UNEP

Investing in a Climate for Change

Engaging the Finance Sector

United Nations Environment Programme

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Investing in a Climate for Change

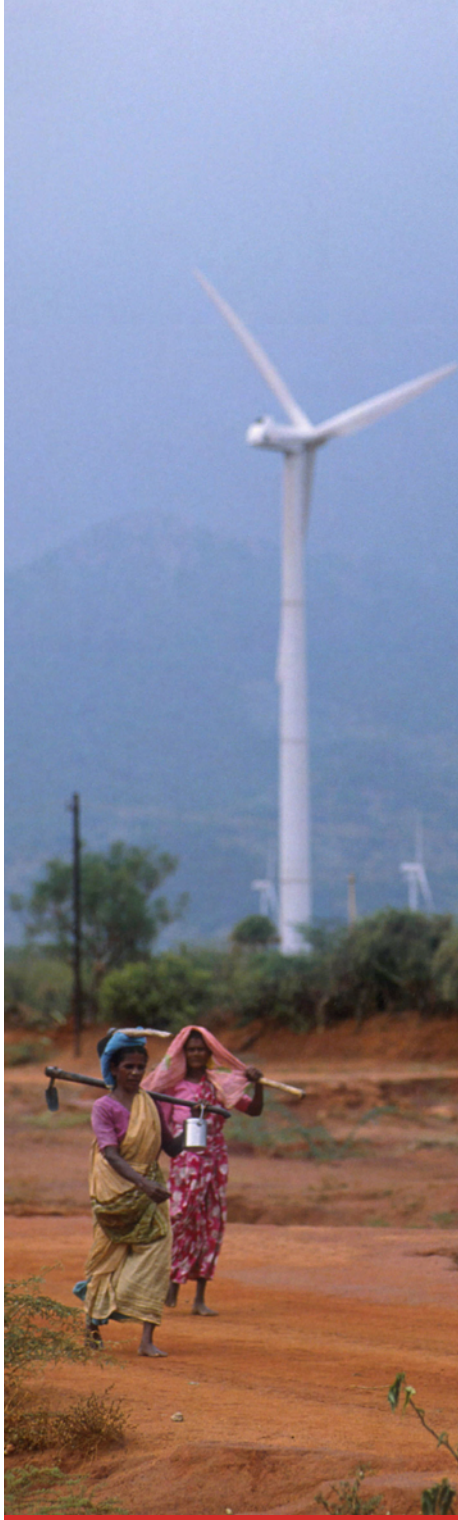
Engaging the Finance Sector

Not Just Important, Finance is Essential

Addressing the serious issue of climate change requires substantial investment in new technologies, processes and services. This investment is not just desirable, it is essential. Without substantial and sustained investment in clean energy and other measures now, the reality of a global economy free of climate change impacts will remain a distant dream.

Investment, however, requires finance in the form of equity, loans, insurance and other options. This finance ranges over a broad spectrum of needs – from conventional project finance for large multi-million dollar windfarms, to micro-credit loans for rural people to purchase efficient cookstoves. Each type of finance comes with its own set of conditions, risks, and rewards, and is generally provided by a different section of the finance community.

With a world increasingly focused on climate change, cleaner technologies are increasingly able to capture an increasing share of the huge capital investments that will be made by financiers over the coming decades to meet the world's energy needs. That share is already starting to accelerate.

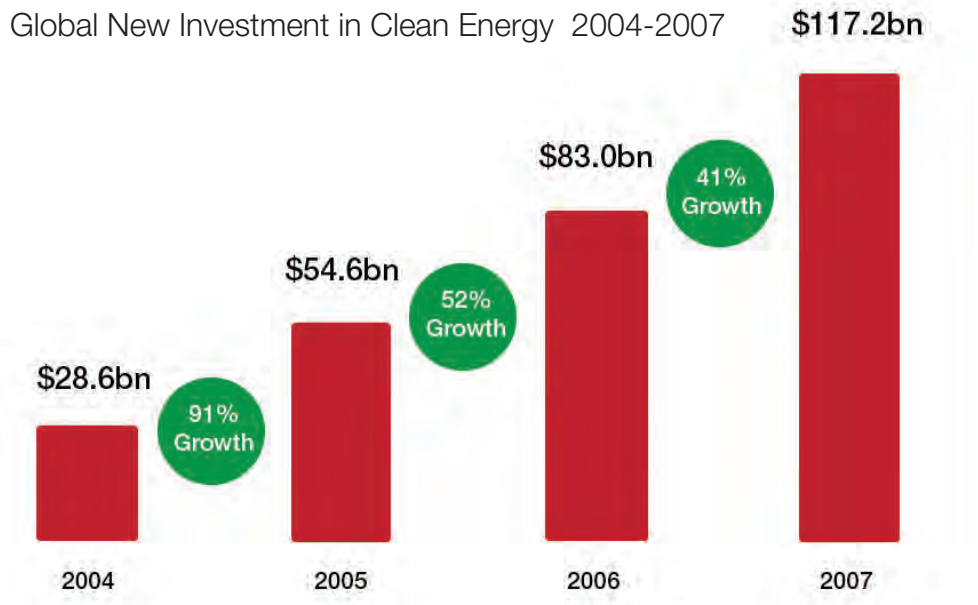


Wind Energy in Tamil Nadu, India

Without substantial and sustained investment in clean energy and other measures now, the reality of a global economy free of climate change impacts will remain a distant dream.

Courtesy Nordex

In 2007, for example, an estimated $117 billion was invested in the renewable energy and energy efficiency sectors, 41% higher than 2006 and more than four times the 2003 figure of $28 billion. This investment now represents about 10% of current energy sector investment, with the wind energy sector alone securing $29 billion in 2006 - more than any other non-fossil fuel technology, including nuclear and large hydro.



New investment in the sustainable energy sector reached $117bn in 2007, an increase of 41% over 2006 and a 400% increase from 2004.

Yet, much greater levels of investment are needed.

For many applications, solar water heaters, solar photovoltaic systems, small hydro and various energy efficiency options are mature, cost-effective technologies with decreasing costs and substantial environmental and economic benefits. However, even in places with ample local renewable energy resources, markets for these technologies are still slow to develop – even with record oil prices and high costs of conventional energy.

Often the reason is simply the unavailability of an affordable loan to finance the increased upfront cost of these technologies compared to fossil-fuelled options - despite operating costs that can be substantially lower and produce significant savings over the life of the system.
Consider Tunisia, a country with a substantial solar resource.
Until recently, a homeowner could get a government subsidy for liquid petroleum gas (LPG) to fuel water heaters, but no equivalent government support or bank financing for a solar water heater. This naturally made the cleaner solar option more expensive to buy and restricted growth of the market, even though the escalating cost of LPG created a substantial drain on government resources.

In many developing countries, promising clean energy ideas and the people who can turn them into viable businesses often need finance and business development support to take their good ideas to market. Investing in the early stages of their business development, however, carries a high risk, as the enterprise can fail.

Financial institutions may also shy away from projects, such as windfarms, if the cost of preparing and administering the first few loans is too high. Most financiers have a strong tendency to let others go first – to "do what they've always done" - and finance another thermal power station powered by fossil fuels, rather than something new like a windfarm.

Most financial institutions still consider sustainable energy applications as "niche" or "boutique" sectors with prohibitive market development and initial transaction costs, and are unwilling to create the new financial products the sector needs to develop. This "wait-and-see" attitude is compounded by an overall lack of information, experience and tools needed to quantify, mitigate and hedge project and product risks.

Perceiving such risks and market development costs, banks compensate with higher interest rates and more restrictive lending conditions that hinder the development of sound projects. Smaller entrepreneurs are often seen as too risky to receive any form of financing from a conventional domestic financial institution.

UNEP and Partners: Investing in a Climate for Change

Removing investment barriers and developing markets for renewable energy and energy efficiency - together referred to as sustainable energy - is the core focus of UNEP's sustainable energy and climate finance work. UNEP's sustainable energy finance activities are part of an overall approach to strengthening the progression of finance needed to carry new ideas and technologies from project conception to commercial investment.

UNEP is not a bank and therefore does not directly finance projects or companies. Rather, UNEP works with a wide range of banks and other financiers to increase their support for clean energy projects. UNEP's work is targeted at lowering market development barriers, offering small financial incentives, and building the capacities and awareness banks need to invest in the sustainable energy sector.

This work complements important activities of the development finance institutions, such as the World Bank. UNEP's finance work fits squarely within the mission of the Division of Technology, Industry and Economics (DTIE) to help decision makers adopt policies, strategies and practices that reduce pollution and risks for human beings and the environment.

The finance sector, however, is not just an industry like others that needs to integrate environmental sustainability into their business practices. Financial institutions have traditionally played a pivotal role, fostering change and innovation in the global energy industry. Without them, investment goals remain unmet; new technology risk is poorly managed; and energy markets remain static and dominated by well-entrenched companies and institutions.

Since the late 1990s, UNEP has maintained a dual approach to promoting sustainable energy finance in developing countries.
The first approach is to partner with leading, "first mover" financial institutions, helping them develop and implement new products, commercial strategies, or investment approaches.
The second approach complements the first by providing broad-based support to develop and grow the sustainable energy finance industry as a whole.

UNEP's strategy is to help strengthen the progression of finance sources needed to carry new ideas and technologies from conception through to commercial investment.

Following this progression, work is currently spread across four programme areas, including:

- Enterprise development and seed financing – helping start and nurture new companies;
- Consumer financing – helping households purchase clean energy technologies;
- Carbon finance – helping to quantify climate mitigation benefits; and
- Broad finance sector engagement – helping the rest of the industry follow the lead of the first movers;

Helping financial institutions develop dedicated financial services is clearly one of the most efficient and "natural" ways of stimulating the growth of markets for clean energy technologies, especially in the developing world.

Led by DTIE through its Renewable Energy and Finance Unit, this work is carried out in partnership with other UNEP teams and collaborating agencies, particularly the UNEP Collaborating Centre BASE (www.energy-base.org), the UNEP Risø Centre on Energy, Climate and Sustainable Development (www.uneprisoe.org) and the UNEP Finance Initiative (www.unepfi.org).

As an implementing agency of the Global Environment Facility (GEF), UNEP brings an innovative perspective on finance to the GEF partnership. UNEP's smaller programmes to those usually funded by major multilateral finance institutions allow testing of innovative approaches, particularly finance for renewable energy and energy efficiency.

Enterprise Development and Seed Capital

In many countries, small and medium-sized enterprises (SMEs) can be leading innovators of the new products and services needed to expand access to modern energy services with few or no emissions of greenhouse gases. Starting a new business activity, however, is a daunting task for an entrepreneur in a developing country – particularly if new technology is involved.

Although few financial institutions have the experience or desire to deal with such risky investments, this is fertile ground for capturing the entrepreneurial spirit to deliver better and cleaner energy services to millions of people. With significant backing from the UN Foundation and now the GEF, UNEP has been developing new approaches to provide early-stage or 'seed' finance for companies and project developers, as well as the enterprise development support they need to succeed.
This work has involved a number of partners and institutions, ranging from the Asian and African Development Banks to specialist finance providers and local enterprise development partners.

UNEP firmly believes that assisting entrepreneurs to take risks, to innovate the way they deliver goods and services, and to continuously refine their business models, is an effective way to gain public trust while attracting commercial investment into the sustainable energy sector.

Key Facts: Rural Energy Enterprise Development Programmes	
Programme Strategy	Offer entrepreneurs a combination of enterprise development support and seed funding to set up or expand a clean energy bussiness of project.
Geographic Coverage	Mali, Senegal, Ghana, Tanzania, Zaùbia, Northeast Brazil, Yunnan Province, China (plus all Asia and Africa for the new SCAF facility)
Total Budget	$20 million (across three programmes + SCAF)
Donors	GEF ($8.3 million), UN Foundation ($8.5 million), Blue Moon Fund ($0.7 million), SIDA ($0.7 million), BMZ ($0.4 million), Dutch Govt ($0.2 million), Other: DBSA, Bodyshop, Domini Social Investments
Seed Fund Managers	E+Co (US 501K non-profit status – audited annually) manages seed funds and provides co-finance ($0.5 million direct; and $8 million indirect) for REED programmes. Commercial fund managers will provide seed finance under SCAF.
Seed fund size	$1mn to $5mn
Enterprise Development Costs	20 to 50 cents per dollar invested
Co-Finance	1.1 times
Leverage	Can be significant over time (e.g. E+Co has achieved 9.4 times)
Impact	Slow to produce direct impacts (job creation, GHG mitigation, etc) but can be significant in medium to long term

Rural Energy Enterprise Development (REED).

Using an innovative enterprise-centered approach pioneered by clean energy investor E+Co, and supported by the United Nations Foundation and others, UNEP's Rural Energy Enterprise Development (REED) initiative combines enterprise development services and seed capital to promising clean energy entrepreneurs, enabling them to deliver modern energy services and products to rural and peri-urban communities. To date, $9.4 million has been invested in REED programmes in five countries of West and Southern Africa (www.areed.org), Northeast Brazil (www.b-reed.org) and China's Yunnan Province (www.c-reed.org), resulting in 50 new clean energy enterprises providing better energy services to more than 400,000 people.

In Tanzania, REED helped Mohammed Parpia to start his business, Mona Mwanza Solar (pictured), in an area completely underserved by the national grid. Mona's solar systems provide a modern energy service, including essential lighting.

Consumer Finance Programmes

Where the growth of markets for clean energy investments is constrained by a lack of customer or consumer finance, UNEP works and partners with local banks and financial institutions to establish lending instruments that help build the number of loans required to be a profitable bank business. Such 'hand-holding' assistance increases the confidence of partner banks to develop and test new credit markets for low emission technologies they previously thought were too small, risky or costly to enter.

Such programmes are underway today in China, Ghana, India, Morocco and Tunisia, with others in development for Algeria, Albania, Chile, Egypt, Mexico and Montenegro. Each programme generally involves a financial mechanism, such as an interest rate subsidy or loan guarantee, technical assistance for training bank personnel, and a vendor qualification process that ensures loans are provided only for reliable equipment.

The financial mechanism provided by UNEP is not used by a bank for lending to its customers, but instead stimulates the banks to lend their own capital, which helps them gain experience with the new, clean energy sector. Although conditions for each programme vary considerably, the many common elements have allowed UNEP to build substantial experience to transfer best-practice finance models across countries and regions.

Subsidizing the finance cost of a loan has proven to be an effective inducement for banks to begin lending for clean energy systems. Banks benefit from the public image as an environmentally responsible organization, and the perception that they offer low-cost finance. One interesting lesson from these programmes in some countries, however, is that merely providing access to finance can be more important for customers than the cost of such finance. This was the case with UNEP's Indian Solar Loan Programme that offered loans for solar photovoltaic (PV) home systems through more than 2,000 bank branches.

In just three years, UNEP's Indian Solar Loan Programme helped Indian banks finance nearly 20,000 solar home systems, benefiting more than 100,000 people (photo courtesy SELCO)

As part of the GreenVillage Credit Programme, UNEP is working with the Nature Conservancy to protect biodiversity and reduce the loss of forest cover in China's Yunnan Province by using solar energy instead of wood to heat water.

Although this might imply that motivating bankers to begin lending to these sectors can be more important than the actual terms at which they lend, bankers themselves are not so easily convinced. They will generally not begin lending to a sector until they see a sufficient number of loans – 10,000 loans to homeowners for PV systems, for example. The challenge is to help bankers achieve this threshold, and then phase out the financial support as part of the transition to a fully commercial and competitive credit market.

A second interesting lesson taken from these loan programmes concerns the feedback loop arising between the actions of the banking community and policy makers. When banks begin to increase lending to a clean energy sector, they create a positive signal to policy makers that the technology is mature and ready to play a significant role in the country's energy mix. The change in perception towards sustainable

When banks begin to increase lending to a clean energy sector, they create a positive signal to policy makers that the technology is mature and ready to play an increasing role in the country's energy mix.

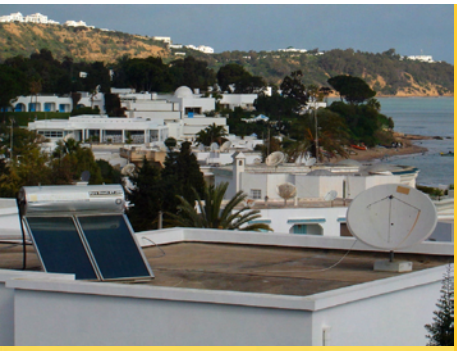
UNEP's experience contradicts the conventional wisdom that investors only engage once the right policies are in place

energy finance can have a significant impact, convincing policy makers of the need to shift policies, often from a narrow technology demonstration approach to a broader, fiscal or regulatory approach.

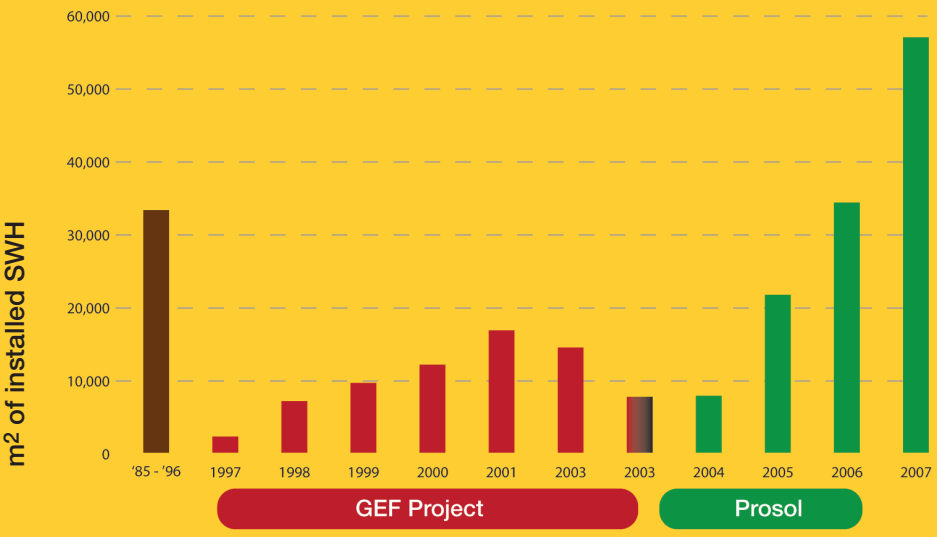
In Tunisia, for example, the **PROSOL** programme (see box) helped convince the government to change its energy subsidy framework, and the Indian Solar Loan Programme led the Indian government to consider shifting its solar photovoltaic support programme away from capital subsidies and towards the UNEP loan approach. Likewise, new and more positive signals from government also feed back to investors, further strengthening their desire to increase investment in the sector.

The positive results achieved by **PROSOL**, for example, have led the Tunisian government to set a more ambitious target for solar hot water heating, which will require a total investment of around $125 million. If this target were met, the annual market for solar water heaters in Tunisia would become comparable to current levels of countries such as Spain or Italy, whose population is 4-6 times higher.

UNEP's experience contradicts the conventional wisdom that investors only engage once the right policies are in place. Finance and policy development evolve in parallel, with one community constantly influencing the actions of the other.



Solar Water Heaters Market Growth in Tunisia



The Programme Solaire – or PROSOL - loan programme was launched in April 2005 to help local Tunisian banks provide low cost finance for solar hot water systems. Under PROSOL, the solar water heater market responded to the signal, adding much more capacity in 2006 than in any previous year and increasing 700% since 2004. Tunisian banks have now provided loans totaling $12 million – five times the $2.4 million cost of the programme – and are now comfortable enough with the sector to continue lending on their own.

The result is that more than 20,000 Tunisian families now get their hot water directly from the country's most abundant and cleanest energy source, and that number is growing. The positive results have also led the government to enact legislation aimed at shifting the country towards solar water heaters and away from water heating with Liquid Petroleum Gas.

Key Facts: Bank Partnership Loan Programmes	
Programme Strategy	Help domestic banking sectors build credit markets for small-scale renewable energy systems through the use of credit enhancements, technical support and vendor qualification.
Geographic Coverage	India, Tunisia, Morocco, Egypt, China, Ghana (soon also in and Albania, Algeria, Mexico and Chile as part of new GEF programme).
Total Budget	$21 million
Donors	GEF, UN Foundation, Shell Foundation, Italian IMET, German BMU, The Nature Conservancy.
Typical Programme Size	$0.4 million – $1.5 million
Bank Co-finance	$5 million to $12 million per programme
Loan Portfolio Targets	10,000 to 20,000 loans per programme (less for China and Ghana due to approach taken).
Overall Impact	Can be quite significant quickly, although only for markets that are somewhat mature.
CO2 Mitigation Cost	In Tunisia, for example, the mitigation cost ranges from $2.60 - $9.50 per ton CO2.
Bank Lending	Can be critical to scaling up markets with direct GHG mitigation and job creation benefits.

Carbon Finance

A rapidly evolving area is climate finance, including the Kyoto Protocol's Clean Development Mechanism or CDM. With the help of the UNEP Risø Centre, UNEP is the global leader in helping developing countries prepare for CDM investment. URC's international group of scientists, engineers, and economists provides technical and analytical support to UNEP and partners in developing countries on a range of climate, development and energy issues.

CDM Investment can stimulate demand for wind energy systems being constructed in this Indian factory (photo courtesy Suzlon).

UNEP has helped build the capacity of more than 30 developing countries to participate in and profit from the CDM since it was originally defined in the Kyoto Protocol. Activities have included regional training programmes and extensive analytical work related to CDM projects, such as baseline definitions, cost analysis, project screening, and possible sustainable development indicators.

The ultimate objective of UNEP's role in the CDM market is to help create an investment climate in host countries that is conducive to identifying, developing, approving, and financing CDM projects. UNEP's efforts are specifically aimed at improving the regional distribution of CDM projects.

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The new French-funded programme, **CASCADe**, has been launched in cooperation with the World Bank's BioCarbon Fund to support the development of African CDM projects in the forestry and bioenergy sectors. These areas have enormous potential for jointly reducing carbon emissions and improving the lives of the poor and their local environment.

At present, however, significant barriers impede these projects. Good examples and successful pilot transactions are needed to create a more favorable "carbon investment climate", and pave the way for commercial investors.

Broad Finance Sector Engagement

Part of UNEP's strategy is to support the growth of a nascent sustainable energy finance community through an industry partnership managed by UNEP's Renewable Energy and Finance Unit and its Collaborating Centre, BASE. **The Sustainable Energy Finance Initiative**, or SEFI (www.sefi.unep.net), brings together financiers, engages them to do jointly what they may have been reluctant or unable to do individually, and promotes public-private alliances that together share costs and lower barriers to investment.

SEFI publishes market research, builds networks of leading first movers, and provides training and other support activities to help local credit institutions and other financial actors operate in the sustainable energy sector.

The *Global Trends in Sustainable Energy Investment Report* was launched for the first time in 2007 with the market research firm New Energy Finance. Without doubt, *Global Trends* shows that the renewable energy and energy efficiency industries are becoming mainstream investment sectors – setting a record of more than $100 billion worth of transactions in 2006. In 2007, the upward trend continued, with capital investments occurring in sectors and regions previously considered too risky and with too few participants to merit the attention of institutional investors.

In 2008, SEFI will launch a **Sustainable Energy Finance Alliance** (see www.sef-alliance.org) to improve the sharing of public finance knowledge and development in the clean energy sector. The alliance will facilitate collaboration, intensive exchange, and the pooling of resources amongst agencies that are funding public or public/private financial mechanisms in the sustainable energy sector. Administered by BASE with the U.S.-based Clean Energy Group, the Alliance helps its members share experience and best practice on public finance instruments in the sustainable energy sector.

SEFI

SEFI grew out of a long-standing voluntary partnership with the finance sector - the **UNEP Finance Initiative** (UNEP FI, http://unepfi.net). Initiated in 1992, UNEP FI today has more than 175 members from more than 50 countries in the insurance and banking sectors that agree to

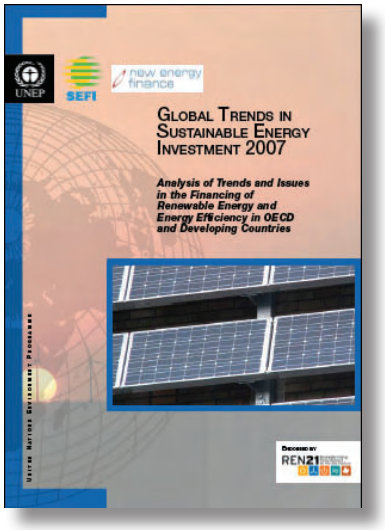
integrate sustainable development considerations into all aspects of their operations and service

UNEP FI's work programme is focused on current and emergent issues relevant to signatories who work collaboratively to find innovative approaches to issues around finance and sustainability, including carbon finance through UNEP FI's Climate Change Working Group.

In the area of **energy efficiency**, UNEP has been working with the World Bank to support the development of new financial mechanisms in Brazil, China and India. This effort builds on the experience of the World Bank as well as UNEP's industrial energy efficiency projects.

UNEP is also helping to develop new **financial risk management instruments** to help insure against unforeseen events. Such instruments are an integral part of any commercial energy project, but their application to the renewable energy sector to date has been limited, especially in non-OECD markets. With funding from the GEF, UNEP has been
assessing financial risk management approaches for the renewable energy sector and working with the insurance industry to develop new products and services that meet the specific needs of clean energy investors.

New instruments are currently being developed through insurance industry leaders, including Munich Re, Royal & SunAlliance, Paris Re, Marsh, and others, in areas such as wind insurance for Mexican wind farms, and fuel supply insurance for Indian biomass projects.



Download the 'Global Trends in Sustainable Energy Investment 2007' Report from http://sefi.unep.org

Geothermal Energy in Africa's Rift Valley

In some regions and for some projects, the insurance industry is not yet ready to participate. In the Africa's Rift Valley, however, UNEP and the World Bank are working with a range of organizations to develop the region's rich geothermal resources.

With funding from the GEF, the African Rift Geothermal Energy Development Program (ARGeo) will help project developers reduce project risks during the exploration drilling phase, provide assistance for resource mapping and surface exploration activities, and build reliable, robust, and sustainable public-private sector relationships.

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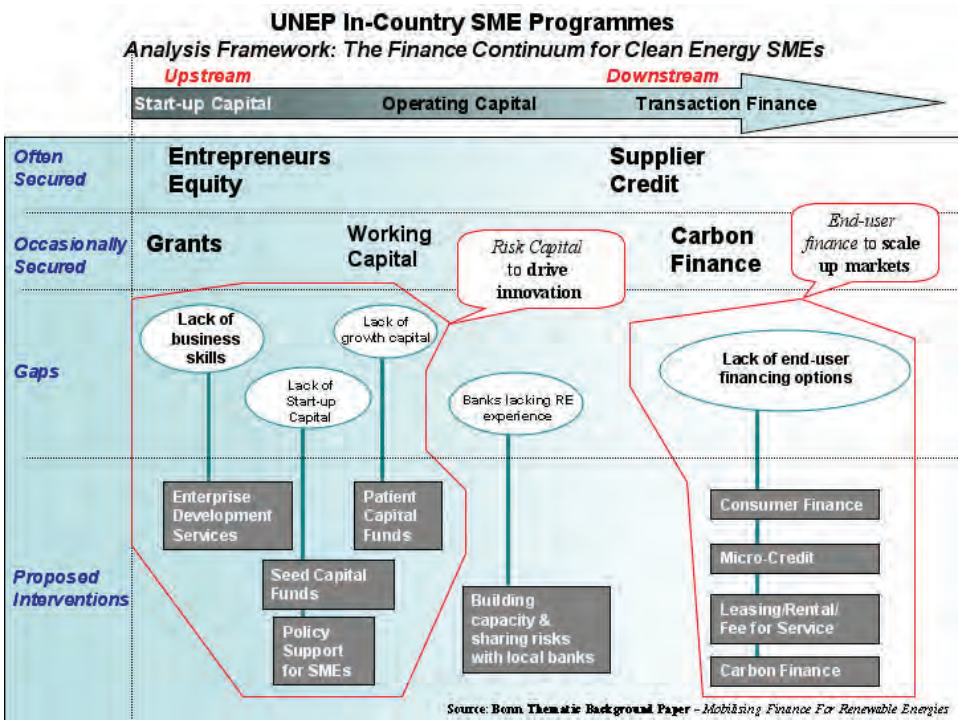

UNEP analysis framework for planning SME finance support programmes.

Contact and Useful Websites

SEFI - www.sefi.unep.net

UNEP Energy Finance - www.unep.fr/energy/finance

UNEP FI - www.unepfi.org

UNEP Collaborating Centre BASE - www.energy-base.org

UNEP Risoe Centre - www.uneprisoe.org

Sustainable Energy Finance Alliance - www.sef-alliance.org

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Creating the Climate for Change details UNEP's sustainable energy finance activities as part of an overall approach to strengthening the progression of finance needed to carry new ideas and technologies from project conception to commercial investment.

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Greenhouse Gas Reductions from PROSOL	
	Tonnes
Total annual CO2 reduced from installed systems	28,000
Total CO2reduced over 20 yrs from installed systems	570,000
Total CO2reduced annually under Government target	135,000
Total CO2reduced over 20 yrs under Government target	2,700,00

Greenhouse Gas Reductions from Selected AREED Projects			
Company	Activity	CO2 Offsets (tonnes)	Est. Value*
KBPS, Zambia	Waste to charcoal	33,361	$50, 042
RAPS, S. Africa	Solar Home Systems	116,875	$759,687
AME, Senegal	Solar Hot Water	1,966	$12,778
RASMA, Zambia	Energy Efficient Stoves	166,341	$249,512
TATEDO, Tanzania	Energy Efficient Stoves	3,936,751	$5,905,127
UBWATO, Zambia	Energy Efficient Stoves	478,542	$717,813
ZED, Mali	Solar Home Systems	2,523	$16,397

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UNEP Projects and Greenhouse Gas Reductions

Many UNEP projects and programmes not only support and finance clean energy services in developing countries, they also offer a clear reduction in greenhouse gas emissions.

In terms of development, projects that improve access to cleaner forms of energy provide a double dividend if they also reduce greenhouse gas emissions. Often, the benefit from this reduction can be quantified and turned into a financial benefit under voluntary and regulated carbon markets, such as those stemming from the Kyoto Protocol.

Where possible, UNEP projects are structured to qualify under the Protocol's Clean Development Mechanism (CDM), which can bring an additional revenue stream from the sale of so-called Certified Emissions Reductions (CERs).

Carbon finance represents a valuable means to leverage more funds for projects, while stimulating the market for sustainable energy technologies. In particular, new programmatic CDM methods being developed bundle small efforts to achieve a scale reduce and reduce the transaction costs that are generally a barrier for small-scale carbon reduction efforts.

A good example of this is the PROSOL initiative in Tunisia, where UNEP support spurred local banks to lend for solar water heaters. In the three-year initiative, more than 20,000 solar water heaters were financed, reducing the country's imports of liquefied petroleum gas (LPG) and reducing carbon emissions. The approximately $2 million cost of PROSOL reduces carbon emissions by an estimated 28,000 tonnes annually, and will total more than 500,000 tonnes over the 20-year life of the solar water heaters.

However, PROSOL has also helped to create a sustainable market for solar water heating, and led to new government initiatives that will further boost the number of systems and subsequent greenhouse gas reductions. If the Tunisian government's goals are reached, solar water heating will significantly expand, reducing carbon dioxide emissions by 135,000 tonnes annually, and more than 2.7 million tonnes over the 20-year life of the systems.

The African Rift Valley Geothermal Energy Development Programme (ARGeo) is another project with significant potential to reduce emissions. With support from the Global Environment Facility, the World Bank and UNEP, ARGeo is a five-year, US$18 million facility to add low-cost power generation from geothermal resources in six countries of the Rift Valley. By adding this new capacity, ARGeo will also help to increase the security of power supplies, promote economic development in the region, and reduce greenhouse gas emissions. ARGeo eligible countries include Djibouti, Eritrea, Ethiopia, Kenya, Tanzania and Uganda.
At the end of ARGeo, up to nine geothermal plants with a combined capacity exceeding 100 megawatts (MW) will be installed or in the pipeline, reducing direct greenhouse gas emissions by 400,000 tonnes per year.

Although the CDM and other formal carbon markets are useful tools to reduce carbon emissions, they are also limited in scope. Under current rules, many UNEP activities and projects with substantial carbon benefits do not qualify.

The Rural Energy Enterprise Development (REED) Initiative is a case in point. REED provides enterprise development and seed financing to clean energy entrepreneurs in five countries of West and Southern Africa, Northeast Brazil and China's Yunnan Province. REED uses an enterprise-centered development model to invest in small and mid-size enterprises (SMEs) marketing clean energy products and services, a sector generally considered too risky to attract conventional sources of finance.

One REED entrepreneur selling improved cook stoves, for example, can not only improve the energy service for a small family, but the lower demand for fuelwood also reduces the destruction of local forests and decreases emissions of greenhouse gases and harmful pollutants. Because these enterprises are small and diverse, however, the avoided emissions can be difficult to quantify.

Consequently, most of the REED enterprises today can not qualify as CDM projects since they deal with decentralized energy products or services where reduced carbon emissions are impossible to verify on a per system basis.

The reductions are real and significant, however. The African REED programme, AREED, has successfully invested from $20,000 to $120,000 in 28 businesses in the areas of solar crop drying, sawmill waste charcoal production, efficient cook stove manufacturing, wind water pumping, solar water heating, liquefied petroleum gas (LPG) distribution, and energy efficiency. Together, the $2.6 million of AREED investments has helped more than 400,000 people in Africa gain cleaner energy while creating new jobs and reducing carbon emissions by more than an estimated 400,000 tonnes annually.

* Based on $6.5/tonCO2 for electricity displacement activities, and $1.5/tonCO2 for wood fuel consumption displacement activities

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Highlights

ARGeo includes Rift Valley countries of Djibouti, Eritrea, Ethiopia, Kenya, Tanzania and Uganda

Potential of 480 megawatts (MW) of geothermal projects identified

Support for exploration risk and resource mapping

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African Rift Geothermal Energy Development Program

African Rift Geothermal Energy Development Program (ARGeo) will add low-cost power generation, reduce greenhouse gas emissions, increase the security of power supplies, and promote economic development in six Rift Valley countries. Support is provided by the Global Environment Facility, the World Bank and UNEP.

A Need for Energy

Africa will need significant new power generation capacity to meet a growing energy demand. Geothermal energy offers a sustainable way to increase energy supplies without significant emissions of greenhouse gases. All countries in the African Rift Valley have significant potential to generate power from geothermal resources. In many of these countries, abundant geothermal resources remain untapped due to a number of barriers, including the technical experience to capture geothermal energy.

Innovative Support

The African Rift Geothermal Energy Development Program (ARGeo) is a five-year, US$18 million region-wide multi-country facility to add low-cost power generation in six countries of the Rift Valley. By adding this power capacity, ARGeo will also help to increase the security of power supplies, promote economic development in the region, and reduce greenhouse gas emissions. ARGeo eligible countries include Djibouti, Eritrea, Ethiopia, Kenya, Tanzania and Uganda, with possible addition of other Rift countries in the region at a later date.

All of the six countries have already identified geothermal resources, with the support of recognized geological surveys institutions from Germany, Iceland, Italy and France. At least, one project in each country can be targeted for further development, while 10 other potential investments are in the pipeline at various stages of advancement. In total, a total potential of 480 megawatts (MW) of projects have been identified where potential has been scientifically qualified.

The ARGeo Program offers:

- a risk mitigation facility to reduce exposure to geothermal resource risks during the exploration drilling phase;
- Technical assistance to transfer necessary skills to tap the significant geothermal potential of the Rift valley;
- Assistance for resource mapping and surface exploration activities;
- Support for capital investments in geothermal energy development projects by building reliable, robust, and sustainable public-private sector relationships;
- Support for policy reforms of the legal, regulatory and institutional frameworks of the energy market.

ARGeo has two main components:

1. Risk Mitigation Fund (RMF)
The US$13 million fund will partially insure project promoters / investors against the short-term, up-front risk of geological exploration. The ARGeo Risk Mitigation Fund is administered by the World Bank and will be implemented in a series of individual subprojects over a period of five years on a project-by-project basis.

2. Regional Technical Assistance (TA)
This part of the ARGeo addresses barriers that impede the use of geothermal and other forms of renewable energy. With a budget of $4.75 million from GEF resources and approximately $5 million from co-financiers, this component will be carried out by UNEP, including the establishment of a regional network managing a geothermal information system, training, and information services. Importantly, this part of ARGeo will also identify, prepare and implement geothermal projects.

Investing in a Climate for Change

Engaging the Finance Sector

List of countries where UNEP has completed CDM technical assistance activities, or where activities are current or planned:

Latin America:
Nicaragua
Peru
Bolivia
Ecuador
Guatemala
Suriname
Caribbean Islands Region

Sub Saharan Africa:
Ghana
Cameroon
Mali
Uganda
Cote D'Ivoire
Zambia
Mozambique
Mauritius
Tanzania
Benin
Gabon
Madagascar
Congo
Senegal

North Africa:
Algeria
Egypt
Morocco

South and South East Asia:
Cambodia
Bangladesh
Sri Lanka
Philippines
Vietnam
Pacific Islands

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Participating in the Clean Development Mechanism

UNEP and the UNEP Risoe Centre on Energy, Climate, and Sustainable Development have conducted numerous projects to help developing countries participate in the Kyoto Protocol's Clean Development Mechanism (CDM).

A Developing Need

The Kyoto Protocol's Clean Development Mechanism enables participating developed countries to finance projects that reduce greenhouse gas emissions in participating developing countries. The CDM is a source of investment funds that can help these developing countries achieve their sustainable development goals while reducing overall emissions.

The geographical distribution of CDM projects, however, has favoured China, India, Brazil and Mexico. With only 33 out of a total of 2,647 CDM projects, sub-Saharan Africa has been largely bypassed along with other regions. One of the key challenges facing developing countries is the complexity and procedures of the CDM and the lack of national CDM expertise and institutional capacity to assess and approve projects.

Access to finance is an additional barrier facing CDM project developers in many countries, partially due to the lack of CDM knowledge among developing country financial intermediaries.

Innovative Support

With the help of UNEP's Collaborating Centre, the UNEP Risoe Centre on Energy, Climate and Sustainable Development (URC, www.uneprisoe.org), UNEP is the global leader in helping developing countries prepare for CDM investment. URC's international group of scientists, engineers, and economists provides technical and analytical support to UNEP and partners in developing countries on a range of climate, development and energy issues.

UNEP has helped to build the capacity of developing countries to participate and profit from the CDM since it was originally defined in the Kyoto Protocol. Activities have included regional training programmes and extensive work on analytical issues related to CDM projects, such as baseline definitions, cost analysis, project screening and possible sustainable development indicators.

The ultimate objective of UNEP's role in the CDM market is to contribute to the creation of an investment climate in the host countries that is conducive for identification, development, approval and financing of CDM projects. UNEP's efforts are specifically aimed at increasing the equitable regional distribution of CDM projects.

Results

The following list is a sample of successful CDM projects. For a more complete description, visit www.uneprisoe.org.

The CD4CDM Project (www.cd4cdm.org), and other support programmes are today helping governments in nearly 30 countries establish CDM projects, and is the largest institutional support programme related to the Kyoto Mechanisms. UNEP is the only multilateral organization focused almost entirely on helping the sellers of credits (developing countries), rather then the buyers.

The CDM Bazaar (www.cdmbazaar.net) is a free platform to CDM market participants, including emissions reductions buyers and sellers, and technology/service providers. Launched by URC and the UNFCCC, the "virtual" CDM Bazaar acts as a market place for CDM project participants, allowing them to exchange information on CDM investment opportunities, emission reductions purchase programs, as well as providing services to market stakeholders. The CDM Bazaar has over 600 registered users from 40 different countries.

URC is also helping to build the capacity of Chinese institutions to implement biomass CDM projects, particularly in the provinces of Guizhou, Hunan, and Xinjiang. With assistance from the Danish International Development Agency (Danida), the project includes a biomass resource survey and assessments of training needs and available technology.

In Francophone Africa and as part of the German Technical Cooperation Agency's (GTZ) Climate Protection Programme, URC is helping Benin, Senegal, Mali, Rwanda and Burkina Faso to build national & institutional capacities to identify, design, approve, finance and implement CDM projects specifically within the energy sector.

The new French-funded programme, Carbon Finance for Agriculture, Silviculture, Conservation, and Action against Deforestation (CASCADe) has been launched in cooperation with the World Bank's BioCarbon Fund to support the development of African CDM projects in the forestry and bioenergy sectors. These areas have enormous potential for jointly reducing carbon emissions and improving the lives of the poor and their local environment.

Presently however, significant barriers are still impeding these projects. Encouraging examples and successful pilot transactions are needed to create a more favorable "carbon investment climate" to pave the way for commercial investors.

Investing in a Climate for Change

Engaging the Finance Sector

Participating Countries

Albania
Belarus
Bosnia and Herzegovina
Bulgaria
Croatia
Kazakhstan
Republic of Moldova
Romania
Russian Federation
Serbia
The former Yugoslav Republic of Macedonia
Ukraine

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Financing Energy Efficiency and Renewable Energy for Climate Change Mitigation

This Project includes a public-private equity fund under the auspices of the Global Environment Facility. The Project will also assist local experts to develop investment projects for financing, and work with local authorities on energy policy reforms to support these investments. In addition to the GEF, support is provided by the United Nations Foundation (UNF), the Fonds Français pour l'Environnement Mondial (FFEM), and the European Business Congress (EBC).

The Need for Efficiency

The inefficient and polluting energy systems in Eastern Europe and the Commonwealth of Independent States (CIS) presents both a substantial economic and environmental challenge, and promising opportunities to reduce global greenhouse gas emissions. The reform of energy prices and subsidies is on the political agenda in most of these countries as their economies suffered from the lower productivity and living standards associated with inefficient energy use – even before the end of central planning.

Efficiency improvements are closely linked to increasing productivity in the industrial and service sectors and rising living standards. Economic output in Eastern European and the CIS is growing at five to twelve per cent annually, and foreign direct investment continues to increase. Rationalizing the large fixed capital investments in their energy infrastructure could help maintain economic growth through productivity gains, attract foreign investment, and diminish the flight of domestic capital.

During the last few years and when combined with bilateral and international projects, national programmes have begun to develop the policy reforms and financial engineering skills needed for energy efficiency and renewable energy investments in Eastern Europe, although with mixed results.

Under reformed energy markets, the capacity to finance energy efficiency investments could open up a vast market in Eastern Europe and the CIS. The investment potential in Eastern Europe for energy efficiency projects with a payback period of less than five years is estimated to be between US$5 - $10 billion. Such an investment volume is so large that the private sector needs to participate in financing these projects. While grants, loan guarantees and other financing schemes have an important demonstration value and help local partners to acquire the professional skills they need, only commercial sector finance on a suitable scale can actually deliver significant results.

The private sector in turn requires a market for energy efficiency and renewable energy in Eastern Europe and the CIS. This market needs to provide opportunities for the commercial sector to make large investments with low transaction costs that have acceptable risks and returns. The achievements of recent and continuing technical assistance projects in this field have established the framework for an energy efficiency market with one important exception: there is still no adequate dedicated source of equity or quasi-equity finance, which is still the limiting factor that hampers the development of energy service companies (ESCOs) in these countries, an essential tool to foster finance for energy efficiency and renewable energy projects.

Innovative Support

The seven-year, US$ 7.5 million Financing Energy Efficiency and Renewable Energy for Climate Change Mitigation Project will fill this gap, launching a public-private equity Fund under the auspices of the Global Environment Facility. The Project will also assist local experts in twelve countries to develop investment projects for financing, and work with local authorities on energy policy reforms to support these investments. The project will:

- Establish an Investment Fund with the participation of public and private sector investors as dedicated source of finance;
- Enhance the skills of the private and public sector experts at the local level to identify, develop, and submit bankable projects to the Fund and/or other sources of finance;
- Provide assistance to municipal authorities and national administrations to introduce economic, institutional and regulatory reforms needed to support these investment projects.

To support the Fund and finance for the sector, the Project will provide technical assistance for needed policy reforms through printed and electronic publications distributed to experts, local and national policy makers and administrators, and energy utility representatives.

Investing in a Climate for Change

Engaging the Finance Sector

Highlights

20,000 systems financed benefiting more than 100,000 people

More than 2000 bank branches participated

New banks have entered the market

A reducing interest rate subsidy provided a key motivation for banks to lend

Energy Globe awarded in 2007

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Indian Solar Loan Programme

From 2003-2007, the Indian Solar Loan Programme worked with two of India's largest banking groups – Canara Bank and Syndicate Bank - to provide consumer financing for solar photovoltaic home systems. Major support was provided by the UN Foundation with additional backing from the Shell Foundation.

A Market Need

More than 60% of rural Indian households do not have access to a reliable electricity supply, and must often rely on kerosene for light and dung and wood for heat. These relatively poor quality energy resources create respiratory diseases impacting their health, and limit economic and social development.

Solar home systems can be an attractive alternative to relying on grid electrification, but without affordable financing options their high initial cost puts them beyond the reach of most households. Increased access to financing can enable rural households to secure a clean and reliable energy source and to pay for it with the money they are currently spending on conventional energy options. Prior to 2003, few banks were willing to offer loans for these systems, and those that did charged high interest rates that put the repayments beyond the reach of most households.

Innovative Support

To overcome this barrier, UNEP and its UNEP Risoe Centre initiated the Indian Solar Loan Programme, providing Canara Bank and Syndicate Bank with broad-based support for beginning to lend to solar home system market. This support included an interest rate subsidy, marketing support and a vendor qualification process.

Syndicate Bank and Canara Bank were chosen based on their extensive branch networks, reputations for progressive social banking and interest in developing dedicated loan products for the solar PV sector. Banks preferred the interest subsidy over loan guarantees or other support mechanisms because it enabled them to offer preferential banking terms to their customers in an efficient and transparent manner, even though they would not directly benefit.

The Indian Solar Loan Programme in essence paid the banks the difference between the commercial interest rate for equivalent loan types – about 12% - and the 5% interest rate the banks charged to customers under the Programme. This subsidy was progressively phased out over the four-year Programme, leaving the banks with a purely commercial, competitive, and affordable solar loan product.

The loans were offered through 1,115 Canara and Syndicate bank branches as well as 1,051 branches of 9 rural Grameen banks sponsored by Canara and Syndicate. Importantly for market development, the Programme also provided oversight of the loan process, including

- the vendor qualification process, which ensures that vendors have the experience and service infrastructure to maintain the products they sell;
- compulsory product warranties and service contracts;
- customer satisfaction surveys;
- bi-annual bank and vendor audits; and
- the programme's overall evaluation component.

Results

Prior to the Indian Solar Loan Programme, only 1400 loans had been provided to the solar sector by a range of banks, mostly through relationships between solar vendors and individual banks that financed in the range of 100-300 loans. By the end of the UNEP Programme, almost 20,000 household systems had been financed benefiting more than 100,000 people.

Although Syndicate and Canara were the first major lenders, a number of other banks started to compete in this new credit market, financing an additional 4,000 loans by the end of 2005. Although the solar home sector was pretty much a cash-only business in 2003, today over 50% of sales are credit-financed, representing an strong response by the credit market to the impetus.

Indian banks are keen to develop new loan products and the partnership with UNEP allows them to do so in a growing clean energy sector. An interest subsidy helps them to build solar financing portfolios without distorting the credit risk - sometimes a problem with instruments such as loan guarantees - or the existing cash market for solar home systems. Five solar vendors were qualified under the Programme, making their customers eligible for financing.

Importantly, the Indian Solar Loan Programme provided a strong market signal, rather than the market distortion that often accompanies larger development projects. Even though the banks did not profit directly from the $1 million interest rate reduction fund since the benefits were passed on to the customer, they still eagerly promoted solar lending because they saw the opportunity to develop a new credit market. Further, the economics of the solar systems changed only very slightly with the interest rate reduction, so the growth of the market had little to do with the lower cost of systems. The Programme provides an important access to finance, motivating banks to lend to a new sector, which helped overcome the barrier to developing the market.

In recognition of its success, UNEP, the UNEP Risoe Centre and the Indian Solar Loan Programme received the Energy Globe Award in 2007.

Investing in a Climate for Change

Engaging the Finance Sector

Highlights

20,000 Tunisian families now get their hot water from the sun

Under PROSOL, the solar water heater market responded to the signal, adding much more capacity in 2006 than in any previous year and increasing 700% since 2004.

PROSOL has facilitated loans by Tunisian banks totaling $12 million – five times the $2.4 million cost of the programme

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PROSOL

From 2004-2007, PROSOL worked with the Tunisian government, and the national electricity authority to help local banks begin lending forsolar hot water systems. Programme support was provided by the Italian Ministry for the Environment, Land and Sea.

Creating New Markets

The Southern Mediterranean region has an abundant solar resource but a small solar water heater market due to a number of barriers, including high initial costs and the lack of available financing.

Since April 2005, however, almost 20,000 Tunisian families now obtain their hot water from the region's abundant sunshine because a UNEP-Tunisian Government initiative helped them obtain a loan to buy and install their rooftop solar system.
The initiative, Programme Solaire - or PROSOL - is a joint effort of the Tunisian Ministry of Industry, Energy and Small and Middle Size Enterprises, the National Agency for Energy Conservation of Tunisia (ANME), the Italian Ministry for the Environment, Land and Sea, and UNEP.

PROSOL is part of the umbrella MEDREP Finance initiative that is developing and testing different options to increasing financing to renewable energy companies and projects in the southern Mediterranean countries of Tunisia, Morocco and Egypt, and other countries.
The overall Mediterranean Renewable Energy Partnership (MEDREP) aims broadly to develop the region's renewable energy potential. In addition to ANME, PROSOL's partners include:

- Société Tunisienne de Banque (STB)
- Two commercial banks (UBCI and Amen bank)
- State electricity utility STEG (Société Tunisienne d'Electricité et du Gaz)
- Manufacturers, importers and installers of solar water heaters
- Local consultants

Innovative Support

PROSOL differs from other support programmes by targeting financial institutions and helping to develop markets through a range of institutional and financial support. The 1.7 million first phase of PROSOL provided:

- Discounted interest rates on solar loans provided by banks and repaid through utility bills, and
- Communications and promotion support.

The banks play a fundamental role in PROSOL, providing the financing to develop the solar water heater market, accounting for about 70% of the total capital mobilised. However, the loans were effectively driven and secured by the solar suppliers accredited by ANME.

Under PROSOL, the customer could pay the loan via their electricity bill. This provided enough guarantees for banks to extend five year loans instead of the usual three-year term, and an interest rate reduction. PROSOL essentially "bought down" the interest rate for loans by 7%, resulting in a rate charged to the initial customers of 0%. Later customers then had to pay higher rates once UNEP's subsidy was phased out, although still low by commercial standards due to the utility billing decreasing the loan default risk.

Subsidizing the finance cost of a solar water heater has proven to be an effective inducement for banks to participate, and it also overcomes the capital cost barrier since customers can now take out an affordable loan, with payments that match previous outlays on LPG. However, in terms of risk sharing, the banks employ the normal lending procedures for any other type of product, such as a household appliance. This means the banks – and not a public agency - carry 100% of the loan risk.

Results

PROSOL has achieved some notable success with the capacity added in the year 2006 higher than the cumulative capacity installed in the entire period 1985-1996, when only a capital subsidy programme was offered under a different non-UNEP programme. Under PROSOL, more than 20,000 Tunisian families now get their hot water from the sun from loans equivalent to $13 million in 2005/2006 – a substantial leverage to the $2.5 million initial cost of PROSOL.

The results achieved by PROSOL have led the Tunisian government to set a more ambitious target for solar water heating of 540,000 m2 in the period 2007-2011 – more than 100,000 m2 per year on average. If this target were met, the annual market for solar water heaters in Tunisia would become comparable to current levels of countries such as Spain or Italy with populations 4-6 times higher.

To reach this goal, a slightly modified scheme called *PROSOL Residential* was launched in 2007, which allows customers to obtain loans directly from banks. Developed entirely by local organisations without UNEP support, PROSOL Residential is evidence that the initial effort has helped create a self-sustaining market.

PROSOL Residential has also led to an important policy change by the Tunisian government. Solar water heaters are now eligible for the energy subsidy that previously was provided only to LPG.

The success of PROSOL has also prompted two new market support mechanisms under additional funding from the Italian Ministry for the Environment and Sea, and helped launch a new global GEF programme.
PROSOL Collective targets the tourism and services sector, and in mid-2008, *PROSOL Industrial* will begin targetting industries able to use solar thermal heat in their processes.

Investing in a Climate for Change

Engaging the Finance Sector

Highlights

REED operates in China, Brazil and five African countries;

More than 100 entrepreneurs trained and more than 50 new enterprises created;

Seed funding provided of $20,000 to $120,000;

More than 400,000 people now have access to cleaner energy;

Financial returns matched or exceeded by social returns, including new jobs.

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Rural Energy Enterprise Development (REED)

The Rural Energy Enterprise Development (REED) initiative provides enterprise development and seed financing for clean energy entrepreneurs in developing countries. Major support provided by the UN Foundation, Blue Moon Foundation, W Alton Jones Foundation, and the Swedish International Development Agency.

Needed: New Clean Energy Entrepreneurs
Two billion People in developing countries lack access to clean and modern forms of energy, including electricity. Relying instead on poor quality fuels, such as wood and dung, these people suffer respiratory disease, and their economic opportunities are limited. Even small energy improvements can create significant economic and social benefits.

The challenge of improving energy access in developing countries requires new enterprises that can deliver cleaner and affordable forms of energy. For many developing countries, however, this is far from an easy task – little training is available and the start up capital non-existent from traditional banks and finance institutions.

Innovative Support
REED programmes are designed to overcome these barriers. Operating in five countries of West and Southern Africa, Northeast Brazil and China's Yunnan Province, REED uses an enterprise-centrerd development model pioneered by the clean energy investor E+Co and advanced by a diverse group of country enterprise development partners. REED invests in small and mid-size enterprises (SMEs) marketing clean energy products and services, a sector generally considered too risky to attract conventional sources of finance.

An underlying goal of REED is to prepare young enterprises for later growth capital from more commercial sources. A young enterprise that services a first loan from REED is well positioned to attract later financing from a local bank. The REED approach is a shift from conventional grant based technology demonstration programmes to the seed capital business. Instead of installing a few wind pumps into rural villages, for example, the equivalent funds can be used to invest risk capital in a clean energy entrepreneur who could eventually install, maintain and service hundreds or thousands of pumps.

UNEP firmly believes that assisting entrepreneurs to take risks, to innovate the way they deliver goods and services, and to continuously refine their business models, is an effective way to gain public trust while attracting commercial investment into the sustainable energy sector.

There are currently three REED initiatives:
In Africa, AREED operates in Senegal, Mali, Ghana, Zambia and Tanzania. In Brazil, B-REED operates in the northeast provinces. In China, C-REED is helping to preserve biodiversity in the province of Yunnan.
Results
The African programme, AREED, is the most advanced to date with investments of $4.1 million in 35 clean energy enterprises. These investments, ranging in scale from $20,000 to $120,000, have seeded businesses in the areas of solar crop drying, sawmill waste charcoal production, efficient cook stove manufacture, wind water pumping, solar water heating, liquefied petroleum gas (LPG) distribution and energy efficiency. Together, AREED has helped more than 400,000 people in Africa gain cleaner energy while creating new jobs and reducing carbon emissions.

Not all enterprises survive, with about 80% of AREED investments performing according to the terms of their investment, which is excellent in development terms but below what a conventional financial institution could tolerate. Even successful enterprises, however, require significant hands-on support to successfully develop their new enterprises. However, the overall portfolio from a financial perspective remains cash-flow positive, meaning that it grows and can be provided to other enterprises over time.

In China, the GreenVillage Credit project is a part of UNEP's China Rural Energy Enterprises Development (CREED) project (www.creed.org) that aims to create a clean energy path in China's Yunnan province and surrounding areas. Supported by the United Nations Foundation (UNF), CREED offers enterprise development services (EDS) and support for consumer credit and income generation loans. The Nature Conservancy (TNC) China Program is responsible for the consumer credit and income generation component through this GreenVillage Credit in the northwestern part of Yunnan Province.

The capital invested by REED is also technical, including helping entrepreneurs with 'enterprise development services' such as developing business plans that conventional financial organisations are not usually able to provide.

The returns are also more than financial and are matched – and in many cases exceeded – by the non-financial returns of economic development, environmental improvement and better access to modern energy services for poorly-served communities.

Investing in a Climate for Change

Engaging the Finance Sector

Highlights

SCAF cost-shares the elevated transactions costs and bridges a return gap of investing in early stage businesses and projects

The $9.4 million facility aims to mobilize over $50 million of investment in clean energy development opportunities.

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Seed Capital Assistance Facility (SCAF)

The Seed Capital Assistance Facility (SCAF) can help early stage clean energy enterprises and projects in Asia and Africa access start-up seed capital from commercial energy investors. To be launched in 2008, the $9.4 million Facility is financed by the Global Environment Facility and the UN Foundation, and implemented through UNEP, the Asian Development Bank and the African Development Bank.

Formidable barriers

SCAF is designed to help clean energy entrepreneurs access enterprise development support and early stage 'seed capital' financing from mainstream energy investors.

Entrepreneurs can transform markets, but the environment for entrepreneurship is poor in many countries, particularly in the energy sector. Banks seldom provide the sort of risk capital finance and technical support entrepreneurs need to start a business, and even investors are reluctant to engage too early. This means that even high potential renewable energy and efficiency sectors develop quite slowly, with most financiers sitting on the fence waiting for entrepreneurs to do the difficult initial work on their own.

Seed capital finance and enterprise development support helps early stage entrepreneurs scope and develop new business activities or project developments. While there is increasing interest in the seed capital sub-sector, almost all of the support to date has come from foundations and the donor community, sources that are able to underwrite the broader developmental objectives of seed capital investing. Attracting mainstream capital to the initial seed stage is a crucial next step to realize the fuller potential of this area of investment.

The two largest hurdles to engage mainstream investors in seed capital projects are the higher transaction costs and the insufficient financial rewards from these smaller, less mature and more risky businesses. The SCAF facility is designed to address these two hurdles.

Innovative Support

To address the above issues and barriers to early stage finance for young, clean energy projects and enterprises, the SCAF offers investment funds two types of cost-sharing support for those willing to include a seed investment windows within their overall commercial investment strategy. For example, a $100 million fund might be asked to set aside 5% to 10% of total capital for earlier stage, seed investing.

SCAF Enterprise Development Support
The first support line shares part of the elevated cost of sourcing, developing and transacting seed-scale investments. As part of this arrangement, the fund manager commits to identifying and developing a pipeline of early stage clean energy projects or businesses, and providing enterprise development services to qualified local entrepreneurs.

The SCAF Enterprise Development Support is provided in the form of annual fees based initially on the amount of seed capital under management, and subsequently on the value of the seed capital portfolio. The Support is limited to a period of two to four years, during which time the investor provides the most enterprise support to the portfolio and successfully seeded projects can grow into full-scale investment opportunities.

SCAF Seed Capital Support
In addition to sharing the transaction costs of preparing early stage, clean energy investments, the SCAF can also enhance the investment returns offered by these seed-financed enterprises. This 'seed capital support' is designed to offset the hurdle of higher perceived risks and lower expected returns from early stage, sustainable energy enterprises and effectively offers a return enhancement for the projects.

This enhancement reflects the reality that seed capital investments take a period of one to three years to mature into opportunities for more commercial capital. The SCAF support mechanism can cover a portion of the incremental returns - the gap between returns a portfolio of early stage enterprises can provide, and what commercial investors are willing to accept to provide finance.

Return enhancement payments can be negotiated for three to four years. Thus, if a fund manager needed to achieve a 15% return on a portfolio basis and the seed capital window was only expected to provide a 7% return, the SCAF will share part of the difference over a three to four year investment window.

Results

By sharing transaction costs and bridging the gap between returns offered by local sustainable energy entrepreneurs and those required by the investment community, SCAF helps to:

- Provide entrepreneurs with the enterprise development services and early stage risk capital they need to develop sustainable energy businesses and projects;
- Increase the scale and scope of clean energy investment opportunities available to commercial financiers; and
- Increase commercial capital to the seed finance sector.

Even if only a small portion of the investments seeded by a fund mature into truly successful commercial investments, the incremental return from these follow-on investments more than compensates for the absorbed risk of providing seed capital. This overall approach can change the portfolio habits of commercial investors, since a follow-on investment is more familiar to a lender and therefore generally less risky than either the seed investment or a first investment in a larger, commercial capital transaction.

Investing in a Climate for Change

Engaging the Finance Sector

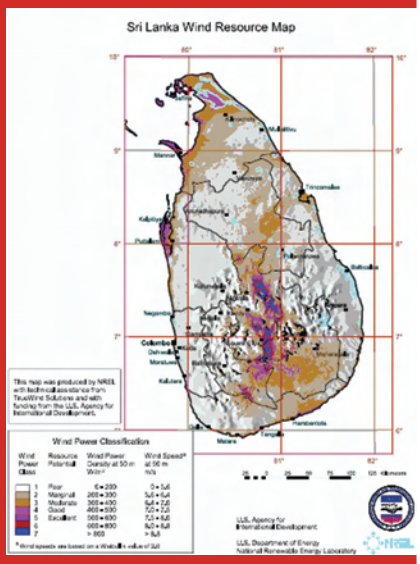
Highlights

Detailed maps of solar and wind energy resources in 13 developing countries to facilitate investment in clean energy

Public domain information with user-friendly computer-based geographic information system data, such as roads and transmission lines

25 partner institutions

New assessment under way in Abu Dhabi with further expansion planned



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Solar and Wind Energy Resource Assessment

From 2001-2007, the Solar and Wind Energy Resource Assessment Programme (SWERA) created detailed assessments of wind and solar energy potential in 13 developing countries. SWERA was principally supported by the Global Environment Facility, with additional support by UNEP, and the US National Aeronautic and Space Administration (NASA).

Knowledge is Power

The world's immense sources of renewable energy are essential to creating a clean energy path for the global economy. Solar, wind, geothermal, biomass, hydro and wave resources have the potential to meet several times the world's present and future energy demands. However, they are not evenly distributed and can vary greatly within even small geographic regions.

Through a range of well-established techniques, detailed and reliable mapping of these resources is possible, and critical for energy planners and financiers. Without timely and reliable assessments of the size and scale of a particular resource, investors cannot determine whether a particular project will be viable, including the potential return on their investment.

High quality assessments of renewable energy resources also allow national and state energy agencies to establish long-term and scientifically robust sustainable energy supply options and policies, including plans and polices by environmental agencies to reduce greenhouse gas emissions.

The relative costs to assess renewable energy resources are low compared with actual project costs. With reliable and timely resource data, project developers can gain confidence their projects will be successful and profitable.

Innovative Support

SWERA was launched in 2001 as a collaboration between 25 international institutions to develop the information tools needed to stimulate renewable energy projects. SWERA initially focussed on major areas of thirteen developing countries in Latin America, the Caribbean, Africa and Asia.

Researchers from partner institutions used satellite and terrestrial measurements, numerical models, and empirical and analytical mapping methods. Results were integrated into a user-friendly computer-based geographic information system containing relevant infrastructure data, such as roads and transmission lines, and into formats easily imported to common geographic-information-system (GIS) software.

This combination of renewable resource maps and data in print quality documents, online mapping, and standalone analysis forms a powerful decision support system for a broad range of clients, including energy planners and developers, policy makers, industry representatives, investors, university researchers, and citizens.

Results

SWERA has produced a range of solar and wind datasets and maps at better spatial scales of resolution than previously available. The renewable energy information provided through SWERA includes:

- Maps of Wind and Solar Energy Potential
- Atlases of Solar and Wind Energy Resources
- National Assessments

Ultimately, SWERA supported informed decision-making and helped increase investor confidence in renewable energy projects. In Nicaragua, for example, project results prompted the Nicaraguan National Assembly to pass the 2004 Decree on Promotion of Wind Energy, while in Bangladesh SWERA transferred local partners critical skills which, for example, allowed them to show that wind measurements taken under a separate project could have been much better sited.

One of SWERA's strengths is the ability to place critical solar and wind energy resource maps and data in the public domain. The expanded SWERA programme aims for an open architecture to include new countries and partners. SWERA also intends to provide training material to users in developing countries, which will contribute to the knowledge and development of renewable energy assessments.

UNEP believes the success of SWERA can be greatly expanded by extending its coverage and broadening the range of services it provides. To this end, UNEP is engaging development aid agencies, investors, and developers, in a combined effort to integrate renewable energy resource assessments into energy and development planning processes, as well as communicating to financiers the profitable investment opportunities offered by renewable energy projects.

At present, most efforts involve a partnership with the Abu Dhabi Future Energy Company, under which a mapping of solar and wind energy resources in several countries of the Middle East and North Africa is being conducted. The online user interface is also being revamped to accommodate the needs of different types of users.