade, a heavy oil upgrader in Regina, Saskatchewan; and the Westray Coal Project in Pictou County, Nova Scotia.<sup>51</sup>

“Critical infrastructure” projects emerge in RE&EE because of the speed that OECD countries have formulated as a policy target in their switch to low-carbon economies. The policy targets call for rapid development and marketing of new RE technologies, investments in grid based and pipe-based infrastructures, and simultaneous development of regulations and planning approvals. Whenever there is a combination of speed, higher than average uncertainties, and yet prospects of solid demand in the long term, one can expect PBGs to be used. Typical candidates for infrastructure PBGs are “collective RE systems” that are capital intensive, have long pay-back periods and confront technical, marketing, or regulatory risks that the private sector either cannot evaluate or will not bear – e.g. investments in superconducting transmission lines.

The emerging need for risk facilities for large, capital intensive investments that have higher than average risks is anticipated by several development finance institutions. The *EIB* established its *Structured Finance facility* in 2001 to provide funding to projects with a risk profile higher than the standard normally accepted by the Bank and to pursue equity financing and guarantee operations in favor of large-scale infrastructure schemes. Transnational transport investments are targeted above all, though RE projects qualify as well. The facility provides a broad mix of financial products: senior

<sup>50</sup> Example of potential project: Commercialization of Advanced Design Bio-Refineries for Multi-Feedstock Processing into Biofuels

<sup>51</sup> For Hibernia, estimated public sector financial assistance is 74% of the net project cost. For NewGrade, the federal government assumed 35% of the risk, the government of Saskatchewan 65%, and CCRL none.

loans and guarantees incorporating pre-completion and early operational risk; subordinated loans and guarantees ranking ahead of shareholder subordinated debt; mezzanine finance, including high-yield debt for SMEs that are growing into larger industrial companies or undergoing restructuring; project-related derivatives. The first reserves in the Risk Provision Fund of €750 million for this purpose were fully allocated between 2001 and 2006, generating operations totaling between €1.5 and €2.5bn.

## 5.2.2 PBGs for exploration risks in geothermal energy

Guarantees can be designed to cover *specialized specific risks*; such as exploration risks in geothermal energy. The latter are capital intensive and carry the risk of failure to find commercially exploitable resources. Below, examples are given of different guarantee structures.

The *World Bank-GEF's ECA Geothermal Energy Program*, started in 2004, set up a Geothermal Energy Development Fund with three financing windows: a technical assistance window, a partial risk guarantee window, and an investment funding window (see chart 17).<sup>52</sup>

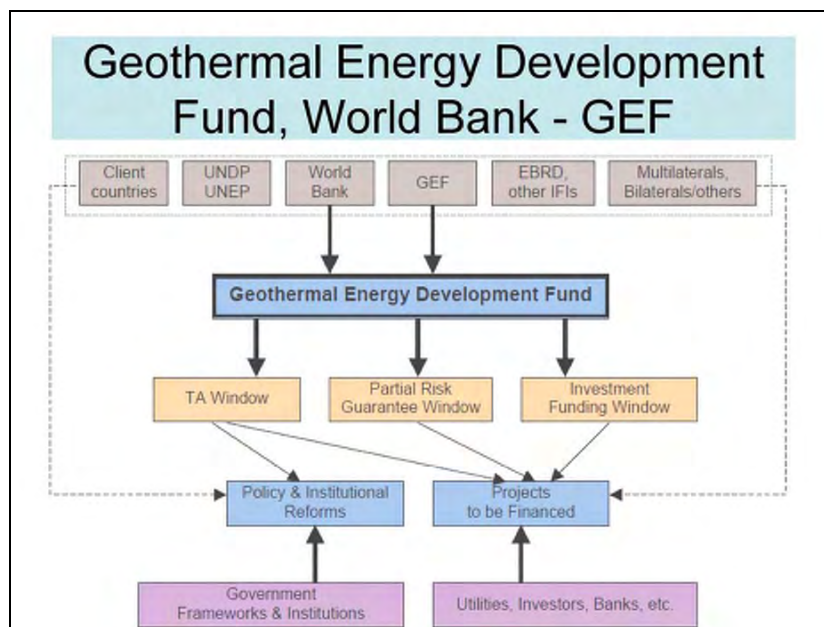


Chart 17: Geothermal Energy Development Fund

The PRG facility, endowed with US\$12 million, partially insures project investors against the short-term up-front geological risk of exploration and/or the long-term geological risk of facing a lower than estimated temperature, higher than estimated mineralization, or difficult re-injectivity.

*Chile uses a public insurance guarantee*, the near-cousin of PBGs. Studies indicate that Chile has potential to host upwards of 3GW in geothermal capacity, but geothermal exploration risk constitutes a barrier to development of this potential. The Government of Chile's energy minister announced in 2009 a program to insure 30-70% of the costs of unsuccessful geothermal exploration wells. The dry-well insurance will be made available to any company that manages to secure a geothermal exploration concession. The first unsuccessful well will have 70% of its costs repaid by the government program; this will decrease to 50% for the second and 30% for the third. Total liability is

<sup>52</sup> Source: World Bank info paper on the GeoFund.

capped at US\$8 million. The Ministry of Energy and Mines is also proceeding with mapping other geothermal resources and developing national geothermal law to stream-line the concession application processes whilst deterring companies that secure concessions with an eye to selling on the rights at a premium.

*KfW is the implementing agency for the German Ministry of Environment's credit program "Resource Risk in Deep-Geothermal Exploration Drilling."*<sup>53</sup> The commercial Munich Counter Guarantee Company collaborates in the program with advice and provides a partial counter guarantee for KfW loans to project developers.<sup>54</sup> Drilling projects comprising at least two deep-well drills in the business plan (production and injection drill) are eligible. KfW will lend to cover up to 80% of eligible costs. Maximum loan amount is €16 million per project. No collateral is required. Maximum tenor is 10 years, grace year is 2 years.

The *African Rift Geothermal Energy Development Facility (ARGe) Risk Guarantee Fund* gives PRGs to early stage exploration drilling, where there is a considerable probability of unsuccessful drilling. It is believed that commercial insurance premiums for this would likely to be prohibitively high for investors. The provision of a grant-financed "soft" guarantee window makes investments more interesting commercially. For later stage production drilling for advanced field assessment, the drilling-failure rate is much inferior, therefore, insurance for this to be provided on a commercial basis.

### **5.2.3 Municipal PBGs for biogas-systems attached to district heating systems**

Municipalities will have an increasingly active role to play in the transformation process towards low-carbon national economies. Partly inspired by Agenda 21 initiatives, municipalities across the world have become increasingly engaged as local promoters and coordinators of environment finance. Rooftop PV, solar water heaters, geo-exchange cooling, EE-projects, water supply, and waste disposal projects are implemented everywhere; hence the importance of including local government as actors in market transformation programs.

District heating systems provide heat or cooling services to residential and commercial areas and, in fulfilling this function, act as "garbage collectors for fuels": their combined heat and power production plants use fossil fuels, municipal waste, biomass waste, wood pellets, or biogas produced from mixtures of manure and slaughterhouse waste, etc. as fuels. Solar thermal heat and wind farm generated power are other RE-sources used for heat production. Because district heating systems are capital intensive, their financial and economic viability depends on (i) high and fast connection rates in their areas of supply and (ii) on getting the cost of debt finance down to low levels. Because of this need and because they serve local clients, there is a long tradition of municipal PCGs to investments in district heating.

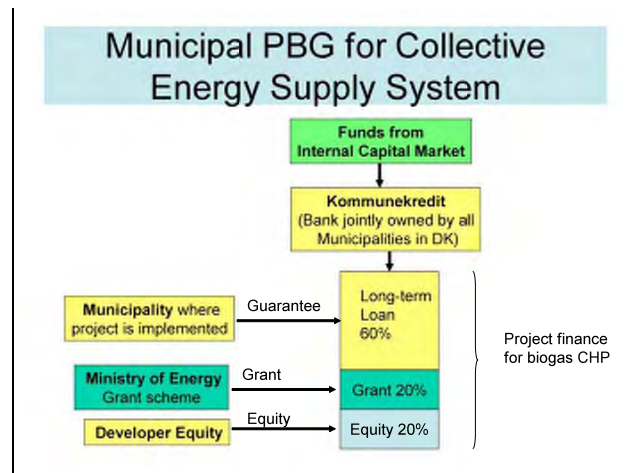
The Danish Government has promoted the establishment of large collective biogas plants (serving as collection points for manure from farms in surrounding supply area) since the late 1980s. After some expensive lessons learned from the application of immature technologies in the 1980s, biogas systems are now technically reliable. But, they are much more capital intensive than fossil-fuel based alternatives, hence the need to keep down the cost of capital. This is achieved by the system summarized in chart 23.

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<sup>53</sup> Bundesministeriums für Umwelt, Naturschutz und Reaktorsicherheit (BMU).

<sup>54</sup> Münchener Rückversicherungs-Gesellschaft AG





**Chart 18: Municipal PBG for Biogas Plant in District Heating**

The loan taker in the biogas system is usually a *not-for-profit consumer owned district heating company*. It asks the local municipality to guarantee a project finance loan given by the Danish Bank for Municipalities (Kommunekredit). The Bank is jointly owned and jointly guaranteed by all Danish municipalities and can according to its statutes only lend against a 100% municipal guarantee. The set-up enables the Bank to have an “AAA” rating, which is essential as it secures its financing from the international capital market (the bank is no deposit bank). In this way, the biogas plant gets a long-term loan at highly competitive interest rates. By law, municipalities are allowed to give municipal guarantees to mortgage type loans for local investments in infrastructure.

Unfortunately, this system is not easily exportable. Danish municipalities have the legal right to raise taxes not just on property but also on income (municipal income tax rates are typically around 19%) and are financially quite homogenous due to a state enforced system of revenue transfer from richer to poorer municipalities. This structure makes the establishment of a municipalities-owned Municipal Bank feasible; Norway instead has a well-functioning state-owned bank serving municipalities.

But, although the details will be different in other countries, the concept of municipal PBGs to RE-serving local infrastructure is likely to feature in low-carbon strategies in many countries.

## 5.2.4 PBGs for battery charging stations for electric cars

The fluctuating power output of wind farms poses a problem for the integration of power in countries that aim at high rates of wind power penetration. When wind speeds are low, there can be close to zero production, requiring back-up production from conventional power plants; when wind speeds are high, production during off-peak period can be higher than national demand, leading to a problem of overflow.

One solution being tested is to use mass-penetration of electric cars and car battery charging managed by smart meters as the means to provide a demand buffer for intermittent supply. The envisaged infrastructure is composed of battery charging stations that operate similarly to gasoline stations (replacing a used battery with a charged battery within minutes) plus individual chargers with smart meters at consumer premises and at public parking lots. When wind farm output is high and power demand low, battery charging starts, when wind farm production is low, electricity can be drawn from the car batteries.



Setting up this system is a huge challenge. The technologies of batteries have to be improved, the cost of electric cars has to come down, demand for electric cars must be created, and, in addition, while all this has yet to emerge, the battery charging infrastructure must be put in place. This will not happen in the absence of PBGs for these investments.

### 5.2.5 Transmission Investments and smart grids

Transmission investments for connecting distributed generation and large-scale (off-shore) wind farms to regional, national, and transnational power grids and investments in smart grids to facilitate RE-integration and EE are obvious candidates for PBGs. The investments are capital intensive and more expensive than the conventional power grids, pose new and complex challenges in terms of technology and new rules and regulations, and yet call for speed of implementation.

The efforts made by the British Government to find finance for investments in transmission grids to transport power from planned off-shore wind-farms to the national transmission grid underline the point. The British Government tried mid-2009 to get private investors to take on the financing of off-shore transmission lines. In November Ofgem contacted EIB to secure a £300 million loan package for the investments. One can assume that a PCG will be thrown in as part of an overall financial package.

In 2009, the US DOE expanded its \$10 billion loan guarantee program for new energy technologies created by EAct 2005, with an additional \$6 billion under Section 1705 of ARRA, of which \$3.4 billion are to be used for its *Smart Grid Investment Grant program (SGIG)*.<sup>55</sup> One may expect superconducting transmission grids to be included. The DOE is adopting a broad definition of 'smart grid,' as the federal government is essentially building a new electricity highway for the country via the SGIG program. The DOE's approach is based on the idea that to have a functioning smart grid, more conventional transmission grids are required in areas where substantial RE project development opportunities exist. The DOE put out a specific solicitation under Section 1705 of ARRA for transmission to bring renewable generation resources into load. The DOE calculates the expected costs of project defaults during the loan guarantee's "due diligence" process. The loans would come from the US Treasury's Federal Financing Bank plus from private lenders who take part in *DOE's Financial Institution Partnership Program (FIPP)*.

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<sup>55</sup> The DOE loan guarantee program includes not only electric power transmission but also renewable energy and leading-edge biofuel technologies.

## 5.3 PBGs for Investments in Small-scale Grid-connected RE

The term “small scale projects” refers to RETs ranging in size from a few hundred kW and up to 20 MW. Grid connected technologies in this size range comprise smaller wind farms, mini/micro-hydro, biomass systems, and wave power. In most countries, RETs in this size category benefit from a protected market established through preferential grid-access and either feed-in-tariffs, RE portfolio standards, or technology-specific PPA-tenders. Yet, although the commercial viability of investments can be established a-priori by on-site measurements of the RE resource base, project development can be blocked by financing obstacles on either the debt finance or the equity finance side.

For the banks, the main concern is how the variability of annual output affects the ability of the generator to pay interest and installments on the loan. This can be addressed by weather derivatives, by weather insurance, by a sufficiently large “buffer” of equity capital, or by a liquidity stand-by guarantee. Yet banks, particularly in developing countries, may still refuse to make financing for RETs available to project finance, that is, on a non-recourse basis. Insistence on non-project collateral limits project development to on-site development of biomass and hydropower resources of major plantation and sugar factory owners. This debt-finance obstacle can be eliminated by PCGs.

The difficulty on the equity-finance side arises from the fact that small scale power projects are not attractive to professional project development companies, or to power utilities: both look for projects in the size of 50 MW as a minimum. Entrepreneurial-type project developers, on the other hand, who are interested in small-scale projects and often undertake the first steps towards the preparation of these, often have insufficient equity capital to secure financial closure. Countries with long traditions of “collective finance” use energy investment societies with multiple share ownership to finance small scale power. In other countries, PBGs for mezzanine finance can be a solution.

Chile illustrates the use of *PCGs to address lack of project finance*. The regulatory framework for small scale RE-power plants is rather favorable. Due to the recent adoption of a renewable energy portfolio standard (RPS), developer interest in RE-projects is strong and Chilean financial institutions (FIs) have adequate liquidity, both short and long-term.<sup>56</sup> But the FIs are very conservative in their lending. They require real property asset security, as a multiple of the borrowing amount, and have very low-risk tolerance. Without a PCG, the credit conditions would be too strict for project developers. This led to the *Renewable Energy and Energy Efficiency Guarantee Program* managed by CORFO (the Foundation for Promoting Development) in the Ministry of Economy.<sup>57</sup> Projects will be mostly hydro, with some wind projects. Geothermal is another RE resource being developed, but since investors are waiting for drilling regulations to be settled, financing for this will not be required in the near future. Guarantees for new transmission lines will be available. The guarantee program appropriation is \$70 million of which \$1 million has been designated for energy efficiency. CORFO is able to leverage the \$70 million five to one, leading to a \$350 million total liability; if losses are greater than \$70 million, they will be full recourse to CORFO.<sup>58</sup> Loans are guaranteed up to 50% pari

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<sup>56</sup> Regulatory Reforms include: (i) Ensuring any renewable energy generation project the right to sell its energy into the electricity market at spot or node price. (ii) Fully or partially releasing NCRE power stations with power surpluses under 20 MW from transmission tolls. (iii) Allowing the connection of small power stations (less than 9 MW) into distribution networks. (iv) Renewable Portfolio standard – any new supply contract signed after 2010 must guarantee 5% of energy is generated from non-conventional renewable energy.

<sup>57</sup> CORFO has since 2007 operated a *SME guarantee program* called FOGAIN, which works with eight to nine banks and is authorized to offer up to \$100 million in guarantees. FOGAIN offers a 70% pari passu guarantee with a total guarantee liability limit per project of \$180,000.

<sup>58</sup> This procedure provides strong discipline: loss records for the FOGAIN program have been around 1%.

passu; maximum terms for EE are 12 years, for RE the grace period plus 12 years.<sup>59</sup> The guarantee fee is 1% per year.

*FIDEME shows how “double leveraged mezzanine finance” can address lack of investor equity in project finance.* Although the French Government had introduced feed-in-tariffs for projects up to 15MW, inter alia, for wind farms, few projects were developed as interested project developers were unable to secure sufficient equity. In 2003, ADEME, the French Environment and Energy Management Agency, and the French commercial bank Natixis launched FIDEME (Fonds d’Investissements de l’Environnement et de la Maîtrise de l’Energie), a €46 million public-private mezzanine fund. ADEME invested €15 million, one third of FIDEME’s capital, as a subordinated tranche within the private fund, providing a first loss guarantee to the private senior lenders in the fund. The fund then provided subordinated financing (convertible bonds or bonds with share warrants attached) to projects as a means to help sponsors to fill the debt-equity gap and attract senior lenders. A typical finance structure would be composed of 80% senior debt, 10% FIDEME mezzanine loan and 10% developer equity. The fund was open to French RE-SMEs who faced debt/equity gaps on their balance sheets, and was based on the concept of non-additionality, meaning that if FIDEME did not finance the project, it would not be implemented. The double leverage structure allowed ADEME to mobilize €320 million in investment, over 20 times its public funding contribution.<sup>60</sup> By the end of 2006, FIDEME had financed 27 RE projects with a total capacity of over 300 MW in wind-power, biomass, hydro, and geothermal energy. The estimated IRR was 10%, whereas the initial target had been 7% only. The success led Natixis to establish a follow-up in 2008, EUROFIDEME2, this time on a purely commercial basis as the renewable market in France has matured beyond the need for ADEME public finance support. Natixis put €25 million into the fund, and its target is €250 including contributions by other financial institutions.

The French government’s willingness to make mezzanine finance, rather than a PCG, available, is probably linked to the long French tradition of public-private co-investments in industry; the US government most likely would have chosen the PCG-instrument instead. Management of FIDEME insists that the mezzanine finance investment provided a better – positive – return to the public coffer.

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<sup>59</sup> The project developer borrows from an eligible lender, who then applies to CORFO for the guarantee; eligible lenders are also able to access credit directly through CORFO.

<sup>60</sup> ADEME’s capital is leveraged: once by the other lenders in the fund, and a second time by the equity and senior lenders within the projects that the fund finances.



## 6 PBGs FOR INVESTMENTS IN END-USER RE & EE

### 6.1 Cost of Capital for End-user Investments in RE & EE

The technologies for the end-user market comprise customer-sited RETs, such as photovoltaics, solar hot water and wind energy, EETs for retrofitting existing building stock, and construction of affordable multifamily EE-housing. Market segments are diverse and dispersed, including public sector buildings, occupant-owned houses, occupant-owned apartment buildings, tenant-occupied buildings, commercial buildings, manufacturing industries, rural enterprises, etc. Individual loans are relatively small, and the transaction costs for investment preparation and financing are relatively high.

Access to credit is a problem for some consumer categories. But the main issue in end-user finance is the costs of transactions for banks in processing small scale heterogeneous loans. Credits for end-user investments in RE&EE face the following cost of capital:

“End-User Finance CC = Corporate balance sheet finance CC + Costs of Transactions Premium”

### 6.2 Market Aggregation and Loan Standardization Strategies

In market aggregation strategies for financing and project development, which aim to mitigate the problem of small loans and high transaction costs, PBGs are used to achieve four different objectives:

- (v) Assisting market entry of new business concepts, such as ESCOs.
- (vi) Facilitating “standardization” of bank financing for RE&EE projects.
- (vii) Addressing the problems of energy poverty.
- (viii) Enabling the securitization of small loans.

PBGs interact with three market aggregators: ESCOs, energy utilities, and regional development corporations.

#### 6.2.1 PBGs for ESCOs serving private sector clients

ESCOs are energy service companies that perform energy audits, assist end-users with installing EE-equipment, and engage with customers on a performance contract basis. One can distinguish between:

- “ESCOs” that: (i) guarantee energy savings (contract for energy savings) and/or the provision of the same level of energy service at a lower cost through the implementation of an EE or RE project (contract for energy supply); (ii) are rewarded based directly on the energy savings achieved; and (iii) typically finance or assist in financing the project.<sup>61</sup>
- “Near ESCOs”: (i) vendors supplying equipment with guarantee for savings/plant performance (penalty clause), or (ii) consulting engineering firms offering “no cure, no pay” contracts.

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<sup>61</sup> In an Energy Performance Contract (EPC) the ESCO is responsible for project feasibility, design, equipment purchase, installation, maintenance and operation, and most importantly, a guaranteed amount of savings, leaving very little financial risk with the customer.

EE specialists who are paid a fee for their services but take no risk (without EPC) can be referred to as "energy service providers".

EE-projects can be structured with various guarantees to assist banks in accepting risks for debt lending. In *shared savings* contracts, the ESCO finances and takes performance and credit risk for the project; the cost savings are split between the ESCO and the customer in accordance with a contractual percentage for a predetermined length of time. In *guaranteed savings* contracts: (i) the project is financed by the customer; (ii) a specified level of energy savings is guaranteed by the ESCO (performance risk), if the minimum is not met, the ESCO pays the customer the difference, if the minimum is exceeded, the client pays the ESCO an agreed upon percentage of the incremental savings; (iii) the client services his debt obligations out of his savings on annual energy expenditure.<sup>62</sup>

In some rare cases the ESCO as a company has a sufficiently strong balance sheet (supported by equity), and strong income statements from other business activities that can be used against the loan. But this is the exception, not the rule. Debt financing for EE projects will almost always require guarantee mechanisms. Some innovative examples of this are given below. They have in common that they all are designed to overcome the two primary barriers to EE/RE project finance and development: (a) credit risk barriers and (b) lack of well-prepared projects seeking financing. To address these barriers, the programs employ two tools: i) a guarantee program, supporting and sharing in the credit risk of EE/RE financings undertaken by FIs; and (ii) a technical assistance program, to help prepare projects for investment and aid general EE market development.

The Bulgarian Energy Efficiency Fund (BEEF) has put in place a well-designed structure for promoting energy savings in industries and households. The BEEF has a line of individual PBGs. But of particular interest are its two portfolio guarantees: the *ESCO portfolio guarantee* and the *Residential portfolio guarantee*.

Chart 19 summarizes its ESCO portfolio guarantee scheme.<sup>63</sup>



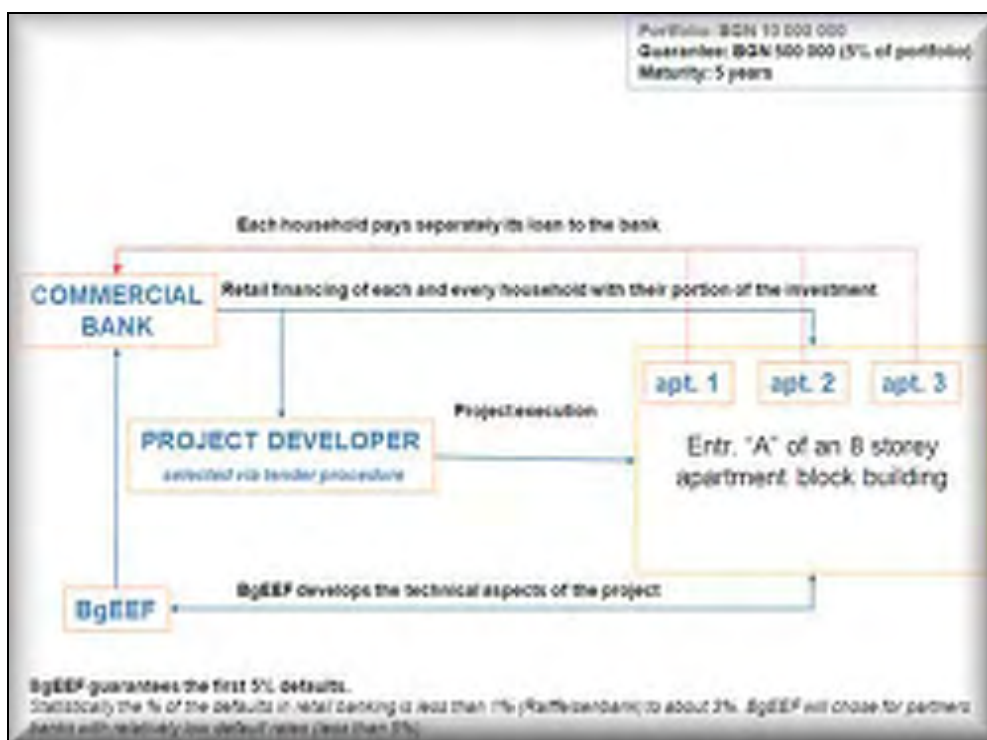
**Chart 19: BEEF's ESCO Portfolio Guarantee Scheme Bulgaria**

<sup>62</sup> The contract has a clause pertaining to a floor price for energy, i.e. debt levels will be met through energy savings provided energy prices do not fall below a certain threshold

<sup>63</sup> Source: BEEF website

Since ESCOs rely heavily on raising debt to fund their performance contracts, delayed payments from clients or defaulting clients may severely disrupt the servicing of the ESCO's own debts. BEEF's ESCO portfolio guarantee scheme provides the ESCO with a guarantee against defaults and a liquidity guarantee to cover disruptions in the flow of receivables: BEEF guarantees that it will cover up to 5% (the percentage is negotiable) of defaults and delayed payments under the portfolio. With this guarantee, the ESCO gets better interest rates on its debt with commercial banks. Statistically, the default rate of clients of ESCOs is negligible so that 5% cover of the guarantee is more than sufficient. Delays in payments are more probable and in such cases BEEF will act as a financial buffer. The approval procedure is as follows: (i) BEEF signs a framework agreement with the ESCO to issue a portfolio guarantee for a preapproved portfolio of projects; (ii) The ESCO wins a tender for an energy efficiency project; (iii) BEEF approves the project and adds it to the portfolio of approved projects.

*The Residential Portfolio Guarantee* scheme is designed to overcome two major obstacles to energy savings in the residential building sector. One is the lack of adequate legislation. The other is the absence in Bulgaria of a tradition of condominiums or household associations. Generally, there is a lack of trust between families in a building. The BEEF acts as a "gluing component" between the commercial banks and EE projects in the residential sector. The scheme is summarized in chart 20.<sup>64</sup>



**Chart 20: BEEF's Residential Housing Guarantee Scheme. Bulgaria**

The product is developed in partnership with commercial FIs. The process starts with BEEF providing TA to the households in a building to develop a good project. Then a first class EE-company is selected to implement the investment. The FI gives the authorized loan funds directly to the project developer. But the borrowers of the project loan are the owner-occupants in the building. The project loan is divided into individual loan agreements between the FI and the households, who are responsible for repayments in proportion to their built-up area. The BEEF guarantee covers the first 5% of defaults within a building block (or portfolio of blocks). As statistically the default rates on

<sup>64</sup> Source: BEEF website

customers' loans in banks range from less than 1% to about 2.5-3%, BEEF's first loss guarantee of 5% provides good risk coverage for the commercial bank.

The *International Finance Corporation IFC/GEF Hungary Energy Efficiency Co-Financing Program (HEECP)* uses a number of marketing channels to increase the market for EE. Financing for EE is offered both to end-users and to ESCOs.<sup>65</sup> The objectives of HEECP are to: a) support financing and implementation of EE projects that are economic and achieve energy savings and reductions in greenhouse gas emissions; b) promote the entry of domestic FIs in the EE/RE financing market, and increase the experience and capacity of domestic FIs to provide EE project finance, c) support FIs in developing and using innovative financing structures and in providing more favorable credit terms to borrowers; d) promote development of the EE market and commercial ESCO industry; and, e) develop and demonstrate new non-grant financial tools for the Global Environment Facility (GEF), including methods of leveraging commercial finance. In conjunction with its FI partners, HEECP has developed financing products for EE/RE financing for multi-family housing, single family housing, municipal street lighting, district heating, industrial cogeneration implemented pursuant to energy sales agreements, and hospitals. EE technologies include lighting, motors, controls, heating systems, industrial process, cogeneration, small scale RE (bio-mass, bio-gas, hydro, wind), etc. A complementary technical assistance (TA) program supports: (i) marketing of EE finance services by participating FIs; (ii) EE project identification by support of initial energy audits; (iii) EE project development and investment preparation; (iv) corporate finance advisory services to ESCOs; and (v) general EE market promotion activities and program evaluation activities.

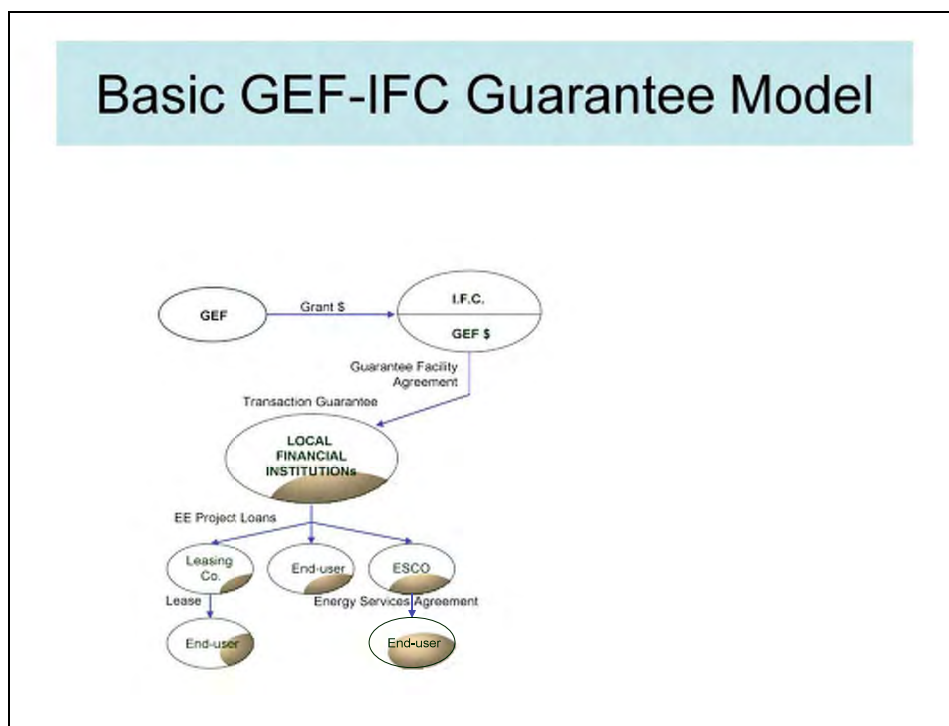


Chart 21: Standard GEF-IFC Guarantee Structure for EE

<sup>65</sup> The HEECP operated in its pilot phase from March 1997 to December 2000 by the IFC with a total of US\$5.0 million in GEF funding; \$4.25 million of which is used as reserves for the guarantee program, the balance of which is used for program operations and technical assistance. In December, 2000, IFC committed up to an additional \$12 million in guarantee resources to expand the program and extend its life an additional four years. In 2003, similar guarantee programs were rolled out in five additional Central European countries.



GEF provided grant funding to IFC for a first loss cover, backing a portion of IFC guarantee liabilities, and to cover costs of technical assistance, capacity building, and program operation. To protect its “AAA” status on the international capital market, IFC is a cautious financial operator. The first loss guarantee facility, therefore, was essential for getting IFC to offer PCG products to the local FIs. The Guarantee Facility Agreement (GFA) with IFC defines a variety of guarantee structures: *pari passu*, subordinated recovery, portfolio guarantees, and first loss guarantees. Through this mechanism, one dollar in GEF funds in the end supported 12-15 dollars of EE project investment.

*The GEF/World Bank/NDRC Phase II China Energy Conservation Project ESCO loan guarantee program* targets the mobilization of *local banks* to provide ESCO project financing and help ESCOs enter the world of formal financing. GEF provided \$16.5 million in grant finance to be placed in a *special guarantee reserve fund held by the Ministry of Finance*. The guarantee reserves are made available on a formula basis to *China National Investment and Guarantee Company Ltd. (I&G)*, a state-owned national guarantee company. With the backing of these resources, I&G provides a 90% guarantee cover to commercial banks that make loans to ESCOs for the financing of qualified EE projects. The *Energy Management Company (EMC) Association of China (EMCA)* was created, as an institution of ESCO mutual support, to provide technical assistance to newcomers and to represent the emerging industry to government and other parties. The Phase II project requires ESCOs to use a prescribed *energy performance contracting approach*, and the ESCO must be the borrower of the project loan; loan guarantees are not provided if the end-user wants to be the borrower. Whereas ESCOs in general are small enterprises with few fixed assets, the end-users are generally relatively large enterprises with substantial fixed assets that can access EE-loans from commercial banks without guarantees. The Government of China issued policies to promote bank loans to end users for EE projects. The loans to ESCOs have tended to be short term, typically three years and under. The ESCOs being small enterprises prefer to choose EE projects with payback periods of under 3 years. But I&G can give a loan guarantee quota to qualified ESCOs, who can use the quota through a cycle to get loans continually.

The PBG has been essential for getting FIs to lend to ESCOs. But the guarantees and associated loans have tended to be underwritten with traditional criteria applied to working capital loans and secured primarily by the balance sheet, assets, and counter guarantees provided by the ESCOs themselves, independent of the security and debt service capacities of the EE projects themselves. Project-based lending methods, defined as lending where the ESCOs’ projects themselves provide the primary source of security for the loan and guarantee and the source of revenues for debt service payments, were not accepted. This loan underwriting approach limited the business volume of the Phase II program.<sup>66</sup>

## **6.2.2 PBGs for ESCOs serving public sector clients**

ESCO-introduction programs that focus too heavily on the development of private sector demand for EE-investments are doomed to encounter difficulties.<sup>67</sup> Even in the USA, after many years of ESCO experience, the public sector demand accounts for around 70% of ESCO revenues. For a variety of

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<sup>66</sup> I&G had issued loan guarantees totalling about \$52 million from 2004 through April 2008, providing support for specific energy performance contracting project investments totalling about \$90 million. About 40 Chinese ESCOs received loan guarantees for one or more of their projects and twelve banks have participated so far.

<sup>67</sup> CAREC, created by E+Co and discussed in section 7.3.1, largely focuses on end-user financing for energy efficiency. According to E+Co, experience to date demonstrates that mezzanine finance for projects, rather than for ESCOs themselves, is an investment mechanism more suited for companies and their EE upgrades and retrofits.

reasons, the most important being the limited financial autonomy of public agencies, the ESCO-finance modality is better suited for public sector clients than for private clients, who have easier access to bank loans for the financing of ad-hoc investment decisions. The potential role of ESCOs in promoting public sector EE is recognized and has in various countries led to the publication of guidelines for public sector managers about how to conclude ESCO-agreements.<sup>68</sup>

Chart 21 summarizes the Rumanian OTP-Bank's PBG-scheme for providing ESCO-services for public sector clients, which was developed in collaboration with IFC-GEF. GEF gave IFC grant funds for a TA-facility and a first-loss facility for OTP-bank loans to EE-projects in municipal buildings. In return for receiving an IFC-loan and the PCG-facility, OTP-bank committed itself to adding its own funds for EE&RE lending, matching the IFC loan in size.

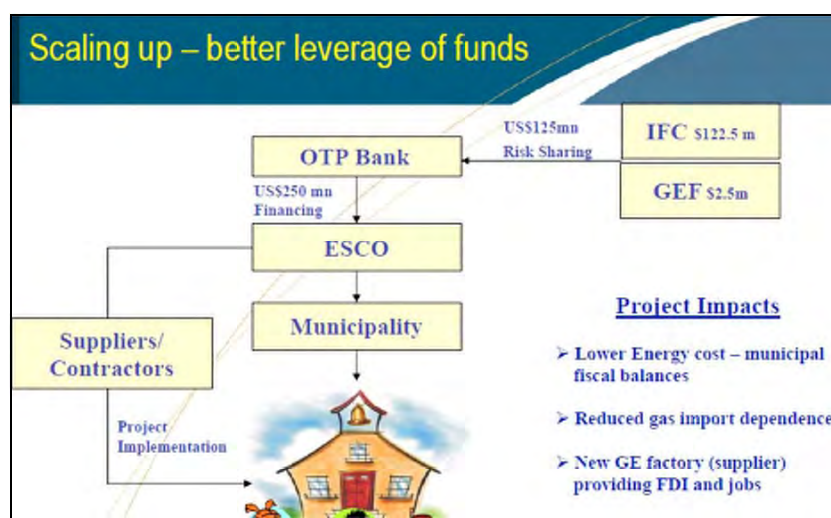


Chart 22: Rumanian ESCO for EE in Municipalities

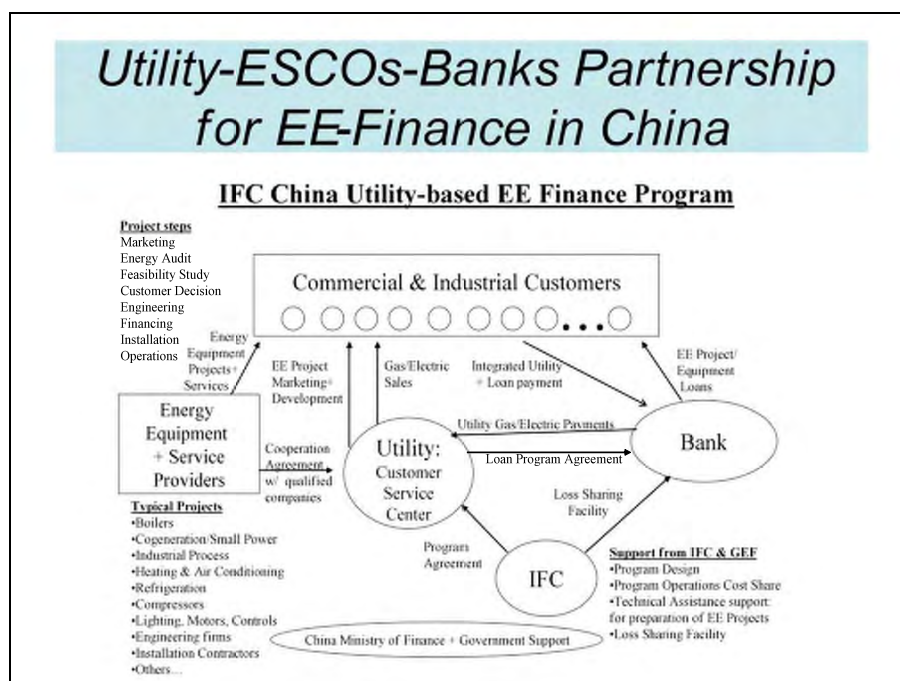
### 6.2.3 PBGs for energy utility ESCOs-FIs partnership program

The IFC has operated the *China Utility-Based Energy Efficiency Finance Program (CHUEE)* since 2006. CHUEE brings together financial institutions, utility companies (a partnership agreement was signed with Xin'ao Gas) and suppliers of EE equipment to create a new financing model for the promotion of EE. CHUEE provides advisory services to banks, project developers, suppliers of EE&RE products and services, and to energy end users in the commercial, industrial, institutional, and multi-family residential sectors. Capacity building includes marketing strategy development, engineering, project development, and equipment financing services, credit underwriting training for banks, and loan origination and structuring support for the marketing partners. CHUEE conducted market research for particular regions and/or industries to help major players in the sector identify potential business opportunities and design tailored financial products.<sup>69</sup> The follow-up *CHUEE II program*, approved in 2008, works with several types of market aggregators to generate EE project finance business for its

<sup>68</sup> The US-DOE published in 2009 "Utility Energy Services Contracts: Enabling Documents." Similar documents exist in other countries, e.g. Germany.

<sup>69</sup> IFC helped these two current bank partners develop a pipeline of about 280 projects. Key areas are waste heat recovery and power generation, electricity saving, building energy saving, boiler renovation, wind farm development, and cogeneration, with total investment exceeding US\$672 million. The first transaction was approved in January 2007, and by the end of November 2007, 37 projects were approved by these two banks, accounting for a total energy efficiency loan portfolio of US\$81 million (Industrial Bank, 82 million; Bank of Beijing, 2.8 million), and the GHG emissions reduction has exceeded 2 million tons per year.

partner banks. Deal flow is generated through (i) multi-project finance facilities with EE/ESCO companies, (ii) utility partnership with Xinao Gas, (iii) vendor finance programs, (iv) direct solicitation of existing bank industrial customers, (v) collaboration with Provincial and local government energy conservation programs, and (vi) direct marketing.<sup>70</sup>



**Chart 23: Utility-ESCOs-Banks Partnership Scheme for EE-Finance**

Chart 22 summarizes the program agreements between the parties. A loss sharing facility from the IFC, and co-financed by GEF, serves to reduce the risks of the Chinese commercial banks for loans within the GHG emission reduction portfolio. In the loss sharing agreements signed with the Industrial Bank (IB) and Bank of Beijing (BOB), losses are defined on a portfolio basis. In the first generation loss sharing agreement (LSA), IFC shares 75% of the first losses, defined as 10% of the total original principal amount of the loan portfolio. Second losses are all losses after the first losses; these are shared 40%/60% between IFC and the bank (the structure is shown in Chart 11). Further risk reduction is provided by the gas utility's multiple involvement in the program. Xinao Gas markets EE-investment opportunities to customers and collects, on behalf of the banks, customer payments on bank loans for their EE-investments: loan payments and collections are integrated with the utility bill, and loan default leads to the suspension of gas service. The sanction provides strong protection against payment defaults. The PBG, therefore, seems to be a protection against the utility not fulfilling its part of the bargain, because if it did, the PBG hardly seems required.

<sup>70</sup> CHUEE II supports a total line of credit of US\$347 million and provides technical assistance to two bank partners. The Norwegian government, as one of the donors, funds technical assistance and advisory services. The PRC Government CDM Fund may provide additional first loss reserves to expand the IFC risk sharing program.

## 6.3 PBGs for Individual Household Investments in EE and RE

### 6.3.1 Local authority as promoter-coordinator of household investments in EE&RE

In the US and in EU-countries, local authorities are becoming increasingly involved in EE&RE promotion activities at local level. However, the approaches differ. In the US, local agencies perform a deal-generating function and give PCGs to reduce risks of lending. In the EU-approach, local agencies do not use PCGs but perform quality control of executed work to reduce lender's risk.

The City of Bellingham and Whatcom County, Washington, have undertaken an *Energy Efficiency Community Challenge*, an initiative under the *US Energy Efficiency Finance and Loan Loss Reserve Program*, to promote the development, implementation, and financing of residential and small commercial sector energy efficiency investments.<sup>71</sup> A local nonprofit organization, *Sustainable Connections*, has established a "one-stop shop" for property owners to identify, develop, procure, and finance EE investments for their properties. The program combines (1) access to finance, with standardized financial products structured and adapted to the target market, with (2) marketing, project development, and project delivery mechanisms that generate a steady flow of investment ready projects, and (3) the provision of a loan loss reserve to reduce risk for the participating FI(s) and enable more favorable terms to the end-user. The city and the county each contribute US\$250,000 to a *Loan Loss Reserve Fund (LRF)* to support partner FIs to make EE project loans. The LRF is intended to enable the FIs to offer longer terms, lower interest rates, and broader access to finance. With US\$500,000 of LRF funds, the FIs will be able to lend at least US\$5 million, a leverage ratio of 10:1 as a minimum. The LRF supports the whole EE loan portfolio and is sized at a margin higher than the portfolio's estimated loan losses. The LRF funds derive from federal grants, created as part of the US government economic stimulus package.

The LRF structure takes a "portfolio approach" to the credit structure of the EE loan program. The FI will be making a large number (several hundred +) of relatively small EE loans. Default and loss rates can be estimated by the FI for the portfolio of loans and sufficient loss reserves can be included into the financial structure to cover the estimated level of losses. LRF monies will be deposited with the partner FI pursuant to an "EE Finance Loss Reserve Fund Agreement" (LRF Agreement) between the city/county and the FI. The LRF Agreement creates two accounts: a deposit account and a reserve account, both defined in the LRF Agreement. Monies are placed first in the *deposit account*, at which point the funds are considered "obligated" for EECBG grant management purposes. Then, on a monthly or quarterly basis, as the FI makes eligible EE loans, the agreed amount of funds for the LRF are transferred from the deposit account to the *reserve account* for the FI to draw on to pay the agreed share of future loan losses. The *risk-sharing formula* has two main parameters.

- (i) The first parameter is the *ratio of the LRF funds to the total original principal amount of loans* in the EE loan portfolio; it will be in the range of 10% providing a leverage ratio of 10:1. The trade-offs between the leverage ratio, loan security, and the public goal of creating broad access to finance was discussed with the city/county. A lower leverage ratio means less lending per amount of LRF funds but greater risk protection for the lender, which can result in relaxed underwriting requirements and approval of more

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<sup>71</sup> The program will reduce barriers to implementing EE, including financing, and raise awareness of opportunities to conserve energy through community-based social marketing and the establishment of community goals and friendly competition.

loans. The city/county accepted a lower leverage ratio in exchange for broader access to finance.

- (ii) The second parameter in the risk-sharing formula is *the share of the losses that the LRF will pay*. Because all losses, after the LRF is exhausted, are borne by the FI, the FI's incentives for good loan origination, administration and recoveries are maintained. Therefore, to provide the most meaningful risk protection, 90-100% of the first losses will be paid with LRF funds.

Because public monies are used to fund the LRF, *a request for proposals (RFP) will be issued this summer to select the key participating FI(s)*. A number of community banks have committed to respond to the RFP. Negotiations on the credit enhancement and loan products will take place after the FIs have been selected by the city and county partners. Another model that has utilized a LRF, Pennsylvania's AFC First/Keystone HELP loan program has seen great success.<sup>72</sup>

The US *Small Business Administration (SBA)'s 504 loan program* is a long-term financing tool for economic development within a community. The 504 program provides growing businesses with long-term, fixed-rate financing for purchasing major fixed assets (such as land or improvements, including new or existing buildings, grading, street improvements, utilities, parking lots, landscaping, the modernization, renovation or conversion of existing facilities, and long-term machinery and equipment). SBA financing is provided through a *Certified Development Company (CDC)*, a nonprofit corporation set up to contribute to the economic development of its community. CDCs work with the SBA and private sector lenders to provide finance to small businesses. There are about 270 CDCs nationwide, and each covers a specific geographic area. Typically in a 504 loan: (i) a *senior lien from a private-sector lender* covers up to 50% of the project cost; (ii) a *loan secured with a junior lien from the CDC* covers up to 40% of the cost (this loan is backed by a 100% SBA-guaranteed debenture); and (iii) a contribution of at least 10% *equity from the small business* being helped is required. This model could be extended to small scale EE&RE finance.

The alternative EU-approach to the US-PBG-schemes is to set up a local framework, which reduces risks for investors and lenders alike and markets standardized EE&RE investment packages. A successful example of a local government scheme for promoting EE in the building sector is the "one-stop clearing house" administered by the *British municipality of Kirklees*. It is composed of: (i) impartial information to consumers about EE&RE; (ii) the administration of subsidy payments to EE&RE, (iii) technical assistance to the supply side; (iv) quality control with performance; and (v) bank loans to consumers for investments in environmental finance.

### 6.3.2 PBGs to alleviate problems of energy poverty

The US *Federal Housing Administration's (FHA)* has a number of programs that provide mortgage insurance from the US Department of Housing and Urban Development (HUD) to mortgage loans of borrowers who would not otherwise qualify for conventional loans on affordable terms, e.g. first time homebuyers and residents of disadvantaged neighborhoods, where mortgages may be hard to get.<sup>73</sup> The mortgage loan is funded by a lending institution, such as a mortgage company, bank, or savings and loan association. Its *Energy Efficient Mortgage program (EEM)* simultaneously mitigates the

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<sup>72</sup> <http://www.afcfirst.com/info/keystonehelp.php>

<sup>73</sup> Borrowers who obtain FHA's popular Section 203(b) Mortgage Insurance for one to four family homes are eligible for approximately 96.5 percent financing, and are able to fold closing costs and the upfront mortgage insurance premium into the mortgage. The borrower must also pay an annual premium.



problem of *energy poverty and promotes EE*. The EEM allows eligible persons to purchase or refinance a principal residence and incorporate the cost of energy efficient improvements into the mortgage. The cost of the energy improvements and estimate of the energy savings must be determined by a home energy rating report that is prepared by an energy consultant using a Home Energy Rating System (HERS). The cost of the energy rating report and inspections may be financed as part of the cost effective energy package. The idea is to help low-income homeowners save money on utility bills, thereby enabling them to finance the cost of adding energy efficiency features to new or existing housing as part of their FHA insured home. The borrower does not have to qualify for the additional money and does not make a down payment on it.

### 6.3.3 Creating conditions allowing for securitization of EE retrofits

In the US, the NRDC in 2009 argued for the establishment of a *US Federal Energy Efficiency Finance Facility (FEEFF)* to manage a federal credit enhancement program to open financing markets for energy efficiency retrofits.<sup>74</sup> The NRDC paper claimed that financing of customer-sited RETs and EE was challenged by lack of data and underwriting standards, lack of experience with the products, and lack of a mechanism to organize the investment market and support a secondary market for numerous small and disaggregated loans. Without primary and secondary financing markets for building efficiency measures, the overall scale of energy efficiency investment would remain constrained. The FEEFF is to facilitate growth of creative repayment mechanisms through compilation of credit risk data and scaled experience across building sectors leading to greater value attribution to energy efficiency in the real estate valuation process. The NRDC sees the credit enhancement program and the standardization it imposes as key to developing a market for efficiency-backed securities. The FEEFF would be established as a special-purpose nonprofit entity wholly owned by the U.S. government with the authority to bind the Treasury for purposes of loan repayment guarantees. It should be staffed by experienced professionals in energy efficiency, risk management, and credit underwriting and have the legal status of a private entity.

## 6.4 Private Industry Investments in EE & RE

### 6.4.1 SME investments in EE&RE

*FOGIME* in France is an example of a *loan guarantee fund for RE&EE investments by SMEs*. FOGIME was created in November 2000 through a co-operative effort between OSEO-BDPME (SME Development Bank) and ADEME (the French Agency for Environment and Energy Management).<sup>75</sup> Whereas other SME projects covered by BDPME have a guarantee coverage of 40% on average, FOGIME provides guarantees of up to 70% of loans granted for implementing EE&RE business activities for SMEs, to a maximum of € 750,000. Eligible investments include: high performance production, use, recovery, and energy storage equipment, EE modifications of production processes, and RE. The guarantee covers medium and long-term risks (2-15 years) and insures the risk taken by the financial institution providing the loan. The guarantee is available for SMEs more than three years old with less than 500 million FF turnover and fewer than 500 employees.

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<sup>74</sup> Leeds & Duke (2009)

<sup>75</sup> OSEO-SO FARIS, a subsidiary of BDPME, finances 40 to 50% of the guarantee from its small business guarantee fund. ADEME covers the remaining portion of the guarantee.

## 6.4.2 Rural energy and efficiency projects

The US Department of Agriculture's *Rural Energy for America Program (REAP)* is authorized by the 2008 Farm Bill. REAP provides loans, guarantees, and grants that can be used for installing RE systems, implementing EE improvements, and conducting feasibility studies and energy audits. Any agricultural producer, including farmers and ranchers, who receives 50% or more of their gross income from agricultural operations is eligible to apply to the program. The maximum percentage of each loan guarantee will be 85% for loans of US\$0.6 million or less; 80% for loans between US\$0.6 million and US\$5 million; 70% for loans from US\$5 million to US\$10 million; and 60% for loans between US\$10 million and US\$25 million.





## 7 PBGS IN DEVELOPING COUNTRIES

### 7.1 Specific Challenges in Developing Countries

#### 7.1.1 Political, legal, and regulatory risks

Effective transfer of low carbon technologies to developing countries is facilitated by direct foreign investments (DFIs) in local companies and RE-projects. A number of investment risks are specific to developing countries: legal voids, defective judicial systems, currency transfer, and political problems in the form of regulatory uncertainty, civil unrest and economic turmoil. These non-commercial risks have led to the introduction of *partial risk guarantees* (PRGs) and *partial credit guarantees* (PCGs) by multinational and bilateral development banks for investments in developing countries. They aim to catalyze private sector financing into support of defined developmental objectives and to give projects access to international debt and capital markets on more favorable terms.

In many cases, concessional monies are used as reserves against guarantee liabilities.

#### 7.1.2 Financial sector weaknesses

The financial sector in developing countries is less developed than in OECD countries (although a number of emerging countries are catching up fast). In 2002, annual domestic credit provided by the banking sector in high-income countries averaged 168% of GDP, in middle-income countries 83%, and in low-income countries 49%. Whereas banks are the primary source of credit in Least Developed Countries (LDCs), high-income countries have sizable bond markets and other significant non-bank sources of credit.<sup>76</sup>

The low-volume of lending to the private sector in developing countries is not primarily due to a lack of funds in the banking sector. Banks in LDCs generally lend only a modest portion of their total deposits to private sector borrowers. A large percentage of their deposits remain in liquid assets such as cash positions, inter-bank loans, central bank debt, or short-term government securities. Whereas U.S. banks keep roughly 6% of their total deposits in liquid assets and the bulk of their capital is used for non-sovereign loans, many banks in developing countries maintain 50% or more of their total deposits in liquid assets and provide minimal credit to the private sector.

Credits to businesses in LDCs must usually be repaid in a very short time frame. Without longer repayment periods it is difficult to finance investments in new equipment or technology because such investments may not yield sufficient revenues in the short-term to repay a loan.

A further problem is the absence in many countries of long-term lending in local currency. This creates a huge financing gap for infrastructure and for capital-intensive RE power plants in LDCs.

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<sup>76</sup> Source: Freedman (2004)

## 7.2 Guarantees to Promote Technology Transfer through DFI

### 7.2.1 Export credits and partial risk guarantees (PRGs)

*Export guarantees* for investments in developing countries have existed since the late 1960s. In the wake of the Washington consensus and the privatization and deregulation drives from the late 1980s onwards, bilateral donors and development banks started increasingly to withdraw from direct infrastructure finance. The World Bank in 1994 introduced *public backed risk guarantees* (PRGs) and *partial credit guarantees* (PCGs) to facilitate direct foreign investment. They aim to catalyze private sector finance in support of developmental objectives and facilitate access to the international debt and capital markets on more favorable terms.

PRGs cover debt against specific sovereign obligations committed to project and are structured to provide minimum coverage necessary to mobilize private financing. PRGs ensure debt-servicing payments to selected lenders or other investors in a project, usually for specific time periods or exposure levels.

The guarantees do not cover commercial risks. They cover critical sovereign risks related to government commitments under the relevant contractual agreements. They would, for example, target perceived investor risks during initial periods of reform: changes in government policy causing a reversal of the privatization agenda, government interference in the operation and management of privatized companies, or non-compliance with agreed tariff framework by the regulator. Whereas a PRG would not cover defaults caused by operations or force majeure events at a power station, payment under the PRG would result from events such as: war, invasion, blockade, terrorist activity, general strikes, expropriation or breach of “quiet enjoyment” of the site, payment default by the national power company under the power sales agreement, or breach of government agreements in support of currency convertibility and transferability.



Chart 24: PRG to Mitigate Concerns Related to Government Performance

Whereas *PCGs* involve three agents, guarantor, lender and project developer, *PRGs* in developing countries involve a fourth: a government giving a “guarantee commitment” to a development bank

(see chart 24).<sup>77</sup> The IBRD issues a guarantee to a commercial lender and receives a counter guarantee from the host country, an indemnity agreement whereby the government will reimburse the bank for any draws made by the lender under the World Bank guarantee.

Sovereign contractual obligations vary depending on project, sector, and circumstances: concession terms, tariff formula, tax incentives, expropriation, obtaining of licenses, right of way, permits, foreign exchange risk, market risk, credit risk. Relevant subjects for RE investments include: maintaining an agreed regulatory framework, including tariff formulas; paying for power purchased by a government utility; compensating for project delays caused by political actions or events.<sup>78</sup>

## 7.2.2 Insurance facility for renewable energy in developing countries

The World Bank Group's *Multilateral Investment Guarantee Agency (MIGA)* provides political risk insurance without host country counter guarantee to *foreign equity and related debt investments*. It can cover war and civil disturbance, expropriation, currency transfer risks, and breach of contract where the claimant is denied appropriate judicial or arbitral relief. MIGA can insure equity and shareholder loans to a project (and loans guaranteed by the shareholders) and cover commercial loans to the project, see the chart.

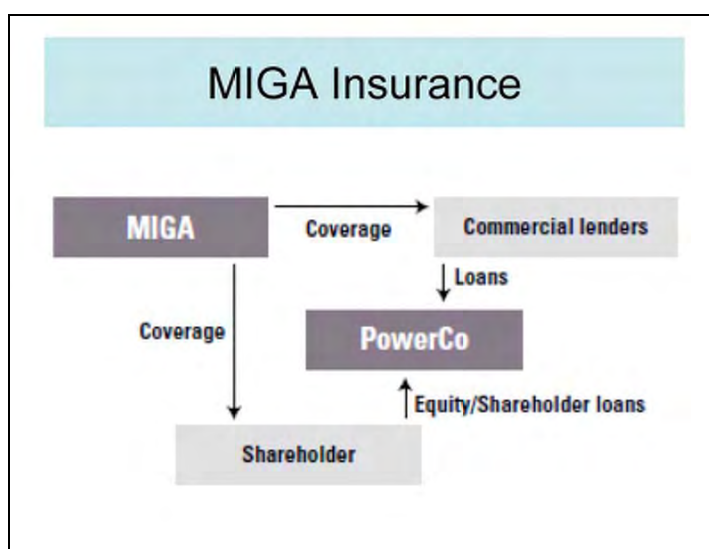


Chart 25: MIGA Political Risk Insurance

Lack of data provides a barrier to insurers who aim to introduce insurance solutions that meet the requirements of RE projects operating in developing countries. With UNEP and GEF as official collaborating partners, the insurance companies Munich Re, RSA Insurance Group (RSA), and CarbonRe created *insurance4renewables* to offer tailor-made products for RE projects worldwide with specific focus on developing countries. CarbonRe, an insurance broker specializing in clean energy

<sup>77</sup> Source of chart: World Bank PowerPoint presentation

<sup>78</sup> *IDA guarantees* are offered on a pilot basis to private lenders against country risks that are beyond the control of investors and where official agencies and private markets currently offer insufficient insurance coverage. *IDA guarantees* are available selectively, where an *IBRD Enclave guarantee* is not available. *IDA guarantees* can cover up to 100 percent of the principal and interest of a private debt trench for defaults arising from specified sovereign risks including government breach of contract, foreign currency convertibility, expropriation, and political violence. *MIGA* provides political risk insurance primarily for equity investments, but it can also cover debt financing, as long as it is also covering equity finance for the same project.

projects, is the appointed broker for access to the facility. The facility embraces a broad spectrum of technologies such as wind power, photovoltaics, solar thermal, and biomass and biogas systems in every phase of construction and operation. Besides the *traditional insurance products* for construction, operation, and transit, the facility offers on a case-by-case basis *innovative covers* such as carbon counterparty credit risk insurance,<sup>79</sup> carbon all risk insurance,<sup>80</sup> carbon delivery guarantee insurance/Kyoto Multi Risk Policy,<sup>81</sup> and lack-of-sun/wind insurance.<sup>82</sup>

Lloyd's insurer Ascot Underwriting set up *Renewco Underwriting* for the RE industry worldwide. Renewco offers onshore and offshore coverage for power generation facilities in the solar, wave, tidal, wind, biomass, geothermal, and small hydroelectric fields.

Ace European Group launched *Ace Renewable Energy*, providing comprehensive cover across a broad scope of renewable energy risks, including perils associated with contractors, suppliers, fire, transportation, and operation. Cover includes construction risks, third party liability, industrial risks, and contractors and premises pollution. Cover is provided for wind power, waste to energy, waste management, and the production of biofuels.

### 7.2.3 Guarantees for the creation of foreign subsidiaries

OSEO manages *FASEP, a guarantee facility that aims to foster the growth of French companies wishing to expand by creating subsidiaries abroad* (outside the European Union, Norway, Iceland, Liechtenstein and Switzerland).<sup>83</sup> The guarantee covers the economic risk of failure of implantation, but political risk coverage must be secured from other parties. The guarantee gives 50% loss cover to equity and quasi-equity investments in the subsidiary: purchase or subscription of shares, securities convertible into shares, loans, advances from shareholders that are blocked for over three years. The guarantee is issued for a period of three to seven years to the French mother company that either created the subsidiary or bought a majority position in it.

### 7.2.4 Guarantees for demonstration projects

Early testing of technologies in their demonstration stage would accelerate technology transfer to developing countries. Unfortunately, for natural reasons, multilateral and bilateral development agencies only finance mature technologies.

The potential demand can be illustrated by two examples from Sri Lanka, which, in 2008, introduced technology specific feed-in-tariffs for grid-connected RE projects with a capacity of up to 10 MW, including dendro power and wave energy.

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<sup>79</sup> Protects carbon credit sellers against risks such as insolvency and non-payment on the buyer's side and country risks.

<sup>80</sup> Covers erection, all risks, delay in start-up, business interruption.

<sup>81</sup> Insurance is given to carbon sellers as well as to carbon buyers.

<sup>82</sup> *Lack-of-sun insurance* provides cover for lost revenues if the radiation of the sun and thus energy production falls below a certain minimum value. *Wind insurance* provides cover for lost revenues if a lull or storm prevents turbines from generating energy.

<sup>83</sup> Companies under French law, whatever their activity, whose turnover does not exceed € 460 million before tax.

Dendro power based on tree harvesting has great potential in Sri Lanka. But progress is slow for various reasons, mainly related to the organization of biomass supply, but also due to financing, which leads national developers to seek co-financing equity partners abroad, and technology. For the moment, *Indian steam turbine technology* is the technology preferred by biomass power developers in Sri Lanka: it is a proven technology and has lower costs of investment than alternative technologies. The downside is a low conversion efficiency of around 20 percent. *Fuel cell technology* is the most advanced, unproven, and expensive technology in terms of investment and non-fuel operating costs: the cost of investment for a 10 MW fuel cell power plant using biomass is estimated at US\$23 million of which US\$3 million are for civil works. Based on 70 percent gasification efficiency and 80 percent fuel cell efficiency, fuel cell power plants can achieve a 56% overall conversion efficiency. For government energy policy, fuel cell technology has the advantage of doubling the share of RE power generated annually for a given amount of yearly biomass supply. In addition to increased national security of supply, there are local environmental advantages such as no need for cooling water and global environmental benefits in the form of higher CO<sub>2</sub>-reductions. Seen from this perspective, the most interesting “national project developer - foreign investor alliance” is the one between Earthwatts and the Singaporean fuel cell technology company AGNI Inc. AGNI is eager to demonstrate the economic-technical feasibility of its fuel cell power plant technology in a full-scale reference plant (gas from gasification is refined to extract hydrogen). AGNI is willing to co-finance 60% of the cost of investment through own equity, looking for the remaining 40% debt finance to come from local financing, most likely from the Bank of Ceylon. That, however, is unlikely to happen without a PBG.

Sri Lanka has no know-how in wave power, and no pilot project has ever been undertaken. Yet, because a developer applied to SEA (Sustainable Energy Agency) for approval of a feed-in-tariff, a specific tariff for wave power was adopted. The tariff is not high enough to finance ocean power projects at their present stage of development and costs of generation. Yet organizing a demonstration project with the help of grant finance plus a PBG for debt financing would assist the development of the technology both in the originating OECD-country and build up expertise and interest in Sri Lanka at an early stage.

## 7.3 PBGs for Business and Asset Finance in Developing and Emerging Countries

Small scale renewable energy and energy efficiency (SS-RE&EE) businesses need several types of funding and support, including TA for enterprise development, equity funding, and creative grant funding for business innovation to penetrate and reach challenging market areas and segments.

### 7.3.1 Closing equity-debt gaps in business and project finance

The *Central American Renewable Energy and Cleaner Production Facility (CAREC)* provides risk finance to clean energy enterprises and projects in Central America and the Caribbean. The target market is grid-connected RE projects of less than 5 MW, but a range of clean energy enterprises can be funded as well. Like a strategic investor, CAREC provides flexible capital - mezzanine-finance such as subordinated debt, convertible debt, preferred shares, and other quasi-equity structures - to help mobilize commercial and development bank debt from both local and international sources. CAREC finances up to 25% of a project's capital cost. The terms of CAREC finance are matched to a project's revenue stream; loan payment come out of revenues net of operating costs and senior debt service.

The instruments are typically designed to earn a fixed rate of return plus additional returns in the form of profit sharing, ownership shares, and, potentially, acquisition and sale of carbon emission reduction credits. Chart 26 shows how the CAREC Fund was financed; E stands for equity, ML for mezzanine loan, and SL for senior loan.

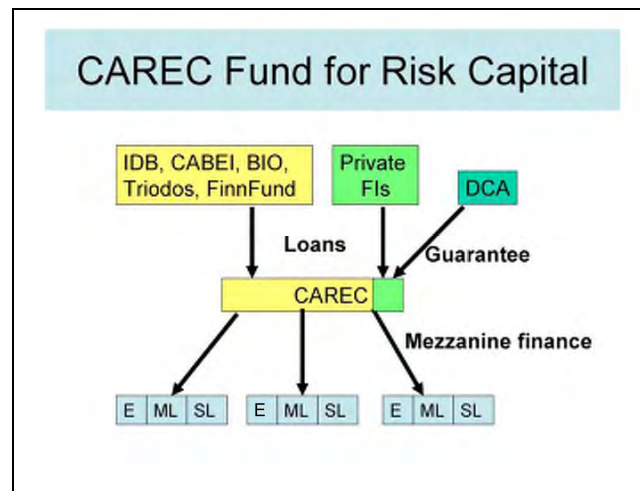


Chart 26: CAREC for Equity-Debt Finance Gaps in Developing Countries

CAREC is managed by E+Co Capital Latin America Ltd, a subsidiary of E+Co. The Multilateral Investment Fund (MIF) of the Inter-American Development Bank (IDB), CABI, the BIO, Triodos and FinnFund agreed late 2006 to fund US\$17 million of a total targeted capitalization of US\$20 million. E+Co Capital Latin America secured a loan guarantee facility from USAID Development Credit Authority (DCA) to be used in support of private sector debt to the CAREC fund.<sup>84</sup> With grant funding from MIF and the Netherlands Development Finance Company (FMO), the fund has a TA facility to help cover investment preparation and project and business financial advisory services.

The *European Commission's Global Energy Efficiency and Renewable Energy Fund (GEEREF)* is a risk capital fund to mobilize private investment in energy efficiency and renewable energy projects in developing countries and economies in transition. It will accelerate the transfer, development, and deployment of environmentally sound technologies and help bring secure energy supplies to people in poorer regions of the world. These projects will also combat climate change and air pollution. The EU will contribute €80 million for the first four years. Financing from other public and private sources has already taken the initial funding to at least €100 million. These investments are expected to attract risk capital of between €300 million and €1 billion for investment in projects on the ground. GEEREF will prioritize small investments, below €10 million, that are largely ignored by commercial investors and international financial institutions.

### 7.3.2 Foreign seed and growth capital for local start-up SMEs

UNEP's Renewable Energy Enterprise Development program conceived an alternative approach to attract risk capital that does not include recourse to a PBG. The *Seed Capital Assistant Fund (SCAF)* tries to engage private equity capital in early stage clean energy businesses in developing countries by lowering the risks and transaction costs for *seed-capital investments by private equity firms who also invest in subsequent growth stages*. The SCAF concept is based on two hypotheses. The first is that it is not the risk so much as the higher transaction and management costs of smaller and less developed

<sup>84</sup> For more information, please see <http://eandco.org/>

clean energy transactions and the lower risk-adjusted returns of these investments that deter professional equity funds from making seed capital investments. Even if a fund manager is interested in making a seed capital investment, covering the transaction costs can be challenging. When a fund manager commits to seed capital financing of an early stage RE enterprise, the standard management fee of 2–3% of invested funds is substantially below the actual cost of sourcing, transacting and providing enterprise development services to a seed capital investment.<sup>85</sup> The second hypothesis is that a realistic way to address the original cost barrier is to link seed capital investments to follow-up finance: by investing seed capital in a portfolio of small investments, a fund can create a pipeline for subsequent growth capital investment.

The SCAF is implemented in Asia through ADB and in Africa by AfDB. The SCAF of ADB cooperates with China Environment Fund III, a \$250 million clean energy-focused partnership in Cayman Islands owned by China Environment Fund III, Management, L.P. based in Beijing.<sup>86</sup> SCAF's collaboration agreement with the private equity firm establishes two lines of support:

- The “*Enterprise Development Support*” line cost-shares on a portfolio basis some of the elevated costs associated with deal sourcing, providing enterprise development services to, and transacting seed scale investments. As part of the arrangement, the cooperating fund manager commits to providing enterprise development services to qualified local entrepreneurs as a means to identify and develop a pipeline of early stage clean energy investment opportunities. The cooperating fund manager decides the services to offer based on the local context: e.g. identification and training of new ‘pre-commercial’ clean energy entrepreneurs and project developers; coaching services for specific promising investment opportunities; and co-financing of pre-investment feasibility studies.
- The “*Seed Capital Support*” line aims to offset the hurdle of higher perceived risks and lower expected returns when dealing with early stage clean energy projects. It covers some of the costs of technical assessments, feasibility studies, product certifications, legal reviews of intellectual property and patent rights, and other project-related permitting processes on a per transaction basis.

### 7.3.3 PCGs for vendor-assisted asset finance

Some schemes include Vendor Finance Agreements with qualified vendors that require vendors to provide buyback guarantees to repurchase equipment repossessed in loan default situations. UNDP, with a small grant from the GEF, operated a *solar home systems financing program in Palawan, Philippines* from 2004 to 2006. Because of Palawan's island geography, more than 60% of all villages lack grid power. Because of their remote location, many households must rely on stand-alone household energy systems, which provides an excellent market opportunity for Solar PV home systems (SHSs). *Shell Solar Philippines Corp. (SSPC)*, the sole vendor in the region, has been active marketing and selling SHSs. But sales momentum was hard to achieve due to lack of available consumer financing. UNDP established a vendor finance program involving SSPC and the *Cooperative*

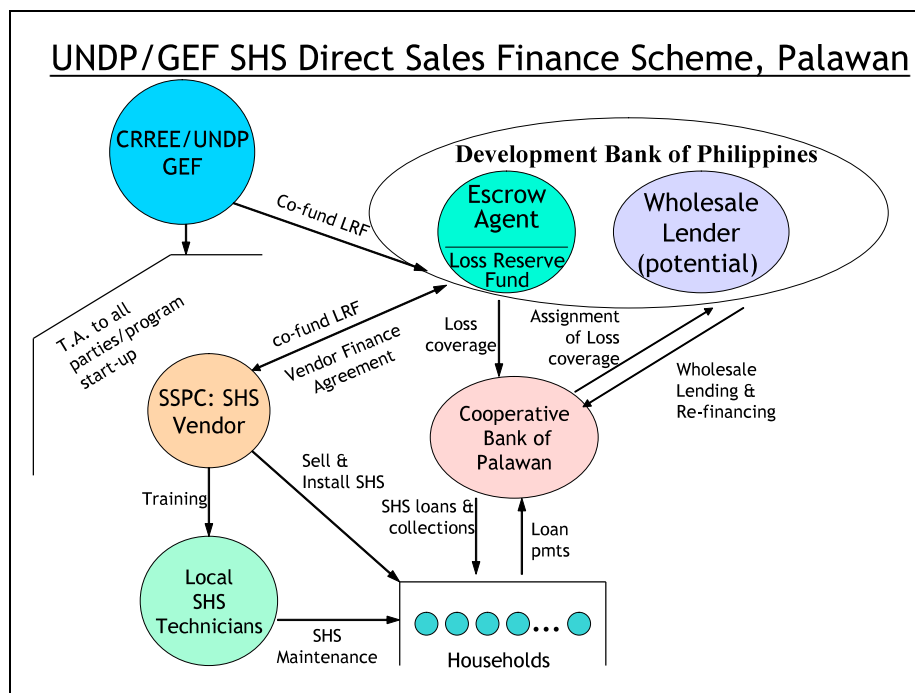
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<sup>85</sup> Investors pay an annual fee of 2–3% to asset management firms to manage capital on their behalf, usually through closed-end investment funds.

<sup>86</sup> Through the seed capital investment process, prospective investees for growth capital investment can be prepared. Even though China Environment Fund III has been set up to target later stage transactions, its fund manager sees an opportunity with SCAF support to also invest in smaller, less mature projects through the creation of a seed capital window. It is expected that several of the projects financed through this seed capital window will mature into full-scale investment opportunities for subsequent consideration by the fund.



*Bank of Palawan (CBP or Bank)*, a small local rural bank with total assets of approximately USD\$3 million equivalent. CBP had experience in capital lending to farmers and fishermen, but had not been in the business of providing term loans to households for purchases of consumer equipment. The program utilizes a *loss reserve fund (LRF)*, co-funded by UNDP with GEF monies, to provide credit enhancement to household loans for the acquisition of SHSs. The LRF was funded with an initial deposit of US\$35,000 by UNDP, enough to support more than US\$400,000 in loans to SHS systems, enabling approximately 1200 SHSs to be purchased; the balance was to be contributed by the Vendor and by the Bank. The LRF was deposited with *Development Bank of the Philippines (DBP)*, which served as *escrow agent*. The vendor, SSPC, provides system warranties and training in after-sale services to local technicians and was committed to buy back SHSs repossessed from defaulting borrowers at a price reflecting the value of the PV panel and equal to at least 50% of the remaining principal balance of the loan. The LRF was sized to cover all losses net of the proceeds from SSPC's buyback of the PV panel; the estimated default rate was set at 20%, greater than the level that was really expected. The typical loan term is four years. Customer down payments are small; a minimum of 10% is required, plus a security deposit of two month's payments. On these terms the household's monthly payments are considered to be affordable. The design of this program is depicted in chart 29.



**Chart 27: SHS Direct Sales Finance Scheme, Palawan**

Loan defaults have been low, less than 4% of total loans to date. Successor programs can therefore use a smaller planned default rate to size the LRF and therefore achieve greater leverage of donor funds. DBP is considering providing wholesale loan funds to CBP to expand its lending resources for this program.

### 7.3.4 PBGs for carbon revenues in programmatic JI or CDM

An innovative way of structuring public funds for carbon finance is through carbon delivery guarantees aiming at minimizing the *under-delivery risk of CERs to developed country buyers*.



An alternative is to *guarantee carbon revenues for lenders who acquire entitlements to carbon credits in return for providing low-interest loans to project finance*. A joint implementation project for EE in residencies in Eastern and Central Europe, which is in the idea phase, suggests that lenders provide low-interest rate finance to investments by home owners in improved EE of their houses. For achieved energy savings, homeowners receive a white certificate quantifying the tons of CO<sub>2</sub> that were saved. In return for the low-interest rate, the homeowners hand over the certificate ownership rights to the lender. The lender finances the interest subsidy by selling acquired certificates on to a carbon fund. Because the subsidy is financed after the EE measures have been implemented, lenders are expected to need an upfront PBG to cover the risk of losses on the low interest rate.

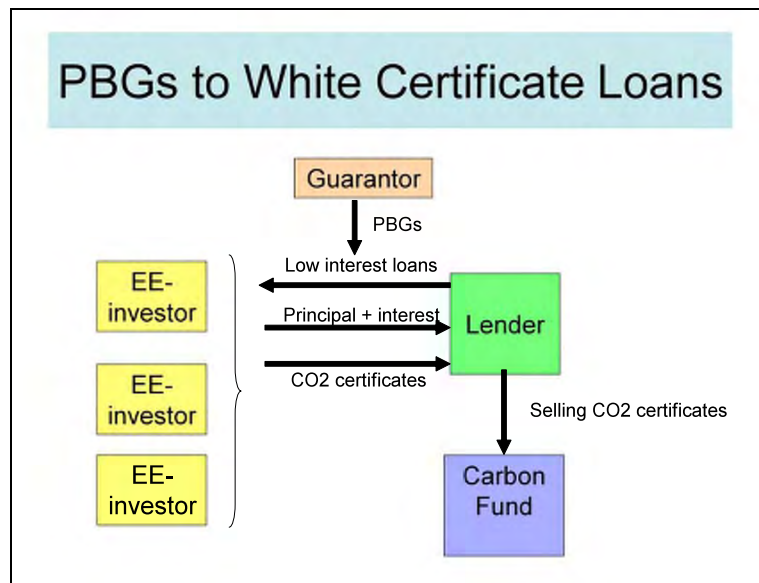
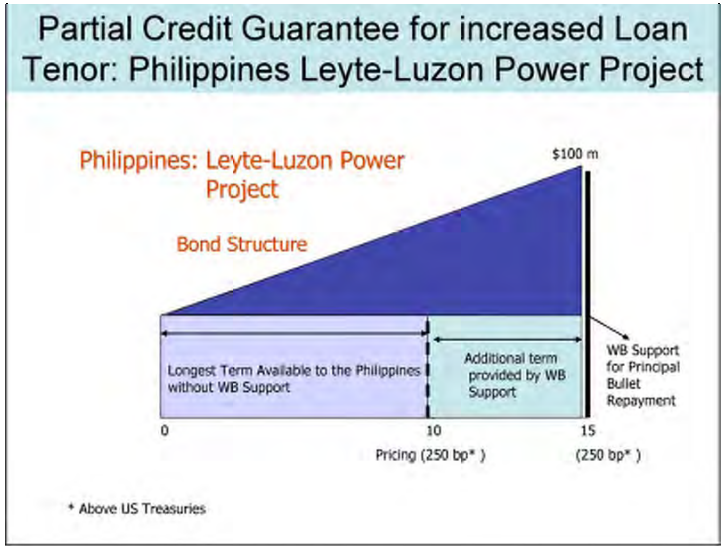


Chart 28: PBGs to White Certificate Loans

## 7.4 Matching Loan Tenor with RE & EE Revenues in Project Finance

The *Leyte-Luzon geothermal power plant project* was implemented by the National Power Corporation (NPC), the Philippine National Oil Company (PNOC), and the Electricity Development Corporation, both state owned companies. The NPC raised US\$100 in project finance through a 15 years' bond issue on the international capital market. The World Bank provided a PCG to the bond issue structured as a put option for principal repayment at maturity: it allowed bondholders to present or "put" their bonds to the World Bank at maturity for payment of principal. The PCG had a double purpose: (i) to help the government entity access long-term financing on the international capital market and (ii) to expand loan tenor.



**Chart 29: PCG for Increased Loan Tenor: Philippines**

With the support of the Bank’s guarantee program, the NPC was able to get a bond with a 15-year maturity, one-third greater than the longest maturity previously attained by an issue from a Philippine sovereign entity (10 years). The 15- year maturity was obtained at the favorable pricing of 250 basis points (2.5%) over the yield of US treasuries of the same maturity, a pricing, which compares favorably with that of previous Philippine issues of much shorter maturities.

A simpler structure was used in the China Ertan Power Project: the World Bank issued a US\$50 million PCG in the China Ertan Power Project covering the later maturities of commercial loans to finance the expansion of a public sector hydroelectric power plant. As seen in the chart, the agreement expanded loan tenor from 7 to 15 years, although the guarantee only covered payments during years 13-15.



**Chart 30: BRG for Increased Loan Tenor: China**

After the break up of the former power monopoly, Uganda Electricity Board, the *West Nile Rural Electrification Company (WENRECO)* won a 30-year contract to generate and distribute electricity in the West Nile, a regionally isolated grid. The investment program in the concession contract included, inter alia, the construction of a 5 MW small hydro project. The government, assisted by a World Bank loan committed to grant finance roughly 70 percent of the investment program. The

remaining 30 percent were to be financed by investor equity and a commercial bank loan from Barclays. Given their lack of experience with this type of project and other financial market conditions, including regulatory limits on maximum loan tenor, Barclays was willing to provide a seven-year loan term for the project. In order to get Barclays to extend the loan tenor from seven to 14 years, and thereby make the price per kWh from the system affordable, the World Bank provided a form of partial guarantee on the loan. The guarantee liability amount was sized and structured so as to fully repay the remaining principal balance on the 14-years loan after seven years ("bullet payment"). The World Bank provided a cash instrument that, with accumulated interest payments, was to grow to a sum equal to the full guarantee liability amount. A zero-coupon bond was to be used that would have a future redemption value, at the seven year point, equal to the required bullet payment.<sup>87</sup> At Barclays' option, the instrument could be redeemed at the end of the first seven-year loan term to prepay the remaining principal on the loan. If the project performs well and meets its debt service obligations, the parties expect that at the end seven years, Barclays would extend its loan for a second seven-year term, allowing the WB guarantee to be retired.

This type of guarantee is useful. But, because a cash-type instrument was used, it also required a large sum from the World Bank to implement. After seven years, the remaining principal on a 14-year loan will be in the range of 67% of the original loan principal. Depending on the effective yield on the zero-coupon bond, the purchase price of the bond will be in the range of 65% of the planned seventh year redemption value (based on a 6% yield). Therefore, the cash required to purchase the bond will be on the order of 45% of the total loan amount. Thus, it would be costly in terms of concessional and development funds to replicate on a large scale. If this type of instrument is to be replicated, a guarantee program would be established whereby a local guarantor offers similar partial loan guarantee instruments for a series of transactions; concessional funds could be used as equity or a first loss reserve by the guarantor to support undertaking such liabilities. The parties would need to agree in advance that the redemption option is only available if the project loan does not perform. Then, it can be estimated that only a portion of the guarantee liabilities will in fact be called. Then total guarantee liabilities could be a multiple of the concessional reserve funds and the concessional funder would achieve better leverage of its resources.

## 7.5 Are PBGs Successful in Changing Ingrained Lending Practices?

To what extent do PBGs contribute to *financial sector deepening*, meaning

- (i) increasing access to financial services for those who previously had restricted or no access;
- (ii) increased provision by financial institutions to such clients of products and services relevant to their needs?

The difficulty of getting participating FIs to change ingrained lending practices through the use of PBGs is demonstrated in Mexico's FIDE. In 1990, the *Mexican Government launched FIDE, (Fideicomiso para el Ahorro de Energía Eléctrica), a national Trust for Electric Energy Saving* to promote rational electric energy use and energy saving. FIDE's many activities include providing no-

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<sup>87</sup> A zero-coupon bond is a bond bought at a price lower than its face value, with the face value repaid at the time of maturity. It does not make periodic interest payments or have so-called "coupons," hence the term zero-coupon bond. Investors earn return from the compounded interest all paid at maturity plus the difference between the discounted price of the bond and its par (or redemption) value.

and low-interest loans for commercial, industrial, municipal, and household EE-projects. The FIDE debt financing mechanisms demonstrated significant results vis-à-vis loan servicing and leveraging further financing and energy savings. Yet, in terms of financial sector deepening, the results were less promising. A main objective of FIDE's EE finance programs was to increase the participation of the commercial banking sector in providing debt and other finance to EE projects and ventures. To achieve this, a *guarantee fund* was launched, which was capitalized by *FIDE* (MXN\$5 million - or approx. US\$440,000) and *NAFIN*, a Mexican development bank (MXN\$50 million- or approx US\$4.4 million). The guarantee program has been in existence for 1.5 years in cooperation with its commercial banking partner *BANORTE*. The FIDE/NAFIN guarantee covers 75% of the loan, limited only by the financial limits of the fund itself (approx. US\$5 million). The partner bank assumes the financing of the loan and the remaining risk of 25% of the total debt granted. Despite the successful FIDE loan track record to date (some 15 years of successful loan program), no commercial loans have been granted under the private bank loan and FIDE/NAFIN guarantee program. FIDE also covers the technical due diligence and related transaction costs. This demonstrates the challenge of convincing the local banks that EE ventures and projects are profitable and that servicing debts through energy savings is a reliable model. The FIDE example demonstrates that guarantee funds cannot be used as a stand-alone solution. In Mexico strategies and efforts such as banker awareness and training are under consideration to make the commercial finance sector more aware of the opportunities associated with financing EE.

The *GEF/World Bank/NDRC Phase II China Energy Conservation Project* (described in section 5.3.2) was unsuccessful in getting *local banks* to provide ESCO project debt finance. The guarantees and associated loans tended to be underwritten with traditional criteria, similar to working capital loans and secured primarily by the balance sheet, assets, and counter guarantees provided by the ESCOs themselves, independent of the energy efficiency (EE) projects being implemented.

A DFID-financed study looked at the contribution of PCGs to financial deepening: whether sustainable changes in the behavior of lenders towards the SME sector come about as a direct or indirect result of PCG activity? The result of PCG for SMEs should be improved provision of products and services appropriate to SMEs and thus access by SMEs to financial services. The study concluded that "CGS serve as accelerators, not drivers, of financial sector deepening." Credit guarantee schemes (CGS) are effective in promoting sustainable changes in lender behavior, leading to financial sector deepening, in situations where certain specific factors for success pertain. Where the need for financial sector deepening is greatest, CGS are least likely to be successful in promoting that deepening."<sup>88</sup>

In short, PBGs influence the flow of finance within existing arteries, and can be used as an instrument to create new financial arteries, e.g. venture capital funds. Yet, there is a risk that they leave no lasting effect behind when they are withdrawn from the system.

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<sup>88</sup> Bennett & Billington & Doran (2005). The study looked at evidence from Chile, Egypt, India, and Poland.

# 8 STRUCTURING PBG PROGRAMS

## 8.1 Criteria and Success Indicators for Use of Guarantees

### 8.1.1 Criteria for evaluation of the relevance of a PBG

The economic relevance of a guarantee scheme depends on (i) the scheme's ability to fill a market gap and (ii) its ability to reduce costs for investors and (iii) to do it cost-effectively.<sup>89</sup>

The *definition of an imperfect credit market* as "existing when creditworthy borrowers (i.e. borrowers that are likely to earn sufficient revenues to repay the loan) are unable to obtain loans" is too strong for RE&EE promotion policy. For RE&EE policy, a market gap exists when tailor-made finance, which is cost-neutral to public budgets, can substantially accelerate investments in RE&EE.<sup>90</sup> The additionality criterion for a PBG is its capacity to provide access to loans with more suitable conditions: longer terms, grace periods, credits with no private assets to be pledged, and credits for intangible investment. Relevant success indicators are (i) lending activity, (ii) variety in credit terms, and (iii) the attraction of more banking partners in municipalities covered by a PBG-program. Data from these can be measured against the evidence in municipalities without a PBG-program.<sup>91</sup>

A good indicator of the relevance of PBGs is their ability to continue to grant support to projects during a downward economic cycle. This can be measured by assessing the development in the lending volumes of PBG-loans versus the development in financing activity in general during a downturn.<sup>92</sup>

### 8.1.2 Criteria for evaluation of PBG program management

PBG-program *efficiency* concerns the productivity and quality of PBG-program management: costs, organization and process relative to the output and price of the service. It can be evaluated by measuring the costs of the operation in percent of guarantee volume and guarantee loss rates against data from comparable programs.

*Sustainability.* Each guarantee scheme has a strategy compliant with public support policies. Higher default rates are possible in systems that benefit from counter guarantees and are acceptable if the system offers more additionality at the same time.

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<sup>89</sup> The economic justifications for PBGs have been the subject of chapter 1: stimulate lending to groups who lack access to formal loans; overcome imperfections in financial markets; serve as a partial collateral substitute that reduces the lender's risk of not recovering the loan; and help lenders learn about new clients and markets.

<sup>90</sup> If a PBG is priced at a level below long-run cost coverage, measured success of a PBG in terms of increased investment in EE&RE can be due to its ability to overcome financial market barriers to lending, or be a result of the subsidy effect.

<sup>91</sup> Except that there can be an attribution problem: to isolate the effect of a PBG program on lender and investor behaviors from the effects of other complementary measures that are certain to be implemented in these municipalities.

<sup>92</sup> During the 2002–03 economic downturn in the US, many financial intermediaries (e.g. venture capitalists) reduced their level of activity; most guarantee societies actively increased their commitment.

### 8.1.3 Design criteria for guarantee structure

Design of an appropriate guarantee structure supported by public financing should meet several criteria.

- *Appropriate Risk Sharing.* The instrument must provide levels of risk sharing sufficient to attract and motivate FIs, expand their risk profiles and horizons, and provide the kind and amount of support needed to meet their lending criteria and credit requirements and to mobilize their lending for the target markets, while also maintaining and aligning incentives of the parties for good loan origination and administration.
- *Commercial Viability and Pathway to Commercialization.* Instruments proposed should work with and support commercial parties, incorporate commercial financing, and strengthen, not distort, the marketplace. They must address market barriers, meet the specific needs and business objectives of the EE/RE business and the customers, support financing that is matched to the economics of the EE/RE projects and the customer's ability to pay so as to create a marketable offer to the customers, and achieve a distribution of roles and risks that meets the objectives of all parties. The program should define a pathway for declining public support over time and a vision for how the EE/RE financing systems can proceed on a full- or near-commercial basis following completion of the program and how the capacities of all parties to do so will be built.
- *Flexibility, Suitability, Replicability.* The instrument should be suitable and matched to the types of financial products that meet the needs of the target market, address market barriers and conditions. It should also be flexible to support the range of financial products that can be developed to meet market needs. Transaction structures include: (i) loans to end-users; (ii) loans to EE/RE enterprises for on-lending to end-users (via rental and fee-for-service arrangements) being sure to cover not only credit risk exposure of the lender, but also some of the credit risk exposure of EE/RE enterprise to the end-user; (iii) loans to EE/RE enterprises for on-lending to dealers; and (iv) small business loans to EE/RE enterprises for both working capital and plant/equipment term lending. The selected instruments should apply to a range of EE/RE technologies and should be matched up to support EE/RE delivery mechanisms that aggregate end-users and the demand for capital and hence creates sufficient business scale.
- *Administration.* The instrument should be designed to be easy to administer and responsive to commercial needs and transaction timing and provide for proper reporting and accountability.
- *Provide the right incentives.* The loan guarantee must not create incentives for significant moral hazard with respect to the guaranteed lender or the borrower.

## 8.2 Leveraging Ratios: Some Basic Issues

Public finance instruments for RE&EE share the *immediate objective* of leveraging a maximum of private finance with the public funds that are made available; each structure option should be assessed by this metric.

Leverage for concessional funding sources is usually measured in terms of (A) the total energy project and equipment financing accomplished through a program, in ratio to (B) the amount of concessional funding provided. Retrospectively, since under a guarantee program capital is only expanded when loan losses occur, (B) refers to actual concessional funds expended in loss claims. *Leveraging ratios* measured this way of up to 30:1 can be achieved. However, they measure the *gross impact*, so the de facto leveraging *net impact* of loan substitution (debt finance that would have been provided also in the absence of a PBG) is lower.

At the individual loan level, the *pari passu* partial guarantees provide leverage according to the guarantee percentage. If the guarantee percentage is 50%, \$1.00 in guarantee liability leverages \$2.00 in lending. If the project sponsor provides own funds equal to 20% of the equipment cost, the total investment is \$2.50. The public funding required to back the \$1.00 in guarantee liability is much lower, equal to the estimated probability of loss of, say, 10%. Thus, behind the \$1.00 in PBG, a publicly financed loss reserve fund of \$0.20 is required. This leads to a total leverage of 15:1 for the public funding behind the PBG.

In guarantee structures, *leverage can be achieved at several levels of financial intermediation*. Subordinated recovery and first loss guarantees and loss reserves all take on incrementally greater risk than senior loans. As the likelihood that guarantor funds will be spent to cover loan losses on these is greater, they require a higher loss reserve per dollar of guarantee commitment than a senior loan guarantee. This negative impact on the leveraging ratio is partly counteracted by the fact that a partial risk guarantee for a subordinated loan is given to only one part of the loan finance package.

The leveraging, which is achievable, depends on circumstances.

- A guarantee percentage of 50% results, mathematically, in a higher leveraging ratio than an 80% guarantee. Yet, if a 50% cover is insufficiently attractive for potentially interested FIs, it will not be taken up.
- *Ceteris paribus*, higher leveraging ratios can be achieved in sophisticated financial markets than in less developed financial markets.
- Another determinant are risks for the guarantor's credit rating. A development finance institution (DFI) like the IFC is highly conscious of the need to protect its "AAA" status in order to secure funds from the international capital market on the most favorable terms. It is, therefore, very conservative in its gearing ratios.<sup>93</sup>

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<sup>93</sup> The example of an IFC/GEF guarantee program case illustrates this. GEF provided \$20 million in public monies as a first loss guarantee reserve against a contractual obligation by the IFC to issue up to \$120 million of guarantees to local financial institutions. A 20% loss rate coverage is very conservative, yet, previously, the IFC had a policy of matching loss reserves on a 1:1, rather than on a 5:1 basis.



## 8.3 Guarantee Pricing

### 8.3.1 Objectives for pricing

To ensure additionality, fees are charged to guaranteed lenders. Lenders would be reluctant to pay fees if they were otherwise willing to make the same loan without a guarantee.

Guarantee pricing is typically expressed as a percentage per annum of the guarantee liability and paid semi-annually or annually. Not surprisingly, there is a close correspondence between the fee structure of loans and partial risk guarantees (see table 5 showing the fee structures for IBRD loans and IBRD-PRGs).

**Table 5: Correspondence Between Fee Structures for IBRD Loans and PRGs**

IBRD-Loan	IBRD Partial Risk Guarantee	Fee rates (2005)
front-end fee	front-end fee	1.05%
commitment fee	standby fee	0.25
lending spread on IBRD loans	guarantee fee	0.55

Not all guarantee pricing formulas include all three price items. Some call for a single guarantee payment at origination. Most common is an upfront commitment fee and an annual utilization fee. In most guarantee funds, the guarantee fee is set as a percentage of the guaranteed loan amount, charged annually, while others define the fee as a percentage of the entire loan.

Four major considerations drive the pricing of PCGs.

1. *EE&RE market penetration.* A low guarantee price keeps down the cost of debt for EE&RE investors and encourages banks to make use of it to enter new sectors or extend loans to new types of borrowers.
2. *Avoidance of dependence.* Sound pricing reduces the potential for capital substitution and provides an incentive for lenders to exercise care in underwriting and monitoring loans and to drop their reliance on PCGs in the future when their perceptions of the technology or business activity have improved.<sup>94</sup>
3. *Sustainability.* Pricing based on full cost coverage allows guarantee agencies to replenish their guarantees at the inflation-adjusted original and keeps down public expenditure.
4. *Avoid market distortions.* Setting the fee below commercial bank rates for guarantees to credit-worthy clients would block or delay the introduction of commercial guarantees.

When full cost coverage fees are charged, *differences in fee levels* reflect differences in the *default risk* (a PCG for a loan to an offshore wind farm would have a higher price than a PCG for an equivalent loan given to an offshore wind farm - and in the *security* of the guaranteed loan: the price of the PCG for a subordinated loan is higher than for a loan that has first charge on the assets used to secure the loans.

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<sup>94</sup> Loan guarantees create an incentive to use debt and thus may lead firms to substitute debt for equity and to borrow more than they need.



### 8.3.2 Pricing methodologies

Two different approaches are used to fix the price of a PCG. One approach is to fix the price in accordance with *prevailing market rates*. The other is to base the fee rates on the *expected costs* of the guarantee program.<sup>95</sup> The *cost structure of PBG programs* is composed of (i) cost of funds, (ii) operational costs, and (iii) payment of claims for losses on guaranteed loans. Estimates of the first two cost categories are straightforward,<sup>96</sup> while the estimation of claim payments is more difficult, being subject to the uncertainty of forecasting the future. Three alternative methods are used to estimate the flow of claim payments during the lifetime of a PBG.<sup>97</sup>

1. One method uses historic *loss data from comparable programs* to determine the likelihood and distribution of future losses for the program and, based on that, to set the guarantee fees at an amount that will cover the expected losses. If one can see that annual net losses on guarantee operations for comparable programs are 1.5% of the average outstanding guarantee amount per year, this will provide a good basis for fixing the annual utilization fee.
2. A second method equates a *loan guarantee with a put option*. The guaranteed payments, when the borrower defaults on the loan contract, are, seen from the viewpoint of the lender, similar to the exercise price of a put at maturity. This assumption allows options value theory (the Black-Scholes formula) to be used to determine the value, and thus, the price of a loan guarantee. The US Office of Management and Budget, for example, uses options value theory to value some forms of federal government insurance and guarantees.
3. A third method treats the value of the guarantee as the *difference between the value of a risk-free bond and a risky bond*. Using bond prices and historic data on bond default rates and recovery rates on “similar projects,” binominal tree analysis assigns probabilities to a range of cash flow outcomes for the guaranteed firm or project and estimates the resulting guarantee cost as the weighted average of these.

All four approaches have weaknesses in the form of simplified assumptions and lack of relevant quality data:

- Using existing market prices to fix the guarantee fees for a PBG faces the contradiction that PBGs are supposed to be used for situations where no commercial guarantor is willing to provide cover.
- Attempts to base the estimate of claims on the experience from similar programs face the problem of limited availability of loss data for comparable programs and loans, and that they assume loss rates to be stable over time.
- The options value theory approach calculates changing value estimates over time, but requires historic data for comparable financial assets to estimate the variability of income from the guaranteed loan/project. The identification of relevant financial assets is difficult.

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<sup>95</sup> In theory, since commercial market rates are cost based, the two approaches should lead to the same level of guarantee fees.

<sup>96</sup> Public guarantee funds are composed of equity provided by government grant and, in some cases, debt borrowed on the capital market. The cost of funds is the weighted cost of these. The asked for rate of return on equity is either the inflation rate or the interest rate on “risk-free” government bonds.

<sup>97</sup> See Seidman (2005).

- The binominal tree analysis faces the problem that the large firms and projects that use the bond market are very different from the firms and projects that are covered by PBGs. In addition, because the difference between risk-free and risky bonds is used for pricing PBGs, it seems that the approach calculates the value of a guarantee for the FI, rather than the value of the contingent liability for government. In a perfect competitive market, the two estimates should be equal, but in real capital markets they are not: otherwise, wrapping bonds would provide no net financial benefits to the issuer.

### 8.3.3 Guarantee fees and conditions for selected programs

Table 6: Guarantee Fees and Conditions in Programs Involved in RE&EE Investments

GUARANTOR	GUARANTEE LIMIT	FINANCIAL LIMIT	UPFRONT FEE	ANNUAL FEE *	TENOR	ELIGIBLE LOAN RECIPIENTS	ELIGIBLE FINANCIAL INSTITUTIONS
<b>1. PBGs for business finance</b>							
Austria, AWS Double Equity Guarantee Fund	80%	€2.5 m = owner equity	0.5%	1-5% of outstanding credit + result dependent fee	Max 10 years/ up to several years	SMS (EU definition) max 5 years after founding date	Loan taker's bank
Denmark, Vækstfond Growth-G.	75%	€0.7 m	2%	1.25%	3-10		
<b>2. PBGs for RE&amp;EE asset finance</b>							
IBRD PCG	50%		0.5%	0.75%			
IBRD PRG	50%		1.05%	0.75%			
Bulgarian EE Fund	80% pari-passu 50%: first loss basis			0.5-2.0%  0.5-2.0%	5 5		

Source: websites of programs

\* Commitment + standby fees

### 8.3.4 Sharing upside gains/potential

In exchange for assuming a share of the risks to individual projects, the government can seek to share in any extraordinary gains. This aspect is relevant for “risk capital PBGs” to equity investments and to mezzanine loans.

Governments can share in the upside potential of supported projects through the acquisition of *warrants*, an option given by the company to holders of a particular security that gives them the right to subscribe for ordinary or other shares at a future date.

A more straightforward and more common approach is to divide the fee for a “risk capital PBG” into a fixed annual fee (expressed as a percentage of the guaranteed amount) and a success fee, which is related to the size of future profits. Austria Wirtschaftsservice GmbH (AWS) uses this approach in its Equity guarantee, Double Equity Guarantee, Technology Financing Programme and Profit-sharing Bonds (“Micro Corporate Bond”) schemes. In Sofaris’s *Développement Technologique pour les FCPI/FCPR Fund*, the guarantee fee is fixed as an annual percentage of the guaranteed financial investment plus a small share in capital gains made by the VC-Funds.

## 8.4 Funding and Public Budget Accounting of PBGs

### 8.4.1 Funding: Funded and non-funded guarantee schemes

Guarantee funds are in general founded and owned by local, regional, or national public authorities.

An institution wanting to offer credit guarantees has to convince the FIs that its guarantee fund has the necessary resources to pay out in cases of loan defaults.

A *funded scheme* maintains deposits specifically for this purpose, either keeping an amount of money in a bank account or invested in some other way. Financial support to the guarantee scheme can take the form of: equity formation, increases in risk funds (provision accounts), or subsidies for recently established schemes.

CORFO, the Chilean Economic Development Agency's RE&EE Guarantee Program, is an example of a funded scheme. The guarantee program appropriation in the law passed in 2008 is US\$70 million. CORFO is allowed to leverage the US\$70 million 5:1, leading to a US\$350,000 total liability. If losses are greater than \$70 million, they will be full recourse to the CORFO. Loss records for the FOGAIN program have been around 1%.

In *non-funded schemes*, upfront funding is limited to operating expenses. The government assumes financial responsibility for the guarantees offered, providing an automatic counter guarantee for its losses. Deficiency payments are made directly from the government budget.

### 8.4.2 Loss rates in PBG programs: What is the experience?

What is the experience of PBG guarantee programs with regard to cost coverage versus loss making? The record is mixed:

- The annual charge of 1 to 2% of the loan amount (depending on the claims performance of participating banks) of Chile's FOGAPE covers administrative expenses plus claims.
- The charges of between 0.5 and 4% of the sum guaranteed made by Mexican schemes cover only about a half of the operating costs and underwriting losses.
- The US SBA Section 7a program is underpriced, at about 0.1% per annum of the outstanding stock of guaranteed loans; US Student Loan Guarantees are at about 1.5% per annum.
- The annual subsidy in Italy's SGS grew to about 1% by 2004.
- Korean KCGF charges between 0.5 and 2%, depending on the borrower's credit rating, with an average of just over 1%, yet covers only a fifth of the scheme's outlays. The two big Korean schemes lost almost 4% per annum of the stock of outstanding guarantees in 2001-5.
- The UK SFLG scheme, which charges an annual 2% fee, experienced defaults on more than one in three of its guaranteed loans; requiring a subsidy amounting in a recent year to 15% of gross new guarantees in that year.
- Historically, *ad hoc loan guarantees* have had a much higher rate of default than *loan guarantee programs*.<sup>98</sup>

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<sup>98</sup> Refers to experience in Canada. But the same is the case in other countries as well.

Thus, losses on PBGs are common. As illustrated above, fee percentages are no indicator of full cost-coverage; the reason being that PBG programs serve clients with different risks. It would be interesting to check whether loss levels in percent of guaranteed loan volumes are positively correlated with the level of guarantee fees, if the guarantee levels are a relevant proxy for objective project risks.

Losses on PBG-programs can have different origins. One is error in forecasting methodology. Unfortunately, no comparative analysis is available on the relative loss making records of the four fee-setting methods.<sup>99</sup> Another is that the PBGs either were never intended to cover full costs (intended subsidy to beneficiaries), or that potential losses were not a concern due to positive external benefits from incremental investments.<sup>100</sup> A third is mismanagement on the part of participating FIs, the moral hazard factor. A fourth is political cronyism.

A World Bank review of PBG experiences worldwide found that the number of loans in default as a percent of the number of guaranteed loans averaged 5.4%. Individual factors that influence default rates include the following:

- “Loan level” guarantee programs had more loans in default, 6%, than “portfolio guarantee” schemes, 4.2%.
- The default percentage was 18% for those who used ex-post risk management in the form of insurance or securitization, and 2.2% for those who used no reinsurance.
- Defaults are higher in schemes that provide pay-off after a bank writes off a loan (11.5%) than in schemes that require banks to initiate legal action before payout.
- Government involvement in credit risk assessment and recovery is associated with higher default (7.8%), than in schemes where government involvement was zero (3.6%).<sup>101</sup>

### 8.4.3 Accounting of contingent liabilities in the public budget

When providing a guarantee or approving a non-funded guarantee program, government incurs a *contingent* liability (a liability that is conditional on some future event); the expected cost of this must be made evident to decision makers before the PBG is approved by government. A contingent liability program is *funded* when the premiums for the guarantees and reserves created through budgetary appropriations are equal to the expected payments. In principle, guarantees should be recorded in the public budget at the present value of their *expected payments minus guarantee fees* received, and provisions for this should be created. In practice, countries follow different policies.

Some have a forward-looking provision policy. Canadian government accounting policies require it to set up a contingent liability for guarantees given.<sup>102</sup> The Statement of Contingent Liabilities included in the public accounts discloses claim rates (net claims as a percentage of outstanding guarantees) associated with loan guarantee programs. These contingent liabilities are disclosed in a note to the financial statements of Canada and details are provided in the public accounts of Canada. Reserves are established in the balance sheet to offset the potential costs associated with new loan guarantees to ensure that defaults would not exert undue pressure on the fiscal framework. The deficit is

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<sup>99</sup> AIG’s de facto collapse in 2008 and the huge amount of toxic assets in private banks show that mispricing of risks due to faulty modelling is not a privilege of PBGs.

<sup>100</sup> Honohan (2008) concludes: “While the market can find uses for partial credit guarantees, the attractions for public policy can be illusory: indeed their most attractive feature for myopic politicians may be the ease with which the true cost of guarantees can be understated, at least at the outset.”

<sup>101</sup> Bech & Klapper & Mendoza (2008)

<sup>102</sup> In funded schemes that charge cost-covering fees, this liability is taken care of upfront in the public budget.

charged when events indicate that the government will have to incur an expenditure to cover the contingency, and the amount can be reasonably estimated. The required funds are provided by Parliament.

The accounting policy of the US Government is similar. Title XVII of the 2005 Environmental Policy Act established in law the DOE loan guarantee program. It specifies that the DOE must receive either an appropriation for the subsidy cost or payment of that cost by the borrower. The subsidy cost is the expected long-term liability to the federal government in issuing the loan guarantee (estimated claims payments). The American Recovery and Reinvestment Act of 2009 and 2009 budget appropriated \$3.25 billion for subsidy costs.

Others have a “react when a default event occurs” policy. The Danish government makes reference to potential costs of the liability in the supporting documents for a PBG-approval by Parliament; yet, an estimate of the default cost for ad hoc PBGs is not made. Hence, there is no mention of loan guarantee costs in the budget, against which the government could be held accountable at the reporting stage. Neither is the cost nor risk of loss of the guarantees recognized on an annual basis but only in years when the government must provide cash to pay for them.

## 8.5 Developing EE/RE Finance Guarantee Programs: Topics and Steps for SEF Alliance Members to Consider

The following topics are recommended for consideration as SEF Alliance members and other development finance agencies consider the design and development EE/RE guarantee programs for their particular market applications. The starting steps are to identify and select the target EE/RE markets that the guarantee program will address and then identify and research interested FIs.

### 8.5.1 Identification of target markets

A guarantee program must be designed to match the financing needs and characteristics of the target market. One key parameter is *deal size and numbers of transactions* to be supported. If EE and small RE projects are targeted, then portfolio guarantees, first loss guarantees, and even loan loss reserve fund structures can be applied. The authority to add loans to the portfolio can be delegated to the partner financial institution, subject to agreed underwriting criteria. Grid connected RE and bio-fuels projects will be larger and be covered by partial credit guarantees that require deal-by-deal appraisal.

The choice of target markets is a *clean energy development policy matter*: which types of EE/RE projects does the development finance agency want to promote? And, in what sectors? It is also a *commercial matter*: is there effective demand for financing? What are the economics of the EE/RE projects, and is there a compelling business case for their implementation? Are there commercial parties, EE/RE companies, interested energy users, and other partners, e.g. utilities, that are developing projects in the target markets? Is there a demand for financing that will make addressing the target market a profitable line of business for the partner financial institution?

This information should be gathered in advance to present to and convince the prospective partner FIs. The market research agenda includes:

- *EE/RE project economics and types of projects that have compelling economics.* The easiest method for researching this topic is to collect project engineering/economic feasibility studies for existing and prospective projects.
- *Existing Government EE/RE Programs.* Identify and summarize background, experience, interests, and activities of government, NGO, and development agencies active in promoting EE/RE project development and finance in the target markets. Inventory main development and concessional programs underway and the resources they offer. Where have market aggregation partners (utilities, local governments, EE/RE and ESCO companies, etc.) established EE/RE marketing and project development programs, etc?
- *Identification of the capable EE/RE equipment and project companies.* Identify and collect background information on the experience, business interests, and activities of the main commercial players in the target EE/RE market who are selling and developing projects. From interested, cooperating firms, collect case studies of implemented projects and feasibility studies for projects under development.
- *Energy Sector Price, Tariff, and Regulatory Background.* General energy sector background information is needed focusing on tariffs, prices, and regulatory structure; and policy and institutional support for EE/RE. Include background on independent power and cogeneration projects and rules/tariffs for in-feed buyback and standby rates for power sales to the utility grid.
- *End-User Sector Research.* Assess background on credit, legal, and institutional decision making characteristics of the target energy end-user sectors: industry, municipal, power utility, hospital, etc. Procurement rules for public sector end-users must be understood.

From this research, the development finance agency can determine the types of lending it chooses to support, e.g., project and equipment finance, corporate finance for EE/RE enterprises, new technology development and venture funding.

## **8.5.2 Identification of collaborating financial institutions**

Once target markets are researched, then interested financial institutions must be identified. Research will assess their capacities, experience, lending criteria and typical terms for the target markets, confirm that adequate lending capacity for medium and long-term lending exists, and whether guarantee and risk sharing instruments can help mobilize these resources. Questions include the following:

- What barriers do interested FIs face to EE/RE lending? What experience does the FI have with this market? What types of borrowers are they most interested in (residential, corporate, SME, industrial, public sector, etc.)?
- What types and terms for risk sharing instruments will address these barriers? How can these be structured for maximum financial benefit to the FI? Does the FI have available medium-to-long term lending resources?
- Are there other guarantee agencies which could be partners for an EE/RE guarantee program?
- What financial products does the FI offer currently that match up well with the financing characteristics of the target EE/RE markets? Experience in plant/equipment term lending, project

finance, leasing, and vendor finance may particularly be valuable and have strong analogs to EE/RE lending.

- What are typical lending terms as regards: minimum and maximum deal size (which may be different for one-off deals versus programmatic relationships for financing); credit standards/requirements and credit analysis procedures, security requirements, transaction processing procedures, documentation requirements; loan tenors and interest rate pricing (fixed/floating); experience with construction financing and/or disbursement procedures.
- What experience does the FI have with other development finance programs?
- What are the steps the FI takes to develop and launch new financial products? Can an EE/RE lending program build off the existing product line? What types of assistance could the FI use productively to enter this EE/RE line of business?

It is useful in FI research to prepare in advance a briefing on the target EE/RE market, to present the case that there is financing business to be done. Better yet, it can be instructive to discuss particular transactions as a means to understand the FI's approach to appraisal, underwriting, due diligence, and credit structuring.

### **8.5.3 Strategies for recruiting & engaging financial institutions**

A key development finance objective of guarantee programs is to mobilize and leverage the resources of commercial financial institutions (FIs) for EE/RE finance. What are the strategies to recruit and engage commercial FIs?

The FIs' motivation is to book profitable assets. Attracting commercial FIs to EE/RE finance requires a substantial, steady, and creditworthy flow of demand for their financial products that can be originated profitably with manageable transactions costs. These, in turn, require marketing, project investment preparation, market aggregation, and use of secure transaction structures, which is the objective guarantees can serve. FI perspectives that must be met to recruit FIs comprise:

- (i) borrower creditworthiness, transaction structure, and security are primary considerations;
- (ii) technical assistance to educate FIs on engineering, technical aspects, and due diligence of EE/RE projects is useful and can be instrumental;
- (iii) FIs must be convinced there are real markets here, and this can be accomplished by bringing FIs real qualified transactions to consider funding and assisting the FIs with marketing to establish relationships with equipment vendors and ESCOs that need financing for their projects and sales;
- (iv) FIs are often interested in cross-selling other services, so opportunities to do so as an EE/RE finance program brings them new customers and deposits should be explored.

Generally, FIs do not initiate projects and cannot drive the market or be the market protagonist. But they can be brought to finance EE/RE projects *provided that* their underwriting criteria, security,

required appraisal methods, technical information needs, transaction size and market strategies can be addressed. Providing a guarantee can be instrumental in this process.

#### **8.5.4 Developing programs by building business relationships**

In the process of developing EE/RE finance programs, development FIs and agencies must conduct research and interviews with prospective partner commercial FIs. Many commercial parties have been wearied and become wary of development agencies, and are rightly concerned about the time spent responding to development agency research requests. Thus, it is important to treat the research process in the same way as if one is establishing a business relationship. The value proposition for the commercial FI must be clear from the beginning. One way to achieve this is to conduct EE/RE market research in advance, provide valuable market information to the commercial FI in the context of initial contacts, and even bring potential transactions in order to ground the first discussions in real financing opportunities.

#### **8.5.5 Guarantee program design: key topics to consider**

With this information on the target market, energy user sectors, types of lending and projects, and financing characteristics of the anticipated transactions, coupled with an understanding of the appetites and interests of prospective FIs, the final step is to enter into the detailed design of the program. The most important reflections for this concern the following.

- *Budget and Resources.* What budget is available for the EE/RE guarantee program? Uses of these funds include: guarantee reserves, guarantee program operations and administration, and technical assistance, e.g., for marketing, to prepare projects for investment supported by the guarantee, and for training and capacity building of participating FIs and other market participants. Program development costs should also be budgeted.
- *Other guarantee agencies.* Are there other guarantee agencies already operating in the market, either publicly backed, e.g., for SMEs, or commercial, who could be partners to implement an EE/RE guarantee program? If so, this type of cooperation could provide a quick way into the market.
- *Use of the public credit.* How is the liability of the government capped for the “publicly-backed” guarantee? Is the general public or government credit available to stand behind the guarantee? Or, is the government providing an appropriation of funds to be used as guarantee reserves by another party or guarantor? If so, what is the perceived credit quality in the market of this proposed guarantor and, hence the perceived value of the guarantee to be offered?
- *Regulation.* How can the guarantee instrument be structured for maximum financial benefit to the beneficiary FI, in view of regulation concerning risk weighting portfolios, loss provisioning, and capital adequacy. The most attractive guarantees will be designed with consideration of these factors; confirmation from regulators should be sought.
- *Leveraging strategies.* How can the development agency best leverage its resources? How can the development agency use its resources to leverage up financing from commercial sources of finance? This topic should be addressed in the guarantee program design, and the guarantee capacities of the program should be correlated with target business volume estimates, market



size and impact, and development goals. The capacity of prospective partner FIs and other guarantee agencies to achieve leverage can be a selection criterion for FI partnerships.

- *Commercialization strategy.* Many guarantee programs are intended in part to help partner FIs pioneer new markets, with a view that the FI, presuming a successful experience, will expand its EE/RE finance business independent of future guarantees. This point should be discussed with the FI, along with at least preliminary ideas on commercialization strategy and how this evolution can be aided.
- *Use of Procurement Processes.* To select partner FIs, some development agencies will use request for proposal (RFP) processes. An RFP document would describe the program, outline the terms of the guarantee program and solicit proposals and information from interested FIs to participate. The format and content of the proposals can be prescribed to assure systematic, thorough information is provided.
- *Program Implementation Plan.* Division of functions between the partner FI, prospective TA service providers, the development finance agency and other market participants should be defined and outlined in a program implementation plan.
- *Program Development.* Because EE/RE market and finance development is an inter-disciplinary topic, the development finance agency may want to assemble an inter-disciplinary and inter-agency team to advise the program. This team could liaise with economic development, industry, agriculture, housing, SME, energy, utility regulatory, financial regulatory, and other agencies.
- *Guarantee Structure Options.* Based on the selection of target markets, related financing characteristics, and interests.
- *Implementing Agreements.* Once the program is designed, implementing agreements will be needed amongst the parties, including, for example, guarantee or loss reserve fund agreements.
- *Technical assistance needs.* What other services are needed to assure good deal flow for the financing facility? It cannot be overstated that complementary technical assistance programs are vital to assure finance program success.

### **8.5.6 Working with an existing guarantee agency**

A general principal of development finance is to build on existing capacities. One approach development banks and bilateral EE&RE agencies can take to establish EE/RE guarantee programs is to work with an existing guarantee agency. Many countries have established state-owned and sometimes commercial loan guarantee agencies, as independent agencies or as units or programs within their national development banks. These guarantors typically target designated important types of lending, e.g., for SMEs.

The EE/RE agency could provide seed financing for a clean energy guarantee program operated by the existing guarantee agency for use as guarantee reserves to establish an EE/RE loan guarantee program. This approach would build on the existing capacities and FI network. These programs could readily target business loans for EE/RE SMEs. The guarantor would typically commit to leveraging the

EE/RE reserve monies 3:1 to 5:1, that is, the guarantor would be willing to issue guarantees with a liability limit equal to up to five times the amount of the EE/RE guarantee reserves provided.

The leading edges of this program concept are business and financial advisory technical assistance services offered to the EE/RE companies. In effect, the business loan guarantee program must follow the delivery of these services. In general, it is recommended that these activities be managed by an active program manager different from the guarantor. The program manager could be a consultant organization, an NGO, an SSRE industry, or an SME business development specialist with a strong knowledge base of the EE/RE industry. Relying on the guarantor and/or lenders to drive the program is often ineffective. At the same time, the availability of finance, supported by the guarantee, can help drive development of good business loan proposals, so the guarantee program can be readied as the delivery of business development services ramps up.

An EE/RE SME guarantee could start as a transaction-oriented pilot scale program and then be increased in size as loan demand develops and more qualified EE/RE companies are identified to participate. To develop the pilot program, to test its thesis, and develop its methods in practice, the program manager could move immediately to identify several EE/RE companies who are good candidates, who need financing and credit support, and then conduct appraisals on them, in conjunction with the selected guarantor and prospective lenders. A key aspect of this strategy is to make it easy for the guarantor to participate, to have the EE/RE SME guarantee program “piggyback” on an existing SME guarantee program. Thus, its start-up costs for the guarantor would be minimal. Guarantee terms would be similar to those the guarantor offers for other types of SME lending.

### 8.5.7 Tips on selecting participating financing intermediaries

The risk of mismanagement on the part of participating FIs in portfolio guarantees - the moral hazard risk – can be reduced by careful selection by PBG-agencies of participating FIs. This is borne out by experience in practice.

- The SBA’s *Preferred Lender Program (PLP)* provides selected lenders with the authority to commit 7(a) guarantees and perform most actions involved in servicing and liquidating loans without prior SBA approval. Early studies found lower default rates for PLP loans than for other 7(a) guaranteed loans.<sup>103</sup>
- *Chile’s FOGAPE* uses a competitive tender process as a means to identify qualified banks. FOGAPE is designed to be a sustainable fund: fees and other income, such as returns on investment, should cover all administrative costs and claims. To allocate the available guarantees, Banco Estado conducts auctions four to six times per year among participating banks. Each bank has to submit a bid indicating the amount of guarantee it wants to receive and the maximum coverage rate as a percentage of lending. The bids are selected by the lowest coverage required until the total amount auctioned has been assigned; therefore the bidding process determines how the risks are shared among FOGAPE and financial intermediaries. Following the bidding process, banks have three months to grant the corresponding loans. FOGAPE used to charge a fixed commission of one percent of the credit guaranteed, but since June 2004 has increased it to a range between one and two percent, depending on the claims performance of each bank. Default rates on loans guaranteed by FOGAPE have been relatively low, standing at 1.05 percent in the second semester of 2005,

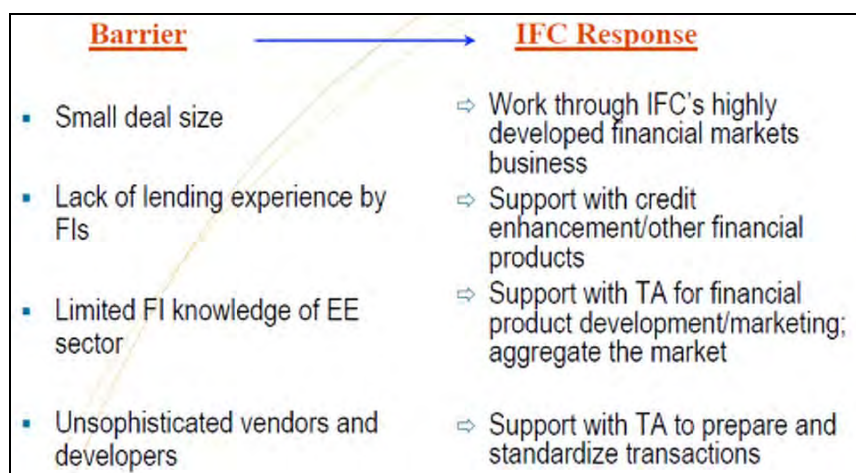
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<sup>103</sup> Source: Seidmann (2005)

suggesting that the provision of its guarantees has not resulted in lower screening and monitoring by banks.

### 8.5.8 Complementary technical assistance programs for participating FIs

Finance is necessary but alone is not sufficient to stimulate EERE investments. Other barriers - e.g., project development risks and costs, need for aggregation of projects, marketing and education of end-users to get them "decision-ready" to buy EE/RE projects, transaction structuring, credit structuring and enhancement - must be addressed. EE/RE finance programs, in addition to organizing access to adapted finance, must also reach back into the project development cycle and promote systematic project development by capable market actors so as to generate a pipeline of investment ready and creditworthy projects. A typical agenda of possible supporting technical assistance (TA) activities for FIs is described in chart 31. Key components of TA to support FIs in EE/RE finance include: market research, marketing support, transaction structuring support, development of new financial products, staff training and business planning, establishing technical standards and engineering due diligence, and development of market aggregation programs to build deal flow and carbon finance. These TA services can be provided to participating FIs to help assure effective demand for the financial products they will offer with the guarantee support.



**Chart 31: Type of Barrier and IFC-Response**

Market Research & Marketing Support. Market studies can assess and demonstrate demand for various EE/RE equipment and project financing, identify needed financial products, understand equipment and project economics, identify active and qualified EE/RE system vendors and project developers, identify and assess target markets and their credit characteristics, and assess perspectives and programs of other key government, NGO, donor, and policy actors which affect the market environment. TA programs with FIs can focus particularly on marketing, especially by assisting FIs to establish relationships with EE/RE businesses, equipment vendors, contractors and project developers; these companies need FI financing to support their sales. A primary means for FIs to market EE/RE finance services is through relationships with EE/RE businesses. Assistance can be provided to FIs to establish relationships and structure vendor finance programs and multi-project finance facilities with EE/RE and ESCO businesses. Other marketing and market aggregation partners include utilities, end-user associations, and local governments. TA programs can help develop such programs and link partner FIs to them to provide the requisite financing facilities. Implementing such strategies can help aggregate demand for financing, build quality deal flow for EE/RE finance programs, and be beneficial to participating FIs.

Transaction Support & Development of New Financial Products. EE/RE finance may be new to prospective partner FIs. In these cases, TA may be highly valued to structure initial transactions. An FI can proceed opportunistically to finance initial transactions that meet their credit criteria, at the same time seeking to define target markets and design financial products with strong replication potential. TA can assist FIs to learn from international experience and best practices, and create new products that are adapted to their internal credit procedures.

Training & Business Planning. EE/RE finance training for FIs can cover EE/RE technologies and applications, EE/RE project economics, structuring EE/RE equipment and project loans, lending to ESCOs, special risk and credit features, case studies, marketing FI financial services, and other topics. Training can be offered initially for an FI's headquarters staff. Then, as financial products are defined and adopted, ready to roll out, then branch staff can be trained on how to promote those specific products. Some FIs can use tailored assistance to prepare business and marketing plans for their implementation of their EE/RE finance programs. Many development FIs (EBRD, IFC, World Bank) and other development agencies have developed and implemented EE/RE finance training programs for FIs.

Engineering Due Diligence & Technical Risk Management. FIs will need to set technical standards and due diligence procedures for EE/RE projects they will finance. FIs have a material interest in ensuring that the equipment and systems are technically sound, durable, well designed and installed, and backed by strong warranties and organized accessible after-sale service. Borrower willingness to repay is strongest if the equipment works properly and can weaken significantly if the equipment breaks or fails to perform as expected. Participating EE/RE vendors can be selected on the basis of their ability to meet minimum standards and be required to follow the standards in practice. This will mitigate potential loan portfolio risks. A TA program can help establish the standards and support FIs with technical knowledge, vendor criteria and selection, train loan officers and lead staff, and provide support for product development and necessary changes in internal processes. For EE/RE project financings, a TA program can also provide engineering due diligence on equipment and systems, and independent engineering reviews to confirm the technical viability and economics of given projects. This type of service is highly valued by FIs. Post-project implementation performance reviews can also be valuable to FIs as a means of monitoring their loan portfolios.

Technical Assistance for Financial Institutions on Carbon Finance. EE/RE projects and equipment will reduce greenhouse gas (GHG) emissions. Capturing these carbon values as Certified Emissions Reductions (CERs) through the Clean Development Mechanism (CDM) or other types of offsets can help make many EE/RE projects and investment programs more economic and financeable. Selling CERs can provide important revenue support and upside profit potential for project sponsors, or be passed through to customers to make projects more affordable. There is strong potential for FIs to act as carbon aggregators and market makers for carbon credits for EERE projects.<sup>104</sup> FIs financing projects are natural aggregators for small-scale projects, a capable nodal agency that, as lender, will have a formal contractual relationship with a series of project sponsors. A TA program could help FIs develop this type of program, working on specific EE/RE markets, help gain approval for the emissions reduction methodology and assist the FIs to create CER purchase agreements and relationships with qualified buyers.

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<sup>104</sup> Canara Bank (India) is financing solar domestic hot water heating systems that typically displace LPG or electricity use, estimated at \$10 million per year (source, personal conversation with senior bank officer, May, 2006) and has expressed interest in being a CER aggregators.

### **8.5.9 Introducing and effecting innovation within an FI**

FIs need to be understood as large corporate organizations, acting in a policy and regulatory environment. Getting FIs to truly adopt and promote EE/RE financial products involves an organizational process of introducing innovation. This requires leadership at the board level, plus active understanding and advocacy of senior management. To get middle management to implement the program, senior management must provide a clear mandate, especially when the innovation involves introduction of new credit risk management practices. New financial products are usually tested and originated initially at the headquarters level. When a new product, including underwriting guidelines, is defined, it can then be rolled out through training at the branch level. Middle management needs to be recognized and be rewarded for promoting the new product line. This support must come from the top of the organization and be followed through with reporting and recognitions. Supporting government and central bank policies and regulations can be instrumental to mobilize and direct the resources of commercial FIs to this market.



# ANNEXES

## Annex I: References

Stefan Arping, Gyöngyi Lóránth, Alan D. Morrison. "Public Initiatives to Support Entrepreneurs: Credit Guarantees versus Co-Funding." 2008,

Thorsten Beck & Leora F. Klapper & Juan Carlos Mendoza. "The Typology of Partial Credit Guarantee Funds around the World," World Bank, 2008,

Fred Bennett & Harriet Billington & Alan Doran. "Do Credit Guarantees Lead to Improved Access to Financial Services? Recent Evidence from Chile, Egypt, India and Poland," Report for Department of International Development. 2005,

BEST report: "Guarantees and Mutual Guarantees" (2006).

Ted K. Bradshaw. "The Contribution of Small Business Loan Guarantees to Economic Development," University of California, Economic Development Quarterly, Vol. 16, No. 4, 360-369, 2002,

Carbon Trust/UKSIF. "Green Opportunity: Accelerating the Financing of Low Carbon Assets," 2007.

Linda Deelen & Klaas Molenaar. "Guarantee Funds for Small Enterprises. A manual for guarantee fund managers," ILO, 2004.

DOE. "Utility Energy Services Contracts: Enabling Documents," 2009.

DTI. "Bridging the gap between environmental necessity and economic opportunity. First Report of the Environmental Innovations Advisory Group," November 2006.

Birgit Ettl & Christian Kamburow. "Funding the Development of Environmental Technologies," FUNDETEC, 2008.

EIB. "SME Consultation 2007/2008. Findings and Conclusions," May 2008.

EU Commission. COM(2006) 349.

EU Commission. "Report of the Task Force on Financing Low-Carbon Energy," 2008.

Freedman, Paul. "Designing Loan Guarantees to spur Growth in Developing Countries," 2004.

Freshfields & Bruckhaus & Deringer. "True-Sales Securitisation," July 2005.

Goldman, McKenna and Murphy, 2004.

Michael Gudger. "Credit Guarantees: An assessment of the state of knowledge and new avenues of research," FAO Agricultural Services Bulletin 129, 1998.

Patrick Honohan. "Partial Credit Guarantees: Principles and Practice," IIS Discussion Paper No. 244. 2008.

Juha-Pekka Hokkanen. "Challenges in Growth Entrepreneurship in the Finnish Energy Sector Creating business through focused policymaking," Sitra Energy Programme, 2009.

Harry Huizinga. "Are There Synergies between World Bank Partial Credit Guarantees and Private Lending?" World Bank/Tilburg University.

Stephan von Klauy and Umang Goswami. "Credit Enhancing Output-based Aid," OBA Working Paper Series, Paper No. 3, January 2004.

Heikki Kottilainen. "Best Practices in Innovation Policies," Tekes. 2005.

Susan Leeds and Richard Duke. "Scaling Up Investment in Energy Efficiency with a Federal Energy Efficiency Financing Facility," Natural Resources Defense Council, NY, NY, April , 2009.  
[www.nrdc.org/cap2.0](http://www.nrdc.org/cap2.0)

Michele Mastroeni. "Shaping Innovation Through Finance: Perceiving the Gatekeepers," 2006.

Ashoka Mody and Dilip Patro. "Methods of Loan Guarantee Valuation and Accounting," 1996.

Franz Pleascak & Birgit Ossenkopf & Bjöen Wolf. "Ursachen des Scheiterns von Technologieunternehmen mit Beteiligungskapital aus dem BTU-Programm," Frauenhofer, 2002.

Karl F. Seidman. Economic development finance, 2005.

OECD. "Innovation in Energy Technology Comparing National Innovation Systems at the Sectoral Level," 2006.

Augusto de la Torre & Juan Carlos Gozzi & Sergio Schmukler. "Innovative Experiences in Access to Finance: Market Friendly Roles for the Visible Hand?" 2006.

UNEP-SEFI. Public Finance Mechanisms to Catalyze Sustainable Energy Sector Growth, 2005.

UNEP-SEFI-BASE. Public Finance Mechanisms to Increase Investment in Energy Efficiency, 2006.

UNEP. Public Finance Mechanisms to Mobilise Investment in Climate Change Mitigation, 2008.

Robert Wisner. "Cellulosic Ethanol Will the Mandates be Met?" AgMRC Renewable Energy Newsletter September 2009.

World Bank. "World Bank Guarantee Products: The Basics," powerpoint presentation, June 2005.

World Bank. "World Bank Guarantees Broaden Capital Market Access. The National Power Corporation (Philippines) and Jordan." 1995.

World Bank. "The World Bank Group's Financial Instruments for Infrastructure," Note 101, 1997.



## Annex II: Typical Guarantee Structure & Terms

A loan guarantee offered by the guarantor to participating lenders will be structured based on a review of the guarantor's existing practices and negotiations with all parties. The loan guarantee documentation can consist of (i) a framework agreement between guarantor and participating lenders, plus (ii) loan guarantee agreements for specific guarantee transactions, or simply a loan guarantee agreement only for the specific guarantee transactions, with the guarantor's published rules concerning lenders' use of the guarantee facility. The guarantee agreements, between guarantor and lender, would typically include the following key terms.

- *Eligible Borrowers*
- *Eligible Use of Loan Proceeds*
- *Risk Sharing and Guarantee %:* The guarantee will typically be a pari passu partial credit guarantee, up to \_\_% [75%] of outstanding loan principal.
- *Maximum guarantee term, years:* \_\_ [five] years.
- *Guarantee pricing:* To be determined, typically in the range of 1.0 to 1.5% per annum of the guarantee liability.
- *Definitions of event of loss:* Tied to the definition of event of default in the underlying loan agreement and following lender's delivery of formal demand notice to borrower calling or accelerating the loan.
- *Guarantee Claims Payments:* Guarantor's proportional share of the loss would be paid within \_\_ [30] days following lender's delivery of formal demand notice to borrower calling the loan.
- *Loan monitoring:* By lender with notice provisions to the guarantor.
- *Administration of loans in default and responsibility for collections/recoveries:* To be determined whether these responsibilities will be performed by the lender or the guarantor.
- *Distribution of Recovered Monies:* Recovered monies shall be distributed to the lender and the guarantor in proportion to each party's share of the loss for the applicable transaction, and net of the collecting parties' reasonable collections costs.
- *Assignment of Guarantee:* Guarantee shall not be assignable by the lender without prior approval of the guarantor.
- *Maximum single transaction/borrower guarantee liability:* To be determined, likely in the range of \$1 million.
- *Guarantee Facility Liability Limit:* Maximum outstanding guarantee liabilities with one single lender, to be determined.
- *Availability Period:* Period during which new guarantees can be issued, to be determined. Expected to be a minimum of two years.
- *Guarantee approval procedures:* Lender will submit loan appraisal report to the guarantor requesting a loan guarantee for transactions which meet the eligibility criteria. Guarantor shall review such proposals and respond to the lender within \_\_ [15] days, indicating either: (i) its acceptance of the guarantee proposal, (ii) terms and conditions under which its acceptance could be provided, or, (ii) rejection of the proposal. In the event that such a proposal is approved by guarantor, the proposed transaction shall be deemed an Approved Transaction and the lender shall proceed to close the transaction. By mutual agreement, and following the conclusion of the first two guarantees, streamlined procedures for approval on a rapid no objections basis may be developed for specific types of transactions. The form for guarantee applications will be included in the framework agreement or published by the guarantor.
- *Information & Reporting:* Requirements to be determined, to meet donor requirements.

## Annex III: US DOE Loan Guarantee Program

### BACKGROUND

Title XVII of the 2005 Environmental Policy Act established in law the DOE loan guarantee program. The program provides guarantees for two categories of eligible clean energy projects.

- **Section 1703: Innovative Technologies.** Eligible Projects include those that avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases and employ “new or significantly improved technologies.” “New and significantly improved technologies” are defined as those technologies concerned with the production, consumption or transportation of energy and that is not a Commercial, and that has either: 1) only recently been developed, discovered or learned; or 2) involves or constitutes one or more meaningful and important improvements in productivity or value, in comparison to Commercial Technologies in use in the United States at the time the Term Sheet is issued. Commercial Technology is defined as a technology in general use in the marketplace.<sup>105</sup> Guarantees are not intended for research and development.
- **Section 1705: Renewable Energy Generation & Transmission Projects.** Named the Temporary Program for Rapid Deployment of Renewable Energy and Electric Power Transmission Projects, the 1705 program was passed through the American Recovery and Reinvestment Act of 2009 (ARRA) and expires September 30, 2011. This new program establishes a new category of Eligible Projects that includes renewable energy systems (including hydropower, electricity or thermal energy generation, manufacturing of related components), electric power transmission systems, and leading edge biofuels.<sup>106</sup>

### US GOVERNMENT AUTHORIZATION

The US Congress authorized \$4 billion for this loan guarantee program through the ARRA. These funds are available to cover administrative costs and the “Credit Subsidy Costs”. The Credit Subsidy Costs are defined as the full cost of the guarantee program to the Federal Government, including all claims payments made to cover defaults, delinquencies, interest subsidies less payments made to the Government in the form of fees and recoveries.

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<sup>105</sup> *Commercial Technology* means a technology in general use in the commercial marketplace in the United States at the time the Term Sheet is issued by DOE. A technology is in general use if it has been installed in and is being used in three or more commercial projects in the United States in the same general application as in the proposed project, and has been in operation in each such commercial project for a period of at least five years. The five year period shall be measured, for each project, starting on the in service date of the project or facility employing that particular technology. For purposes of this section, commercial projects include projects that have been the recipients of a loan guarantee from DOE under this part.

<sup>106</sup> Definition of leading edge biofuels from new law Section 1705: “Leading edge biofuel projects that will use technologies performing at the pilot or demonstration scale that the Secretary determines are likely to become commercial technologies and will produce transportation fuels that substantially reduce life-cycle greenhouse gas emissions compared to other transportation fuels.” Example potential project from current 1705 renewable energy Solicitation: Commercialization of Advanced Design Bio-Refineries for Multi-Feedstock Processing into Biofuels.

## **GUARANTEE PROGRAM LIABILITY LIMIT & US GOVERNMENT BOOKING OF THE GUARANTEE**

As loan guarantees are originated, USDOE makes an estimate of the Credit Subsidy Costs based on the credit quality and the probability of default of each potential project. This estimation is then reviewed and approved by the US Office of Management and Budget. This model for estimating Credit Subsidy Costs has been codified in law, however there is no liability limit defined in statute. The program can issue guarantees for a total amount loans whose estimated Credit Subsidy Costs stay within the authorized budget amount, i.e., \$4 billion. To date, the program has used an overall loss estimate of 10%, recognizing this to be on the conservative side. Based on current estimates, the first \$4 billion is expected to support between \$40 billion in total loan guarantees. The guarantees are backed by the full faith and credit of the US government. If the actual Credit Subsidy Costs exceed the amount authorized, the US Government will still pay the guarantee claims, and the USDOE then is authorized to borrow from the Treasury. In addition, the Lender as the guarantee beneficiary, can reduce its statutory loss provisioning and capital adequacy requirements by the amount of the guarantee, consistent with Basel II standards which place a “0” risk weighting on loans guaranteed by the US Government.<sup>107</sup>

## **THE FINANCIAL INSTITUTION PARTNERSHIP PROGRAM**

The Financial Institution Partnership Program (FIPP) was initiated in the Fall of 2009 as a means to streamline the guarantee origination process. Through the FIPP, the USDOE will select and authorize several financial institutions (FIs) to act on DOE’s behalf to qualify creditworthy projects and prepare loan guarantee proposals to submit for the DOE’s approval. The FIPP incorporates a streamlined set of standards designed to expedite DOE’s loan guarantee underwriting process and leverage private sector expertise and capital for the efficient and prudent funding of eligible projects. The goal of FIPP is to leverage the human and financial capital of private sector financial institutions by accelerating the loan application process while balancing risk between DOE and private sector partners participating in the program. Under the FIPP, prospective borrowers and project sponsors do not apply directly to DOE but instead work with one of the selected FIs to access the loan guarantee program. FI partners are being selected through a competitive solicitation process. Under the first FIPP solicitation, interested FIs are invited to apply for “lender-applicant” status for the 1705 program for renewable energy generation project loans. A new FIPP solicitation for the 1703 program is planned. This lender-applicant approach will be the largest of its kind and the first to draw on the expertise and capacities of development finance organizations (DFOs).<sup>108</sup> A subsequent request for proposals was published on October 29, 2009 to qualify public and non-profit Development Finance Organizations such as States and Housing Finance Agencies to recommend projects for both the open 1703 and 1705 solicitations. After the first round of solicitations DOE will bolster the program in the following ways<sup>109</sup>:

- Outreach to DFO’s that will communicate the program’s potential and early successes
- Educating DFO’s of the program’s requirements and standards
- Training and technical assistance efforts will result in a one-on-one effort to upgrade DFO capabilities to act as project preparation facilitators and/or lender-applicants in subsequent rounds of program solicitations

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<sup>107</sup> This summary is based on discussion with Richard Corrigan, Senior Advisor to the US DOE, contact information for whom is provided below. Any and all mistakes are the responsibility of the author.

<sup>108</sup> Excerpted from the “Financing Alternative Energy: Development Finance Organizations (DFOs) as Deal Origination & Risk-Sharing Partners in DOE’s Loan Guarantee Program – Section 1705 FIPP” power point presented by Thomas H Cochran & Steven Klein, Advisors to US DOE, November 13, 2009.

<sup>109</sup> Ibid.

The FIPP is expected to be operational with several approved lender-applicants as of approximately March, 2010.

**Eligibility & Terms of Guarantee.** The following summarizes key terms of the loan guarantees provided by the program.

- 1. ELIGIBLE APPLICANTS.** – Eligible applicants include any firm, corporation, company, partnership, association, society, trust, joint venture, joint stock company, or governmental non-Federal entity that has the authority to enter into, and is seeking, a loan guarantee issued by the Secretary for a loan or other debt obligation of an Eligible Project under the Act.
- 2. ELIGIBLE USE OF LOAN PROCEEDS.** – Project start-up costs including equipment, land, engineering, and other necessary and reasonable costs as determined by the USDOE. Operating costs are ineligible use of loan funds.
- 3. ELIGIBLE LENDERS.** – Eligible lenders are defined as the following: any person or legal entity formed for the purpose of, or engaged in the business of, lending money, including, but not limited to, commercial banks, savings and loan institutions, insurance companies, factoring companies, investment banks, institutional investors, venture capital investment companies, trusts, or other entities designated as trustees or agents acting on behalf of bondholders or other lenders or The Federal Financing Bank.
- 4. CREDIT UNDERWRITING.** – Project loans that exceed \$25 million are expected to have (whether structured on a project finance or a corporate finance basis) a credit rating from a nationally recognized rating agency of at least a credit rating equivalent of ‘BB’ from Standard & Poor’s or Fitch or ‘Ba2’ from Moody’s as evaluated, in each case, without the benefit of any DOE loan guarantee or any other credit support which would not be available to DOE. Under the FIPP, the lender-applicant must submit the credit assessment, provided or confirmed by a credit rating agency that assigns a rating equivalent to the project loan. USDOE is seeking to modify this minimum credit equivalent to “B” in order to expand application of the guarantee program.
- 5. GUARANTEE APPROVAL PROCEDURES.** – Under the FIPP, DFOs and Lender-Applicants will perform substantial technical and credit underwriting pursuant to DOE guidelines for review of alternative energy projects. These projects will be informally reviewed at an early stage by DOE for creditworthiness, technical eligibility, and NEPA<sup>110</sup> status. Upon approval by DFO, project will be submitted to DOE for final review. DOE will review the underwriting of the DFO. Final formal approval is made by the Credit Review Board of DOE, a high level committee of senior department officials.<sup>111</sup>
- 6. GUARANTEE %.** – For 1703 projects, the guarantee can cover up to 100% of the senior debt amount which must be capped at 80% of the projects costs. For 1705 projects, with the

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<sup>110</sup> All projects must undergo a National Environmental Policy Act (NEPA) review, a federal mandated review that assesses environmental impacts of projects supported by federal funding. NEPA review is estimated to extend the typical project development phase an additional year. This poses difficulties for the Section 1705 projects, funded by the Recovery Act, with construction start deadlines of September 30, 2011.

<sup>111</sup> Excerpted from the “Financing Alternative Energy: Development Finance Organizations (DFOs) as Deal Origination & Risk-Sharing Partners in DOE’s Loan Guarantee Program – Section 1705 FIPP” power point presented by Thomas H Cochran & Steven Klein, Advisors to US DOE, November 13, 2009.

exception of transmission projects, the guarantee can secure a maximum of 80% of the senior debt amount that also must be capped at 80% of the project costs, as estimated at the time at which the guarantee is issued.

- 7. RISK SHARING & COLLATERAL.** — The guaranteed debt obligation (Guaranteed Obligation) shall not be subordinate to other financing. The Secretary has the power to determine an appropriate collateral package and inter-creditor arrangements on a project-by-project basis. DOE recognizes that other lenders or co-guarantors will expect to share collateral on a *pari passu* basis and leaves flexibility for these arrangements. In particular DOE aims to encourage the involvement of Export Credit Agencies. DOE and the Holders of the non-guaranteed portion of the Guaranteed Obligations may share the proceeds received from the sale of project assets.
- 8. INTEREST RATE.** — An obligation shall bear interest at a rate that does not exceed a level that the Secretary determines appropriate, taking into account the prevailing rate of interest in the private sector for similar loans and risks.
- 9. MAXIMUM GUARANTEE TERM.** — The term of an obligation shall require full repayment over a period not to exceed the lesser of —

  - (1) 30 years; or
  - (2) 90 percent of the projected useful life of the physical asset to be financed by the obligation (as determined by the Secretary).
- 10. EQUITY REQUIREMENTS.** — A borrower or project sponsor must contribute 20% equity to a project, the Department will consider “equity” to be cash contributed by the Borrowers or other principals. Equity does not include proceeds from the nonguaranteed portion of any debt supported by a Title XVII loan guarantee or from any other non-guaranteed debt. The value of other forms of government financial assistance or support also does not constitute “equity.”
- 11. CREDIT SUBSIDY COST.** — Title XVII specifies that DOE must receive either an appropriation for the Credit Subsidy Cost or payment of that cost by the borrower. The Credit Subsidy Cost is the expected long-term cost to the Federal government in issuing the loan guarantee. The ARRA act and 2009 budget authorized \$4 billion for Credit Subsidy Costs.
- 12. GUARANTEE PRICING.** — In addition to the Subsidy Cost, DOE will collect administrative fees for the application process, the offering, negotiating and closing of the guarantee, the servicing of the guarantee and the monitoring of the project. These fees include the following: 1) Application Fee, 2) Facility Fee and 3) Maintenance Fee. The exact amount of the fees vary per solicitation. But as an example, fees under the FIPP solicitation are 1) \$50,000 Application Fee, paid by the Lender-Applicant 2) the Facility Fee which is .5% of guaranteed portion of the Guaranteed Obligation, and 3) between \$10,000 and \$25,000 for the Maintenance Fee.
- 13. GUARANTEE CLAIMS PAYMENTS.** — The guarantee can be called in event of late payment of loan debt service which is greater than 60 days past due. The guarantee will cover the agreed proportional share of loan principal and interest payments, but not any penalties. The Secretary shall pay to the holder of the guarantee the unpaid interest on and unpaid principal of the obligation as to which the borrower has defaulted, unless the Secretary finds that there was no default by the borrower in the payment of interest or principal or that the default has been remedied. Payment shall be made 60 days after receipt by the secretary of written

demand for payment from the holder. Interest shall accrue to the holder until the Guaranteed Obligation has been paid in full. The DOE has the authority, once it has begun to pay debt service, to step-in to accelerate the loan and manage the recovery process.

- 14. SECONDARY MARKET.** – If the DOE guarantees more than 90 percent, the non-guaranteed portion may not be stripped from the guaranteed portion and sold on the secondary market. Where DOE guarantees 90 percent or less, the guaranteed portion may be separated or “stripped” if the loan is resold on the secondary market.
- 15. ADMINISTRATION OF LOANS IN DEFAULT AND RESPONSIBILITY FOR COLLECTIONS/RECOVERIES.** – Eligible Lender will administer loans in default until the grace period defined in the Loan Guarantee Agreement has ended.
- 16. DISTRIBUTION OF RECOVERED MONIES.** – DOE maintains responsibility for all recoveries and, as Guarantor, has full subrogation rights. Distribution of recovered monies will match the risk-sharing and collateral arrangements as defined in the Guarantee Agreement.
- 17. ASSIGNMENT OF GUARANTEE.** – Guarantee shall be assignable by Lender with prior DOE approval, provided new Holder of Guarantee meets all Lender requirements.
- 18. MAXIMUM SINGLE TRANSACTION/BORROWER GUARANTEE LIABILITY LIMIT.** – There is no minimum or maximum size, however if project exceeds \$100 million then additional technical and underwriting assistance is required.
- 19. AVAILABILITY PERIOD.** – Projects support by a loan guarantee that meet the 1705 criteria temporary program must begin construction by Sept. 30, 2011.

**Guarantee Awards to Date.** The changing of the administration, which heralded passage of ARRA and the funding of the Credit Subsidy Costs, spurred momentum in the program, which had yet to issue a guarantee as of early 2009. There have been five guarantees awarded to date, indicated below. Additional guarantees are in the program pipeline.

**Solyndra, Inc.:** \$535 million, manufacturing cylindrical solar photovoltaic panels. Approved March 20, 2009.

**Nordic Windpower:** \$16 million, expansion of manufacturing plant for their 2 blade 1MW wind turbines. Approved July 2, 2009.

**Beacon Power:** \$43 million, construction of its 20 megawatt flywheel energy storage plant. Approved July 2, 2009.

**Red River Environmental Products, LLC:** \$245 million, construction of an activated carbon manufacturing facility. Approved December 9, 2009.

**Southern Co.** \$8.3 billion, new construction of two 1,150 MW nuclear reactors to Southern’s two unit site. This is the first guarantee issued under Section 1703 and the first nuclear plant license issued in the US since 1973. Approved February 16, 2010.<sup>112</sup>

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<sup>112</sup> “Obama Touts Nuclear Loan Guarantee as Just a Start” by Julie Pace, Associated Press  
<http://www.google.com/hostednews/ap/article/ALeqM5hx5wB6YEaAyHlpeDxx6ML-TApHzQD9DTCT1O1>

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## REFERENCES AND LINKS

1. US Department of Energy Loan Guarantee Program Website –  
<http://www.lgprogram.energy.gov/index.html>
2. Title XVII of the Energy Policy Act 2005 -  
<http://www.lgprogram.energy.gov/EPA2005TitleXVII.pdf>
3. Title XVII-Innovative Technology Loan Guarantee Program under ARRA -  
<http://www.lgprogram.energy.gov/TitleXVIIARRA.pdf>
4. Title XVII of the Energy Policy Act - Final Rulemaking – Rules and Regulations 2007 -  
<http://www.lgprogram.energy.gov/NOPR-FR-5-16-07.pdf>
5. [Section 406 Temporary Program for Rapid Deployment of Renewable Energy and Electricity Transmission Loan Guarantee Program under ARRA](#) 2009 -  
<http://www.lgprogram.energy.gov/Sect406ARRA.pdf>
6. Notice of Proposed Rulemaking (NOPR) August 6, 2009 -  
[http://www.lgprogram.energy.gov/Final\\_1703NOPR.pdf](http://www.lgprogram.energy.gov/Final_1703NOPR.pdf)
7. Title XVII of the Energy Policy Act Final Rulemaking – Rules and Regulations 2009 –  
<http://www.lgprogram.energy.gov/FR-1703-Dec4.pdf>
8. Request for Proposals - Federal Loan Guarantees for Commercial Technology Renewable Energy Generation Projects Under the Financial Institution Partnership Program Solicitation DE-FOA-0000166. Issued Oct. 7, 2009 –

<http://www.lgprogram.energy.gov/CTRE.pdf>

9. Request for Information - Financial Institution Partnership Program: Partnerships with Public and Non-Profit Development Finance Organizations Co-Lending Opportunities –  
<http://www.lgprogram.energy.gov/rfi.pdf>
10. “Financing Alternative Energy: Development Finance Organizations (DFOs) as Deal Origination & Risk-Sharing Partners in DOE’s Loan Guarantee Program – Section 1705 FIPP” power point presented by Thomas H Cochran & Steven Klein, advisors to US DOE, November 13, 2009 -  
[http://www.cleanenergystates.org/Presentations/CESA\\_DOE\\_LoanGuarantee\\_11.13.09.final.pdf](http://www.cleanenergystates.org/Presentations/CESA_DOE_LoanGuarantee_11.13.09.final.pdf)
11. “Obama Touts Nuclear Loan Guarantee as Just a Start” by Julie Pace, Associated Press, Feb. 16, 2010 –  
<http://www.google.com/hostednews/ap/article/ALeqM5hx5wB6YEaAyHlpeDxx6ML-TApHzQD9DTCT1O1>



## Annex IV: USDA Loan Guarantee Programs

### I. USDA Biorefineries Assistance Program

The BioRefinery Assistance Program is administered by USDA – Rural Development. The purpose of the program is to provide guaranteed loans for the development and construction of commercial-scale biorefineries or for the retrofitting of existing facilities using eligible technology for the development of advanced biofuels (defined as biofuels not produced from food sources – USDA Press Release).

- Maximum loan guarantee is \$250 million
- No minimum
- Amount of guaranteed loan will be reduced by the amount of other direct Federal funding that borrower receives for same project

#### ***Borrower Eligibility:***

- Individual
- National Laboratory
- Indian tribe
- Institution of higher education
- Unit of state or local government
- Rural electric cooperative
- Corporation
- Public power entity
- Farm Cooperative
- Consortium of any of those
- Farmer Cooperative organization entities
- Association of agricultural producers

The project has to be located in a rural area (50,000 or fewer population and not in an urbanized area) and has to be for either:

- The development and construction of commercial-scale biorefineries using eligible technology, or
- The retrofitting of existing facilities, including, but not limited to, wood products facilities and sugar mills, with eligible technology.

#### ***Eligible Technology:***

- A technology that is being adopted in available commercial-scale operation of a biorefinery that produces an advanced biofuel
- A technology not described in the previous paragraph that has been demonstrated to have technical and economic potential for commercial application in a biorefinery that produces an advanced biofuel

Preference will be given to projects where first-of-a-kind technology will be deployed at commercial scale. To that end, **the program will promote the development of the first commercial scale biorefineries that do not rely on corn kernel starch as the feedstock or standard biodiesel technology.**

**Eligible Project Costs:**

- Purchase and installation of equipment (new, refurbished, or remanufactured), except agricultural tillage equipment, used equipment, and vehicles
- Construction or retrofitting, except residential
- Permit and license fees
- Professional service fees, except for application preparation
- Feasibility studies
- Business plans
- Working capital
- Land acquisition
- Cost of financing, excluding guarantee and renewal fees

**Rates and Terms:**

Percentage of loan that is guaranteed:

<b>If the loan amount is :</b>	<b>Then:</b>
Equal to or less than \$80 million	80% of principal and interest due
Greater than \$80 million but less than \$125 million	70% for the amount in excess of \$80 million
Equal to or greater than \$125 million	60% for the entire loan amount.

The interest rate is:

- Negotiated between the lender and applicant
- In line with interest rates on other similar government guaranteed loan programs
- Either fixed or variable
- Fully amortizing
- The same for both the guaranteed and unguaranteed portions of the loan (both fixed or both variable)
- Subject to Agency review and approval

The length of the loan guaranteed under this program would be:

- No more than 20 years or 85% of the useful life of the project as determined by the lender and confirmed by the Agency, whichever is less.
- Has to be the same for the guaranteed and unguaranteed portions of the loan.

This program was created under the 2008 Farm Bill. There have been two solicitations. USDA approved the first ever loan guarantee to a commercial-scale cellulosic ethanol plant in January 2009, an \$80 million loan to Range Fuels Inc., Soperton, Ga. The cellulosic ethanol will be made from wood chips.

## **II. Rural Energy for America Program (REAP)**

The REAP Guaranteed Loan Program encourages the commercial financing of renewable energy (bioenergy, geothermal, hydrogen, solar, wind, and hydro power) and energy efficiency projects. Under the program, project developers will work with local lenders, who in turn can apply to USDA Rural Development for a loan guarantee of up to 85 percent of the loan amount.

### ***Loans Limits:***

- Loans up to 75% of the project's cost
- Maximum of \$25 million, minimum of \$5,000

### ***Maximum Percentage of Guarantee (applies to whole loan):***

- 85% for loan of \$600,000 or less
- 80% for loans greater than \$600,000 but \$5 million or less
- 70% for loans greater than \$5 million up to \$10 million
- 60% for loans greater than \$10 million up to \$25 million

### ***Fees and Interest Rates:***

- Lender's customary interest rate, fixed or variable, negotiated by lender and business
- Lender's customary fees, negotiated by lender and business
- One-time guarantee fee equal to 1% of guaranteed amount
- Annual renewal fee

### ***Eligibility: Borrowers, Lenders, Location***

New definition being determined. A borrower must be an agricultural producer or rural small business. Agricultural producers must gain 50% or more of their gross income from their agricultural operations. An entity is considered a small business in accordance with the Small Business Administration's (SBA) small business size standards NAICS code. (<http://www.sba.gov/size/index.html>). Most lenders are eligible, including national and state-chartered banks, Farm Credit System banks, and savings and loan associations. Other lenders may be eligible if approved by USDA.

### ***Eligible Project Costs:***

Eligible project costs include: 1) Post-application purchase and installation of equipment, 2) Post-application construction or improvements, 3) Energy audits or assessments, 4) Permit or license fees, 5) Professional service fees, 6) Feasibility studies and technical reports, 7) Business plans, 8) Retrofitting, 9) Construction of a new energy efficient facility only when the facility is used for the same purpose, is approximately the same size, and based on the energy audit will provide more energy savings than improving an existing facility, 10) Working capital, and 11) Land acquisition.

### **III. Business and Industry Guaranteed Loans (B & I)**

The purpose of the B&I Guaranteed Loan Program is to improve, develop, or finance business, industry, and employment and to improve the economic and environmental climate in rural communities.

#### ***Eligible Borrowers:***

A borrower may be a cooperative organization, corporation, partnership, or other legal entity organized and operated on a profit or nonprofit basis; an Indian tribe on a Federal or State reservation or other Federally recognized tribal group; a public body; or an individual. A borrower must be engaged in or proposing to engage in a business that will:

1. Provide employment;
2. Improve the economic or environmental climate;
3. Promote the conservation, development, and use of water for aquaculture; or
4. Reduce reliance on nonrenewable energy resources by encouraging the development and construction of solar energy systems and other renewable energy systems.

B&I loans are normally available in rural areas, which include all areas other than cities or towns of more than 50,000 people and the contiguous and adjacent urbanized area of such cities or towns.

#### ***Eligible Use of Funds:***

They include but are not limited to the following:

- a. Business and industrial acquisitions when the loan will keep the business from closing, prevent the loss of employment opportunities, or provide expanded job opportunities.
- b. Business conversion, enlargement, repair, modernization, or development.
- c. Purchase and development of land, easements, rights-of-way, buildings, or facilities.
- d. Purchase of equipment, leasehold improvements, machinery, supplies, or inventory.

#### ***Percentage of Guarantee:***

The percentage of guarantee, up to the maximum allowed, is a matter of negotiation between the lender and the Agency. The maximum percentage of guarantee is 80 percent for loans of \$5 million or less, 70 percent for loans between \$5 and \$10 million, and 60 percent for loans exceeding \$10 million.

#### ***Loan Amounts:***

The total amount of Agency loans to one borrower must not exceed \$10 million. The Administrator may, at the Administrator's discretion, grant an exception to the \$10 million limit for loans of \$25 million under certain circumstances. The Secretary may approve guaranteed loans in excess of \$25 million, up to \$40 million, for rural cooperative organizations that process value-added agricultural commodities.

#### ***Loan Terms:***

The maximum repayment for loans on real estate will not exceed 30 years; machinery and equipment repayment will not exceed the useful life of the machinery and equipment purchased with loan funds

or 15 years, whichever is less; and working capital repayment will not exceed 7 years.

***Interest Rates:***

The interest rate for the guaranteed loan will be negotiated between the lender and the applicant and may be either fixed or variable as long as it is a legal rate. Interest rates are subject to Agency review and approval. The variable interest rate may be adjusted at different intervals during the term of the loan, but the adjustments may not be more often than quarterly.

***Collateral:***

Collateral is required and it must have documented value sufficient to protect the interest of the lender and the Agency. The discounted collateral value will normally be at least equal to the loan amount. Lenders will discount collateral consistent with sound loan-to-value policy.

***Annual Renewal Fee:***

The annual renewal fee is paid once a year and is required to maintain the enforceability of the guarantee as to the lender.

The rate of the annual renewal fee (a specified percentage) is established by Rural Development in an annual notice published in the Federal Register, multiplied by the outstanding principal loan balance as of December 31 of each year, multiplied by the percent of guarantee. The rate is the rate in effect at the time the loan is obligated, and will remain in effect for the life of the loan.







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