



INVESTING IN A CLIMATE FOR CHANGE

*UNEP's Energy Finance Programme:
Scaling Up Clean Technology
Investment*

UNITED NATIONS ENVIRONMENT PROGRAMME



1972-2012:
Serving People
and the Planet

INVESTING IN A CLIMATE FOR CHANGE

**UNEP's Energy Finance Programme:
Scaling Up Clean Technology Investment**

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Foreword

UNEP's Green Economy Report shows how investing US\$1.3 trillion each year in green sectors would deliver long-term stability in the global economy. However, achieving such a low-carbon, resource-efficient economy will require the scaling-up of private-sector investment in clean technology applications around the world.

Energy access and sustainable development are priorities for the United Nations, with 2012 being the International Year of Sustainable Energy for All in 2012, a year also made notable by the Rio+20 conference. The green economy and poverty eradication are key issues in the discussions related to these initiatives, and clearly clean technologies are essential for reaching these development goals. But deploying clean technologies requires investment, and policy-makers urgently need to build lasting links with private investors in order to attract the scale of finance required.

The climate change negotiations have yielded a joint commitment from the world's governments to a green climate fund aimed at mobilising US\$100 billion a year by 2020. This means increased public sector resources that can attract private-sector support for clean technologies. However, to be effective, potential financiers must be able to understand and assess the level of risk and the potential returns associated with such green investments.

Over the past two decades, UNEP has worked to facilitate this need for interaction between public and private-sector financiers, aiming to build the capabilities and awareness of both sides regarding clean technology investments. By demonstrating the commercially viable operation of innovative clean technology applications, especially in developing countries, UNEP is able to reduce the perceived risk of private financiers and so help achieve the scale-up of global investment that is required.

This brochure highlights some of our ongoing or recently completed energy finance programmes that show how clean technologies can be made affordable to end-users and attractive to investors. This process also builds long-term markets for suppliers and generates related economic and social benefits from job creation and improved energy access.

Starting from Rio+20 in UNEP's 40th year, we aim to promote our energy finance activities more widely, providing valuable opportunities for you to learn more about the global need for climate finance and the potential benefit from clean technology investment.



Sylvie Lemmet
Director - Division of Technology, Industry and Economics
United Nations Environment Programme



FOREWORD

A Fresh Approach to Energy Finance

Mitigating climate change requires changing the way we use energy—and how we invest in energy development. Renewable energy and energy-efficiency technologies hold enormous potential for reducing greenhouse gas (GHG) emissions and protecting the environment, provided they are appropriately financed. On a global level, financing for green energy is growing at a significant rate. Investment in renewable energy reached US\$257 billion in 2011, a six-fold increase since 2004. But this represents just a starting point for clean technology applications. There are still many hurdles to overcome, especially in developing countries.



In fact, green energy is a particularly attractive choice in developing countries, where millions of people have extremely limited access to grid electricity. In these countries, clean energy technology represents not only a way of combating climate change, but also a means of achieving development goals, including increased energy access, improved health and education, and enhanced economic development. In rural off-grid areas and other isolated communities, small-scale clean technologies can often be the most cost-effective and practical energy option, offering great investment opportunities.

Green energy ventures can indeed be very profitable, but the perception of risk often deters those who are not familiar with green financial territory. Unconventional technologies, unusual or non-existent regulatory frameworks, and unfamiliar economic settings can make sustainable energy projects seem daunting to the uninitiated investor. And yet, if green energy is going to take root in the global economy, a dramatic increase of private sector investment is crucial.

How can clean technology ventures attract the necessary investment? This booklet attempts to address that question, offering examples and strategies developed through UNEP's energy finance activities.

Enabling the Public Sector to Attract Private Investment

Though public funds make up only a small part of green energy investments, public sector involvement is often crucial to attracting larger-scale private sector finance. By covering some of the start-up costs, and/or setting up demonstration projects, governments can help show that a new concept is commercially viable and thus attractive for private investment.

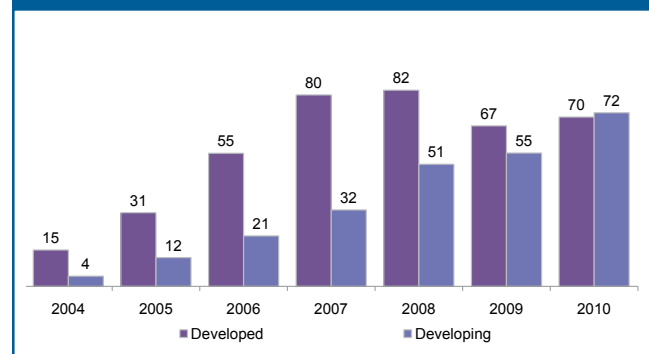
UNEP's Energy Finance programme helps forge the link between the public and the private sectors, assisting governments in doing what it takes to attract investment. Uncertainties over local markets, governance, infrastructure and available resources all contribute to a perception of risk. This perception can be reduced through government-backed demonstration projects that lay the groundwork for innovative clean technology (clean tech) implementation, and show investors that a project is truly "bankable." Coherent policy and regulatory frameworks are of particular concern to investors, who seek a streamlined implementation process

and justified expectations of longer-term returns. Appropriate public sector support can therefore leverage new clean tech projects to attract scaled-up financing.

UNEP's energy finance strategies take many different approaches—often simultaneously—according to the specific needs of the country and the project.

Sometimes lowering costs to consumers can stimulate a new market and attract financing, and a facility will be set up to help local banks provide low-cost loans to clean tech users. Sometimes countries would like to attract finance to increase the viability of clean tech applications by participating in the global carbon market, but need technical support and guidance on the links to nationally-appropriate climate mitigation actions. Other UNEP interventions include offering training for financial institutions in developing countries geared at improving the prospects for clean tech projects, or financial support to suppliers and developers to help get low-carbon projects up and running. The examples in this booklet detail UNEP's major energy finance activities and their various approaches and strategies.

FINANCIAL NEW INVESTMENT IN RENEWABLE ENERGY:
DEVELOPED V DEVELOPING COUNTRIES, 2004-2010 \$BN



New investment volume adjusts for re-invested equity. Total values include estimates for undisclosed deals

Source: Bloomberg New Energy Finance, UNEP

UNEP and Energy Finance

When it comes to sustainable energy finance, UNEP is in a unique position. It is not a bank, nor an investor, and thus has no vested interests. This independence gives UNEP the ability to enable financial partnerships and attract investment, and to provide assistance and incentives that can change attitudes and bring sustainable energy investment into the mainstream. UNEP uses its international expertise to create an environment where finance institutions can connect with key green energy stakeholders—including suppliers, developers, policy-makers, regulators, entrepreneurs, and end-users—and essential partnerships can be forged.

UNEP's energy finance services are provided by its own technical experts, as well as those of its two Collaborating Centres: the Frankfurt School of Finance and Management (FSFM-UNEP Collaborating Centre for Climate and Sustainable Energy Finance), and the UNEP Risoe Centre on Energy, Climate and Sustainable Development (URC) in Copenhagen. These organizations have extensive climate finance skills and can often play a lead role in related initiatives. Together with its Collaborating Centres, UNEP has access to over 50 energy and climate change specialists with widespread international experience on the clean technology investment needs of developing countries and emerging economies.

UNEP's Energy Finance Focus Areas

Innovative Financing

Feasibility studies, market analysis, business plans, training, initial capital expenses—the list of start up costs is

What We Do

UNEP's energy finance activities can be considered in three main groups:

- Bringing the right players together at the right time. Our independent status makes it possible to enter into direct consultation with policy-makers, financiers, suppliers, and end-users, facilitating effective links between all relevant stakeholders.
- Preparing local capability for clean technology investment. Our experts help local financiers become familiar with green energy territory, and offer stakeholders training and support so they can better understand and fully benefit from climate finance. When appropriate, we set up financial incentives to stimulate project development.
- Demonstrating innovative financing mechanisms. Adapting approaches that worked elsewhere in the past or designing new models to meet local needs, we aim to make clean technologies affordable and commercially viable in developing countries.

long and can be daunting for both project planners and financiers alike. UNEP fosters the development of new financial products and offers services geared towards reducing start-up costs and smoothing the road for potential investors in clean energy technologies. Technical support and seed financing are at the core of programmes like the Seed Capital Assistance Facility (page 14), which works in partnership with the African Development Bank and the Asian Development Bank.

End-User Finance

Helping the end-user to pay for clean techs not only takes the financial bite out of implementing systems with relatively high up-front costs, but also demonstrates that sustainable energies are a viable option for local consumers. UNEP's end-user finance projects aim to build consumer confidence, design appropriate financial mechanisms, and build local markets. Projects take multiple approaches to achieve this goal. For example, the Mediterranean Investment Facility (MIF) (page 20) is helping Morocco phase-out incandescent lighting and establish a market for energy-efficient lamps through policy incentives, quality standards, and consumer awareness campaigns.

Carbon Finance

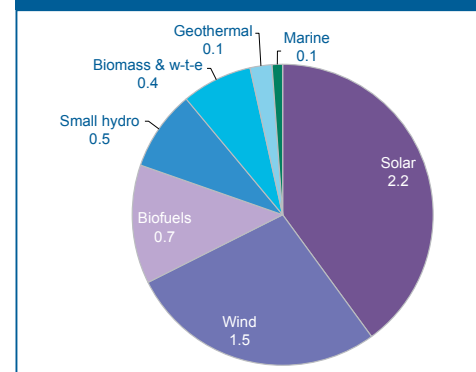
Public and private stakeholders in developing countries often need assistance in accessing the carbon market and making the most of the Clean Development Mechanism (CDM) or voluntary schemes. UNEP and the

UNEP Risoe Centre are the leading providers of carbon finance technical assistance, with activities in dozens of countries around the world. Programmes like the ACAD facility (page 22) and CASCADe (page 24) are designed to help governments and project planners reap the benefits of the carbon finance opportunities related to clean tech investment through training, technical support, and targeted grants and loans.

Finance Networks

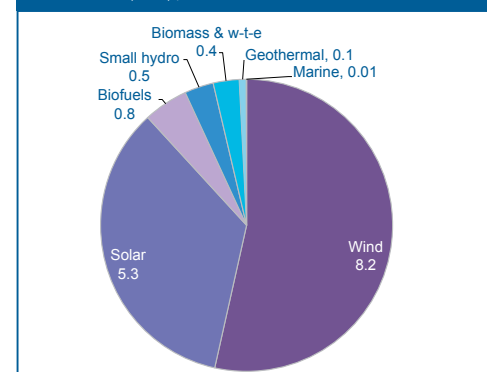
Institutional alliances and networks allow for an exchange of ideas and information that can be crucial to overcoming the perceived risk of investment in clean technologies. These networks represent a pool of collective experience that serves as a resource for potential financiers seeking information on clean energy policy, investment, and market development strategies. UNEP's energy finance networks include both public and private sector institutions, linking stakeholders across sectors and regions.

EARLY-STAGE INVESTMENT IN RENEWABLE ENERGY (PUBLIC AND PRIVATE SECTOR) BY TECHNOLOGY, 2010, \$BN



Early-Stage Investment here refers to venture capital and private equity new investments, excluding private equity buy-outs. Total values include estimates for undisclosed deals.

NEW PRIVATE SECTOR INVESTMENT IN RENEWABLE ENERGY COMPANIES BY TECHNOLOGY, 2010, \$BN



This refers to new investment in publicly-listed companies (via the public equities markets). It does not include asset finance of utility-scale projects.

Source: Bloomberg New Energy Finance, UNEP

African Rural Energy Enterprise Development Phase II (AREED II)



The African Rural Energy Enterprise Development (AREED) programme was founded on the idea that impoverished people can transform their lives and break out of the vicious circle of poverty when they are empowered by clean energy services delivered by small and medium enterprises. In a nutshell, the programme seeks to expand energy access by helping people in rural Africa start income-generating ventures using modern, clean, and reliable energy technologies. These new enterprises can meet the energy needs of under-served populations while reducing the environmental and health consequences of existing energy use, particularly low-quality biomass fuels such as wood and dung.

While AREED's first phase showed that the combination of enterprise development support and seed financing can be effective at expanding energy access, it also demonstrated that this is often not enough to get entrepreneurs focused on rural markets. Without end-user financing, it often proved difficult or impossible to reach potential users who could not pay up front for products and services. AREED II, the programme's second phase, is addressing this problem by leveraging additional financing from local banks and microfinance institutions to rural end-users, and reaching deeper into rural markets that more commercially oriented enterprises tend to avoid. Selected local organizations seeking to set up social enterprises in rural areas receive enterprise development services and targeted grant support.

Sodigaz: Liquid Petroleum Gas for Cookstoves in Mali

Sodigaz is a company based in Bamako that sells cylinders of liquid petroleum gas (LPG) for domestic use, primarily household cooking needs. In Mali, cookstoves are traditionally fueled with charcoal or wood, both of which emit CO₂ and pollutants that are harmful to both the environment and human health. Moreover, the use of wood and charcoal contributes to deforestation, a major issue in Mali. LPG offers an energy efficient alternative that not only curbs deforestation, but also emits substantially less toxins. The company is the first Malian operator in this sector, which was previously dominated by multinational companies.

When Sodigaz contacted AREED, the company was experiencing two major impediments to growth: lack of storage capacity and inadequate stock. AREED provided Sodigaz with a loan that allowed the company to increase its storage capacity and purchase more cylinders for distribution. The company worked with Malifolkcenter and E+Co to develop a viable business plan, which was financed by AREED through a loan of US\$175,000 for the purchase of gas tanks and bottles for customers. Today Sodigaz has expanded its capacity and distribution and is experiencing growth at a rate of 20% per year.

AREED II consists of four components:

- **Enterprise Development**, providing technical support and grant funding to social enterprises, enabling them to implement financially sound energy services;

- **End-User Finance**, leveraging financial services and making them available to rural microfinance organizations, enabling such groups to engage in lending for energy-related income-generating ventures at the local level;
- **Policy Support**, providing governments with energy and financing information to be used in decision making processes aimed at improving livelihoods and energy access in rural areas; and
- **Communication, Dissemination, and Outreach**, building awareness of the AREED approach and how it can be applied in other African communities.

Interlinked to these components, UNEP's Energy Finance Unit disseminates information and lessons learned to other parts of Africa where similar needs and opportunities exist.

AREED II is implemented by UNEP and funded by the Swedish International Development Cooperation Agency.



Climate Finance Innovation Facility (CFIF)

Getting a climate-friendly project or new product development through a bank's financial approval process can be a formidable undertaking. Uncertain policy environments, limited familiarity with low-carbon technologies, lack of risk management approaches—the pitfalls are many in developing country financial institutions, and there is little expertise or support available to turn ideas into action.

UNEP's Climate Finance Innovation Facility (CFIF) works with financial institutions to guide low-carbon projects through the financing process and demonstrate that investments will produce returns commensurate with the risks. In the process, CFIF encourages the development of new financial products and programmes that attract investments in low-carbon infrastructure. Promoting finance industry engagement in



Credit Financing of Solar Home Systems in Rural Nepal

Off-grid energy solutions are gaining momentum in Nepal, where over 250,000 stand-alone solar photovoltaic systems have already been installed in rural areas.

As this market could potentially grow to over 2 million, CFIF is helping Ace Development Bank in Nepal set up a credit programme with local microfinance institutions to finance solar home systems (SHS).

The approach is to leverage existing government subsidies and work with local financing institutions (LFIs) like savings credit cooperatives, agriculture cooperatives, and multipurpose cooperatives, offering them training and support so they can provide low-cost loans to end-users.

Ace dispenses the loans to the LFIs, and LFIs are responsible for repayment, after-sales service, and SHS equipment sourcing from suppliers.

In the project's first year, CFIF's support leveraged four times as much local financing for the installation of close to 1,000 SHS systems.

surate with the risks. In the process, CFIF encourages the development of new financial products and programmes that attract investments in low-carbon infrastructure. Promoting finance industry engagement in

renewable energy, energy efficiency, and sustainable forestry, CFIF supports a wide range of activities, including feasibility and marketing studies, tailor-made training courses, and information tools to educate stakeholders about climate change technologies.

The overall aim of CFIF is to mobilise and increase the financial flow into climate change solutions. By encouraging early action within the finance community, the facility helps cultivate on-the-ground leadership amongst financial players that can have replication effects across markets and geographies.

Since its inception, the facility has supported interventions through a range of financial institutions in Nepal, China, India, Pakistan, Mongolia, Indonesia, Singapore, and the Philippines. Presently operating in Asia, over time CFIF plans to expand to Africa and Latin America.

CFIF is jointly implemented by UNEP and the Frankfurt School–UNEP Collaborating Centre for Climate & Sustainable Energy Finance with the support of UNEP regional offices. It is funded by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety under its International Climate Initiative.

For more information, please visit CFIF's website: www.climate-finance.org.

Bank of Taizhou Energy Efficiency Lending Programme

Aiming to help micro and small enterprises in the Taizhou region in China reduce their energy use and costs, the Bank of Taizhou, with support from the local government, successfully designed and rolled out an energy efficiency (EE) loan product in December 2011.

In collaboration with the Frankfurt School, CFIF provided a detailed market study, a product design, and a business plan for the new financial product, as well as specialized staff training for assessing EE investments and developing EE loan products. Within two months of the roll-out, Bank of Taizhou had disbursed 20 EE loans amounting to some \$US 2 million.



Seed Capital Assistance Facility (SCAF)

Entrepreneurs can transform markets, but in many developing countries they face daunting challenges, particularly in the clean energy sector. New business ventures and project developments face difficulties securing the early stage financing they need to get through the planning and permitting stages. High transaction costs and insufficient risk-adjusted returns are the two biggest factors that keep investors from engaging in these small and somewhat risky ventures.

The Seed Capital Assistance Facility (SCAF) is designed to help investors surmount these obstacles, offering cost-sharing sup-

port to clean energy fund managers willing to include a seed investment window in their overall investment strategy. Working with the Asian Development Bank and the African Development Bank, SCAF is mobilising early investment for clean energy projects and business ventures.

SCAF offers two types of support:

Enterprise Development Support.

Through cost-sharing, cooperating fund managers provide enterprise development services to qualified local entrepreneurs. This can take the form of:

- Training “pre-commercial” clean energy entrepreneurs and project developers;
- Targeted coaching or incubator services for promising investment opportunities; or
- Co-financing of pre-investment feasibility studies.

Seed Capital Support. Funds used to cover some of the more costly elements of early stage project development, including technical assessments, fuel supply agreements, environmental impact analyses, and other aspects of the permitting process.

A few examples of SCAF’s partnerships:

Berkeley Energy’s “Renewable Energy Asia Fund”, a €86 million private equity fund investing in pre-construction renewable energy infrastructure projects in Asia, with a particular focus on India and the Philippines. In partnership with SCAF, Berkeley coaches early-stage project developers, and finances feasibility studies, legal reviews, and other soft costs.

Inspired Evolution Investment Management’s “Evolution One Fund”, Africa’s first specialised “clean tech” investment fund with approximately US\$90 million in committed capital, of which US\$5 million is focused on seed scale investments. SCAF is co-financing a programme offering project planner mentoring and guidance, as well as funding for various preparatory costs.

Frontier Investment Management’s “DI Frontier Market Energy and Carbon Fund”, a fund focusing on renewable energy and carbon credit projects in Kenya, Mozambique, Tanzania, South Africa, Uganda, and Zambia. Frontier held its first close of €60 million in 2011, and with SCAF has created a €5 million early stage investment window for seed scale debt and equity investments.

To date, five commercial investment funds have been engaged in Asia and Africa, em-

ploying a range of early stage investment strategies. In addition four fund managers have received cost-sharing support for the setting up of new funds. In total, these funds aim to realise over US\$2 billion of clean energy infrastructure in the developing world, of which US\$30 million will be invested at the early seed stage. With the support of the Global Environment Facility and the UN Foundation, SCAF is investing US\$10 million to help entrepreneurs access the seed support they need to prepare and realize these industry leading low carbon projects.

SCAF is financed by the Global Environment Facility and the UN Foundation, and implemented through UNEP, the Frankfurt School UNEP Collaborating Centre, the Asian Development Bank and the African Development Bank.

For more information, please visit SCAF’s website at www.scaf-energy.org.



Kouga Wind Farm, South Africa

SCAF and Inspired Evolution Investment Management (IEIM) have signed an agreement to help Red Cap development company set up one of Africa’s largest wind farms. At completion, the farm will generate 300MW with 121 turbines over three contiguous sites in the Kouga region of the Eastern Cape.

Through its Evolution One Fund, IEIM has leveraged SCAF support to provide early stage financing to Red Cap, which covers the cost of grid connection and engineering studies, environmental assessments, financing modelling and other preparatory measures. As these start-up costs are more expensive in South Africa, where this project is one of the first of its kind, SCAF’s participation in cost-sharing considerably enhances the venture’s prospects for success.



End-User Finance for Access to Clean Energy Technologies in South and Southeast Asia (FACET)

To date, only a small percentage of South and Southeast Asian end-users can afford to purchase clean energy technologies on a cash basis and pay up front for the long-term, low-carbon, and low-maintenance energy supply these systems can provide. With the exception of very small-scale devices such as compact fluorescent bulbs, most clean energy technologies—including biogas digesters, hydropower systems, solar water heaters and wind generators—are too capital intensive to be affordable to individual end-users on a cash basis. While some form of financing is generally needed to overcome the hurdle of up-front costs, financial institutions are often unaware of the new credit market opportunities associated with these small-scale clean technologies.

FACET's main goal is to help overcome financial barriers to implementing such technologies. The programme aims to increase domestic bank lending to end-users of these technologies in South and Southeast Asia through a combination of technical assistance and temporary financial support. Using financial mechanisms such as interest softening or partial guarantees, the programme encourages banks to build up initial loan portfolios of around 5,000 to 10,000 loans in each of the target countries. These financing schemes are open to any technology supplier that can pass a qualification process. This multi-supplier qualification strategy ensures not only minimum quality standards, but also competitive pricing and after-sales service. Each scheme aims to combine approximately €1 million

from the German government with €5 to 10 million of bank co-financing in order to finance small-scale loans for a targeted low-carbon technology. Over time, the goal is to phase out the financial support mechanism, with the intention that bank lending will continue to grow, thus establishing a commercial market that is fully sustainable without any further external intervention.

The financial support mechanisms implemented by UNEP through this project involve local governments, public and private financial institutions, state utilities, and the private sector. With the aid of these mechanisms, stakeholders will be ready to lead successful clean energy and market transformation programmes that:

- Strengthen local financial institutions' overall technical capacity and create an enabling environment for sustainable growth in the financial sector;

- Establish new market links and fill information gaps, allowing banks to better understand consumer demand for clean technologies, and in turn, encourage market-oriented policy reforms; and
- Identify barriers to renewable energy project financing, suggest practical ways to overcome them, and demonstrate a selection of financial mechanisms that support renewable energy investment.

FACET is a UNEP initiative supported by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU).

The project is an innovative public-private partnership between the German Ministry, UNEP, the Frankfurt School of Finance & Management, and the Indonesian financial sector.



END-USER FINANCE

Indonesia Solar Lending Programme

Over 80 million Indonesians currently live without access to the electricity grid. Meanwhile, the country's energy consumption is increasing by 7 percent per year.

Clean, renewable technologies like solar energy will be crucial to tackling rising energy demands, and at the same time diversifying fuel portfolios beyond oil and gas.

Compared to fossil fuels, solar technology brings several advantages: relief from fuel price volatility and supply bottlenecks, technical reliability, and an absence of greenhouse gas emissions. Solar is particularly attractive outside the national grid, especially in rural areas such as Nusa Tenggara, Sumatra, and Sulawesi where

populations have little or no access to electricity and grid extension is prohibitively expensive.

Bringing Light to Villages in Central Kalimantan

In the rural areas of Indonesia's Central Kalimantan province, grid connections are rare, and many villages are without electricity.

A pilot project supported by UNEP's Indonesia Solar Lending Programme (ISL) has helped village residents acquire small solar LED systems for household lighting, partnering with local SME entrepreneurs to increase distribution of solar technology off-grid.

These solar lighting systems consist of a small rooftop solar PV panel, a LED light with a dimmer switch and basic electronics. During the first phase of the pilot project, 38 systems were installed in rural households, allowing residents to light up their homes and more easily study, work, and take care of their families at night.

For the pilot project, ISL conducted market analysis, stakeholder consultations, and feasibility studies. ISL also conducted a three-day workshop for Lembaga Pengelolaan Dana Bergulir, a local financial institution that seeks to scale up lending for renewable energy projects, and provided business development and financial model design services for local solar vendors, notably PT Azet Surya Lestari.

The Indonesia Solar Lending Programme (ISL) has established a solar lending finance mechanism as a pilot project that Indonesian business and finance sectors can replicate. Past attempts to build up the solar market have been largely unsuccessful because they often relied on up-front capital subsidies and give-aways that did little to support market forces or contribute to commercial market growth, or else they were hindered by global economic downturns. ISL marks a shift from this subsidy mindset, providing support for a commercially oriented, self-sustaining market.

ISL uses four complementary approaches:

- Forging partnerships between end-users, vendors, and local financial institutions;
- Creating a solar lending product and a support system for lending institutions (including improved credit access for eco-entrepreneurs), and banker training;
- Setting minimum quality standards and monitoring vendor performance; and
- Improving both market and public awareness regarding solar technology.

The project is an innovative public-private partnership between the Germany Ministry of Environment (funded under its International Climate Initiative), UNEP, the Frankfurt School of Finance & Management, and the Indonesian financial sector.



Mediterranean Investment Facility (MIF)

The Mediterranean and Balkan regions have a hot and sunny climate, and many with sufficient income install Solar Water Heating (SWH) systems for their hot water needs. However, SWH can cost up to four times the totally monthly earnings of lower and middle class families. This high upfront cost presents an unscalable financial barrier for many families, even though the SWH investment can pay itself back in as little as four years. Despite this payback, loans are hard to come by because banks are reluctant to finance this little-known clean energy technology.

PROSOL: Making Solar Water Heating Accessible in Tunisia

UNEP's PROSOL programme has helped some 135,250 Tunisian households obtain solar water heaters (SWH) for their domestic water needs. Through a temporary interest rate subsidy, PROSOL significantly lowered installation costs for end-users. Contracted through local financial institutions, the loans could be repaid through utility bills, providing banks with enough of a guarantee to offer five-year loans instead of the usual three-year term.

Tunisian policy has changed as a result of the programme: SWHs are now eligible for the energy subsidy that was previously only applied to liquid petroleum gas.

Similar approaches are being applied in 11 other countries and new market support mechanisms have been created under the PROSOL umbrella: PROSOL Tertiary for the tourism and services sector, PROSOL Industrial for the industrial sector, and most recently, PROSOL Elec, which promotes photovoltaic technology for the residential sector.

The Mediterranean Investment Facility (MIF) develops and tests different options to increase available financing for renewable energy and energy efficiency systems such as SWH in Tunisia, Morocco, Egypt, FYR Macedonia, and Montenegro. With the cooperation of local governments and public and private financial institutions, the project

implements a range of financial support mechanisms including:

- financing incentives, such as an interest rate buy-down for solar home system financing;
- a guarantee facility to secure commercial loans and lower interest rates;
- investment advisory services that help banks or other financial institutions evaluate small- and medium-scale investments;
- guidance on creating specialized credit facilities, clean energy funds, and investment vehicles; and
- bank loan officer training and end-user awareness-raising campaigns.

A few examples of MIF's activities:

- In Morocco, MIF is helping to transform the market for energy efficient lighting, paving the way for phasing out incandescent lighting and creating huge energy savings. The project is working to boost policy incentives, establish standards for compact fluorescents and other energy

efficient lighting, stimulate end-user financing, and raise consumer awareness.

- In Egypt, MIF is encouraging the hotel industry to install SWH systems through a combination of subsidies, awareness raising, and training workshops, and by establishing quality standards for SWH suppliers. So far, eight solar thermal installations were completed, totaling over 1,000 m² of solar modules.
- In Montenegro, MIF is allowing local banks to finance SWH end-users through preferential terms such as interest-free loans, and thus activate the SWH market. These incentives will permit end-users to spread the cost over up to seven years.
- In Tunisia, MIF has shown significant results since it was established in 2004. Its PROSOL programme (see box) has created a sustainable market for SWH and a large number of jobs and new micro-enterprises.

MIF is a joint initiative under UNEP and the Italian Ministry for Environment Land and Sea (IMELS).

Global Solar Water Heating Market Transformation and Strengthening Initiative (GSWH)

While MIF addresses SWH market development in the Mediterranean region, GSWH works to accelerate the commercialization and sustainable market transformation of SWH on a global scale. Working with local finance institutions, vendors, power utilities, and other stakeholders, GSWH seeks to develop new financing models or apply existing ones to help make SWH an affordable option for end-users. UNEP's primary contribution has been a global knowledge management platform that acts as a worldwide forum for SWH experts and others interested in the development of this market. The platform can be accessed at www.solarthermalworld.org.

GSWH is also implementing activities through national programmes in five countries: Albania, Chile, India, Lebanon, and Mexico. Part of the mission of these country programmes is to enhance the demand for SWH by offering attractive end-user finance. In Mexico and Chile, UNEP is offering technical assistance in designing financial mechanisms geared towards end-users.



African Carbon Asset Development Facility (ACAD)



In recent years, carbon finance has yielded billions of US\$ in transactions, demonstrating its value as a revenue-generating resource. The clean technology projects supported by carbon finance help buyers meet emission reduction targets, and help communities in developing countries attract new investment, create jobs, and lower energy costs. But while the Clean Development Mechanism (CDM), the primary carbon finance market mechanism, includes some 4,000 registered projects, only about two percent of those are in Africa, whose rich carbon finance potential has yet to be realized.

The primary factor contributing to Africa's limited performance in the carbon markets is the lack of project finance and local carbon expertise. This has established a pattern where innovative projects go unrealized due to lack of finance, and financiers hesitate to venture into new sectors for lack of successful projects to emulate. The ACAD Facility was designed to break this pattern and unlock Africa's carbon finance potential.

ACAD supports local project developers and local financial institutions. Through targeted financial and technical support, ACAD puts in place the tools needed for tapping into carbon finance opportunities and market growth. By providing successful project models, the Facility stimulates similar projects elsewhere in Africa that can be produced with lower transaction costs, and are thus more attractive to investors. During its first phase (2009–2011) the facility supported 14 projects in nine African countries, at an average of US\$ 60,000.

ACAD offers three complementary support lines:

Transaction Cost Sharing - Targeted grants are directed through financial institutions to cover upstream development costs and enable projects to reach financial closure. These costs can include critical steps in the CDM process such as PDD finalization, project validation, and business plan development.

Technical Assistance to Financial Institutions - Project clinics and one-on-one technical assistance helps African financiers and project developers tackle key issues throughout the advanced stages of the carbon project development cycle.

Stakeholder Outreach and Mobilization and Methodology Development - Hosted by local partner financial institutions, ACAD experts train staff and develop a tailored training curriculum. ACAD also works with institutional stakeholders to develop tools to stimulate market development, such as standardized baselines and a directory to help carbon investors find skilled local partners in Africa.

In its second phase, the Facility is expanding into new countries and offering grant funding for 20 new projects, placing emphasis on programmatic CDM activities (PoAs), and financing projects in Least Developed Countries.

ACAD is funded by the German Ministry for the Environment through the International Climate Initiative (BMU ICI). For more information, please visit the project's website at www.acadfacility.com.

Cogeneration: Producing Energy and Reducing Carbon Emissions in South Africa

In the usual manufacturing process, the production of ferrochrome—an essential ingredient of stainless steel—releases significant amounts of CO₂ into the atmosphere. But with the support of ACAD, International Ferro-Metals (IFM) has harnessed its carbon-laden waste gas to generate energy.

IFM installed a cogeneration facility at its ferrochrome smelting plant that collects and cleans the plant's waste gas and uses it to produce 17MW of carbon-neutral electricity, with a target of 140,000 MWh per year. The cogeneration facility supplies around 12 percent of the smelting factory's electricity needs, helping to ensure continuous operation in a region where energy shortages are frequent.

This project was the first of its kind in the ferrochrome industry, creating a replicable model for similar ventures elsewhere in Africa and the world. ACAD grants helped with CDM-related costs such as PDD development, validation, and registration. IFM partners with AAP Carbon, a carbon asset firm, to coordinate the CDM process.



Carbon Finance for Agriculture, Silviculture, Conservation and Action against Deforestation (CASCADe)

Operating in seven sub-Saharan African countries, CASCADe helps project developers make climate change mitigation projects a reality in rural Africa. The programme's primary goal is to enhance expertise in generating carbon credits through Land Use, Land Use Change and Forestry (LULUCF) and bioenergy projects. Since 2007, CASCADe has been providing customized technical assistance, support, and capacity building for project developers, national climate change institutions, and carbon project stakeholders in Benin, Cam-

eroon, the Democratic Republic of the Congo, Gabon, Madagascar, Mali and Senegal. Despite the increase in global carbon finance transactions, carbon finance projects in sub-Saharan Africa are still being bypassed by commercial investors and project developers. Among other obstacles is the misconception that the potential for carbon finance in Africa is limited, when in fact the demand for forest carbon is growing rapidly. Other barriers include prohibitive transaction costs, high risks, and a lack of regulatory and institutional frameworks.

CASCADe is addressing these issues by providing **technical assistance** for projects such as community reforestation, commercial forestry, and energy ventures; holding **training workshops** for national Clean Development Mechanism (CDM) stakeholders; and offering **targeted support** to national CDM institutions.

By supporting replicable projects in the forestry, agriculture and bioenergy sectors, CASCADe is opening up opportunities for African participation in both the CDM and the voluntary carbon markets. Through a hands-on, learn-by-doing approach, local developers are given the opportunity to develop and prepare PINs and PDDs (key carbon reference documents), and prepare for the later stages of project development. The programme also links buyers and sellers, and facilitates regional cooperation and exchange.

A few examples of CASCADe-supported projects:

- An agro-forestry project on the Bateke plateau in the Kinshasa region of the Democratic Republic of the Congo that will both enhance carbon sinks and provide a renewable charcoal supply for the capital city;

Protecting Mangroves and Livelihoods in Cameroon

The mangrove estuaries of Cameroon are a precious natural resource that is vital to both wildlife and local communities. Among other things, they provide a refuge to many species of fish, which in turn serve as food and income for local residents. Unfortunately, deforestation and inadequate management is threatening these essential ecosystems. CASCADe supported the Cameroon Wildlife Conservation Society's efforts to increase protection of mangrove forests in the Douala-Edea nature reserve, offering technical support and CDM-related training for an innovative energy-efficiency project that will reduce the use of mangrove for firewood.

The project aims to improve traditional fish smokehouses so that they use significantly less fuel. As these smokehouses are primarily fueled with mangrove wood, the improved technology helps reduce deforestation and degradation of the mangrove estuary. Thanks to CASCADe, the project has been able to complete and validate a Project Design Document (PDD), and has been submitted for validation by the UNFCCC. One of the few CDM projects based in Cameroon, it is now in a good position to attract carbon financiers.

- A project that protects estuary mangroves in Cameroon by promoting improved fish smokehouses that use less mangrove wood (see box); and
- A cogeneration plant in the Lastourville region of Gabon that will produce heat and electricity using wood waste from a neighbouring sawmill—replacing diesel fuel.

The programme has also developed reference documentation and an expert network, both of which are available at the www.cascade-africa.org website.

The programme is jointly implemented by UNEP and UNEP Risoe Centre and funded by the Fonds Français pour l'Environnement Mondial.



CDM Loan Scheme

Launched in April 2012 during the Africa Carbon Forum in Addis Ababa, the CDM Loan Scheme is designed to support Clean Development Mechanism (CDM) projects in countries that have not yet fully participated in the carbon market, especially Least Developed Countries (LDCs). CDM projects help reduce greenhouse gas emissions and contribute to sustainable development, a boon to both the environment and the economies of developing countries.

Under the scheme, project developers in countries with less than 10 registered CDM activities, including most LDCs, can obtain interest-free loans for CDM-related costs such as PDD development, validation, reg-

istration, monitoring, and verification. Loans are to be repaid as soon as Certified Emissions Reductions (CERs) are issued. While there are no defined limits on loan amounts, on average loans are expected to be around US\$ 100,000. Some 100 loans will be provided over a five-year period.

Implemented by the United Nations Office for Project Services (UNOPS), the scheme will receive technical support and evaluation services from the UNEP Risoe Centre. Executive decisions on loan applications are made by an independent board. In addition to the project developers and UNOPS, a CDM consultant acts as a third party to the loan agreement.

An electronic loan application platform went online at the programme's launch: www.cdmloanscheme.org. This website, which is linked to the CDM Bazaar (www.cdm-bazaar.net), includes an electronic loan application form, as well as a roster of experienced CDM consultants who can help develop documentation for the CDM process and move projects forward.

The scheme is particularly timely for LDCs, since, from 2013 onwards, the European Union's Emissions Trading System (EU ETS) will only accept CERs related to new projects registered in these countries. And since many of the LDCs are in Africa, the CDM Loan Scheme offers an opportunity to expand the African access to the carbon market.



National Climate Finance Institutions Support Programme (NCFISP)



As climate change mitigation and adaptation financing becomes increasingly available to developing countries, these countries are looking for ways to manage funds. With the country-driven, direct access approach in mind, some countries are establishing national funding entities. Creating these new entities entails acquiring new skills and overcoming capacity constraints. NCFISP, also known as “Fit for the Funds,” brings these institutions together in a forum where they learn about climate finance and share experiences regarding publicly financed mitigation and adaptation measures. National climate finance institutions in an early stage of development, especially those in Least Developed Countries (LDCs), receive a range of practical services to develop technical know-how, innovative financing approaches and joint pilot projects. The programme consists of three components:

Forum

The forum provides a venue for exchanging information, experiences, and best practices, allowing participants to develop joint research projects according to mutual interests and needs. Training on key aspects of financial management is offered, and modern electronic communication tools and face-to-face meetings are used to facilitate focused dialogue between participants.

Technical Assistance

NCFISP offers customized technical support for national finance entities in LDCs, building their capacity to access and effectively utilize international climate finance

mechanisms. This component also facilitates peer-to-peer exchanges through practical training and learning opportunities, and develops new mechanisms for financing adaptation and mitigation projects.

Climate Finance Policy Dialogue

NCFISP brings lessons from practitioners on the ground in developing countries to international climate finance negotiations, particularly regarding the design and operation of the Green Climate Fund. Business models are explained and demonstrated, including those that use public funds to scale up finance by mobilizing private capital. NCFISP identifies institutions' needs in regards to accountability, such as performance indicators and fiscal, environmental, and social safeguards.

The project is jointly implemented by UNEP and the Frankfurt School - UNEP Collaborating Centre for Climate & Sustainable Energy Finance. It is funded by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety under its International Climate Initiative.

For more information, please visit the NCFISP website at <http://ncfisp.fs-unesp-centre.org> or www.unep-fin.org



UNEP Bilateral Finance Institutions Climate Change Working Group (UNEP BFI CCWG)

Formed in 2009, the UNEP BFI Climate Change Working Group is comprised of five public finance institutions (PFIs) that have come together to advance efforts to channel financial resources towards climate change mitigation and adaptation. Other relevant PFIs are welcome to join. Together, they represent many years of hands-on experience in development cooperation and climate change finance projects around the world.

The Working Group is comprised of financial institutions that are set up to finance development projects in developing countries and emerging markets. The current members are: Agence Française de Dével-

oppement (AFD), KfW Entwicklungsbank (Development Bank, Germany), Japan International Cooperation Agency (JICA), Nordic Environment Finance Corporation (NEFCO), and European Investment Bank (EIB). These five institutions make up over 40% of public climate finance flowing to developing countries worldwide.

The UNEP BFI CCWG serves as a platform for:

- sharing experiences and best practices;
- catalyzing joint activities;
- providing increased visibility and impact; and
- developing new partnerships, co-financing, and tools.

The Working Group publishes an annual mapping report outlining members' climate change financial flows to developing countries. In 2011, the Working Group also published a study called Innovative Climate Finance, which details the innovative financial instruments implemented by members. These reports are available from the UNEP energy branch website: www.unep.org/energy, or www.unep-fin.org.

For more information, please visit www.unep-fin.org.



UNEP Sustainable Energy Finance Alliance (UNEP SEF Alliance)

The only international convening body for public finance agencies in the clean energy sector, the UNEP SEF Alliance is a network that promotes effective public finance mechanisms for clean energy. Through the network, members receive vital support for their energy finance ideas by sharing knowledge and pooling resources with organisations in other countries that are tackling the same challenges.

Current members include Sustainable Technology Development Canada (STDC), Corporación de Fomento de la Producción de Chile (CORFO), Finnish Innovation Fund (SITRA), Sustainable Energy Authority of Ireland (SEAI), Fideicomisos Instituidos en Relación con la Agricultura Mexico (FIRA), and the UK Carbon Trust. Each member finances the development of sustainable energy markets in its respective region and fund managers use the Alliance platform to exchange best practices and launch collaborative projects.

UNEP SEF Alliance's activities include:

- Bi-monthly webinars – Led by experts and members, webinars are offered on a specialized topic and participants are invited to share best practices in an informal discussion.
- Mapping public finance mechanisms (PFMs) – The Secretariat is building a database of current and emerging PFMs implemented around the globe. Members have access to the database.
- Specialised research – UNEP SEF Alliance members jointly produce a variety of assessments to collect, advance, and share their expertise.

For more information, or to download the above-mentioned publications, please visit the Alliance's website: www.unepsefalliance.org, or www.unep-fin.org.



United Nations Environment Programme Finance Initiative (UNEP FI)

The UNEP FI concept was launched in 1991 with the mission of bringing together a broad range of financial institutions—including commercial, development and investment banks, asset managers, and insurance companies—for constructive dialogue on the nexus between financial performance, environmental protection, and sustainable development. A secondary objective was to foster private sector investment in environmentally sound technologies and services.

A unique global partnership between UNEP and the global financial sector, UNEP FI works closely with over 200 financial institutions. Its mandate is to identify, promote, and mainstream the adoption of best environmental and sustainable practices by financial institutions and policy-makers. The backbone of the partnership is the UNEP Statement of Commitment by Financial Institutions on Sustainable Development, through which members openly recognize the role of the financial services sector in making the global economy sustainable, and commit to integrating environmental and social considerations into all aspects of their operations.

UNEP FI's activities include research, training, and advocacy. The initiative works collaboratively to find innovative approaches to issues around finance and sustainability. Core themes include banking, insurance, investment, property, sustainable finance, and climate change. UNEP FI channels its work on this last topic through its Climate Change Work Stream.

Its mission is to:

- Help define the role of the financial services sector and capital markets in the transition towards low-carbon and climate-resilient economies.
- Raise awareness of the challenges, risks and opportunities related to climate change for financial institutions, as well as their clients and investee companies.
- Develop policy recommendations, particularly at the international level, that help channel private sector skills, funds and expertise into mitigation and adaptation activities; and provide private sector input to the UNFCCC process.
- Equip financial institutions with the capacity, tools and guidelines they need to integrate climate change issues decision-making practices.

For more information, please visit the UNEP FI website: www.uneppi.org, or www.unepp-fin.org.



Mobilizing Climate Finance

UNEP's Energy Finance Unit is working with the finance sector to help create the climate for change. Reports have been prepared on a range of key climate finance issues with support from the UNEP Finance Initiative, the UNEP Collaborating Centres, the UNEP SEF-Alliance, and other partners. Some recent examples are listed below.

“Financing Renewable Energy in Developing Countries: Drivers and Barriers for Private Finance in sub-Saharan Africa” - how private finance can address obstacles to the scaling-up of sustainable energy solutions in Africa.

“Evaluating Clean Energy Public Finance Mechanisms” highlights leading practices in the design and delivery of clean energy public finance mechanisms.

“Re-launch of AND YET IT MOVES – success stories and drivers of CDM project development in sub-Saharan Africa” - real-world examples show it is possible to combine financial and environmental returns.

“Why Clean Energy Public Investment Makes Economic Sense - The Evidence Base” shows how countercyclical public investment in sustainable energy can be a sound economic response to recession.

“The materiality of climate change: How finance copes with the ticking clock – The perspective of capital markets” describes best practices on climate change finance, identifying risks and opportunities.

“Catalysing Low-Carbon Growth in Developing Economies” examines innovative public finance mechanisms to scale up private sector investment in climate solutions.

“Global Trends in Sustainable Energy Investment Report” is an annual overview of capital flows and an elaborate analysis of the trends and issues in the financing of renewable energy.

“Publicly Backed Guarantees as Policy Instruments to Promote Clean Energy” - the advantages and disadvantages of different types of publicly-backed guarantee structures at various stages of clean energy development.

“Weathering the Storm - Public funding for low-carbon energy in the post financial crisis era” suggests that low-carbon clean energy funding should not be reduced, but expanded even in the global economic crisis.

“Public Finance Mechanisms to Mobilise Investment in Climate Change Mitigation” - an overview of mechanisms being used by the public sector to help scale up the climate mitigation markets.

To obtain publications in printed or digital format, please visit www.unep.org/climatechange/finance.



About the UNEP Division of Technology, Industry and Economics

Set up in 1975, three years after UNEP was created, the Division of Technology, Economics (DTIE) provides solutions to policy-makers and helps change the business environment by offering platforms for dialogue and co-operation, innovative policy options, pilot projects and creative market mechanisms.

DTIE plays a leading role in three of the six UNEP strategic priorities: climate change, harmful substances and hazardous waste, resource efficiency.

DTIE is also actively contributing to the Green Economy Initiative launched by UNEP in 2008. This aims to shift national and world economies on to a new path, in which jobs and output growth are driven by increased investment in green sectors, and by a switch of consumers' preferences towards environmentally friendly goods and services.

Moreover, DTIE is responsible for fulfilling UNEP's mandate as an implementing agency for the Montreal Protocol Multilateral Fund and plays an executing role for a number of UNEP projects financed by the Global Environment Facility.

The Office of the Director, located in Paris, coordinates activities through:

- > **The International Environmental Technology Centre** - IETC (Osaka), which implements integrated waste, water and disaster management programmes, focusing in particular on Asia.
- > **Sustainable Consumption and Production** (Paris), which promotes sustainable consumption and production patterns as a contribution to human development through global markets.
- > **Chemicals** (Geneva), which catalyses global actions to bring about the sound management of chemicals and the improvement of chemical safety worldwide.
- > **Energy** (Paris and Nairobi), which fosters energy and transport policies for sustainable development and encourages investment in renewable energy and energy efficiency.
- > **OzonAction** (Paris), which supports the phase-out of ozone depleting substances in developing countries and countries in transition to ensure implementation of the Montreal Protocol.
- > **Economics and Trade** (Geneva), which helps countries to integrate environmental considerations into economic and trade policies, and works with the finance sector to incorporate sustainable development policies. This branch is also charged with producing green economy reports.

DTIE works with many partners (other UN agencies and programmes, international organizations, governments, non-governmental organizations, business, industry, the media and the public) to raise awareness, improve the transfer of knowledge and information, foster technological cooperation and implement international conventions and agreements.

For more information,
see www.unep.org/dtie

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Laying the groundwork for clean technology investment, UNEP's energy finance activities aim at building skills, raising awareness and reducing investor risks, so that when the right stakeholders are brought together, financing happens.

This brochure details UNEP's energy finance strategy: building sustainable markets by using public sector funds to attract private investment. Fourteen different UNEP energy finance projects, initiatives, and alliances are summarized in this booklet, covering end-user and carbon finance, innovative financial mechanisms, and finance networks for pooling resources and sharing knowledge.