

Open for Business



REED
rural energy enterprise development



*Entrepreneurs, Clean Energy and
Sustainable Development*



UNITED NATIONS
FOUNDATION™

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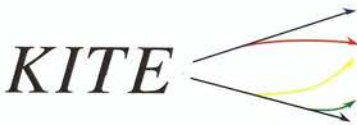
Programme partners



UCCEE



Country partners



CEEEZ



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Before you read this publication...

...consider that hundreds of billions of dollars have been invested in development over the past two decades; yet many of the world's poorest people still rely on traditional forms of energy, mostly woodfuels, dung and crop wastes. These energy resources are often expensive, inefficient, and damaging to the health of humans and the environment. Exposure to indoor pollution from this energy use has been estimated to cause 4-5 percent of the global burden of disease and is one of the leading causes of childhood and infant mortality.

The lack of access to modern energy services is directly linked to the fact that past development efforts, though well intentioned, haven't been able to break the cycle of poverty. Improving energy access can enable education and communications, protect health and environmental values and promote economic growth – all necessary to alleviate poverty.

A reliable and secure supply of energy is thus a *fundamental* and essential element of any form of national or regional development. Further, providing *clean* energy from a renewable energy or energy efficiency technology is the basis for *sustainable* development.

Over the past decade, much has been learned about sustainable development, including the essential role that energy plays. As experience with many clean energy technologies increases, so does technical progress, which has dramatically lowered the cost of energy from sources such as modern biomass technologies and wind energy. The focus has now shifted from one of technology, demonstrations and gifts to that of *empowerment, markets and investments*.

Under new forces of market restructuring, the focus of governments is also shifting from centrally planned approaches to public-private partnerships, and to the creation of competitive environments conducive to private sector investments in clean energy.

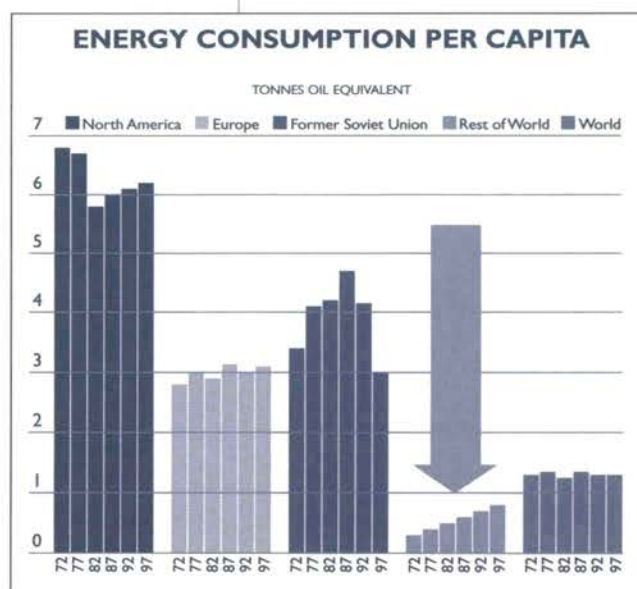
Within this shift, there is an enormous opportunity for new *enterprises* to deliver clean energy services to the more than 2 billion people who need them. Creating, financing and developing these new services using an *enterprise centred approach* pioneered by non-profit clean energy investor E+Co is the heart of a partnership between the United Nations Foundation (UNF), the United Nations Environment Programme (UNEP), E+Co, and local non-governmental organisations such as ENDA (Africa), BRASUS (Brazil) and The Nature Conservancy (China). The *rural energy enterprise development* approach, called REED, is fully explained in the following pages.



Klaus Töpfer,
UNEP Executive Director



Tim Wirth,
UNF President

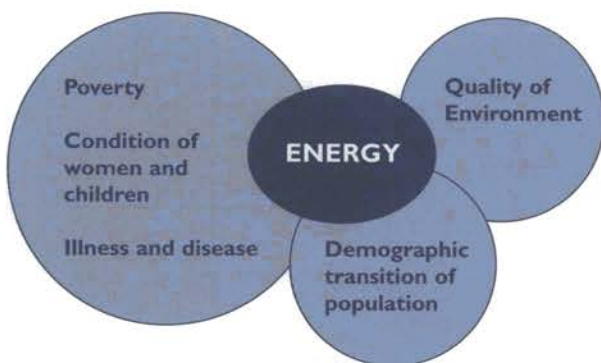


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The UNF and UNEP have invested considerable resources in this effort because we believe that new and innovative approaches such as REED are needed to *simultaneously* address the multitude of development and environment challenges facing many of the world's poorest countries. The direct economic, social and environmental benefits resulting from these new approaches can benefit us all. Development based on clean energy, for example, can reduce local air pollution while also addressing global climate change.

THE ENERGY-DEVELOPMENT-ENVIRONMENT INTERCONNECTION



Energy enterprise development, and the seed financing it provides, can thus leverage much greater outcomes than simple financial return on investment. *The demonstration effect* alone is quite powerful, particularly when the effect is a clean energy service and an entrepreneur making money.

We invite you to read this publication carefully and to use the lessons and experience to help create a future of economic, social and environmental prosperity that is the core of sustainable development.

Klaus Töpfer,
UNEP Executive Director

Tim Wirth,
UNF President

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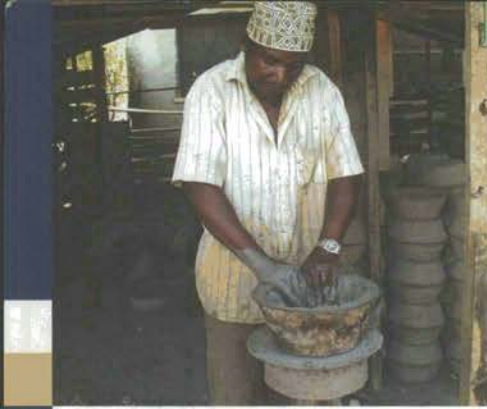
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A New Approach to Energy and Sustainable Development

Rural entrepreneurs are key drivers of new clean-energy technologies, particularly for household lighting and productive uses in small industry, agriculture and water supply. But few clean-energy industries exist, and the challenges of rural enterprise development and financing are large. New models of enterprise development and financing are needed, along with adoption of proven methods.

- Global Environment Facility Roundtable on Sustainable Development, January 2002

WHY CLEAN ENERGY?

In terms of development, clean energy – energy efficiency and renewable energy – can often provide substantial environmental improvements in addition to needed energy services. Consider:

- Deforestation from unsustainable wood fuel collection is a pressing problem in sub-Saharan nations, who will experience severe shortages by 2025.
- Indoor air pollution from the inefficient burning of wood, crop waste and dung causes an estimated two million premature deaths a year and is a leading cause of child mortality.

Rashid Phiri is an intrepid inventor and craftsman living in Zambia's capital, Lusaka. Along with more than 90% of Zambia's population at the start of the 21st century, Mr. Phiri's household cooked their meals on traditional stoves using charcoal or firewood. The task was less than pleasant – the stoves are only 10% efficient, last just 12 to 18 months, and produce substantial indoor smoke and soot.

Then he learned about an improved stove developed in Kenya – the ceramic Jiko – a stove that is more than twice as efficient and lasts 8 years. After buying one and testing it, he discovered that the Jiko produced not only better cooking heat, but also reduced the household consumption – and cost – of charcoal and the resulting exposure to indoor smoke and soot. A business making and selling improved stoves, Mr. Phiri concluded, was a good idea.

In his business, Rasma Engineering, he began a new activity making and selling the improved stove, but soon encountered a common obstacle to new ideas: success. His stoves became popular, but to meet the increasing demand he needed to expand production, initially from 50 to 600 stoves per month. He faced the dilemma of finding and managing the additional investment with his limited formal business skills. He first went to a conventional financial institution – the local bank.

“Being a very small business, the bank would not even recognize me,” he says.

Mr. Phiri's dilemma is not unique. In many regions of the world, good ideas from innovative local entrepreneurs would make a real difference to the lives of millions of people living without modern energy services. But they are often not tried, simply because the small amounts of money needed to try them – and the skill to use the money successfully – are just not available.

Yet, hundreds of billions of dollars have been invested in development over the past two decades. So why haven't the world's poorest countries traveled further down the road to sustainable development? The answer is complex but linked to the fact that past development efforts, though well intentioned, haven't been able to break the cycle of poverty – a cycle directly linked to the provision of energy.

In the energy sector, international development stakeholders and investors have too often ignored the potential of innovative local enterprises to deliver essential energy services. This is due to a number of factors: the enterprises such as Mr. Phiri's were too small; they operated in remote, rural areas; they maintained no formal book-keeping; and because development agencies and governments often believed that centralised programs were the best means to deliver those services.

However, much has changed and been learned about the means to successfully overcome the hurdles to sustainable development, including the essential need to



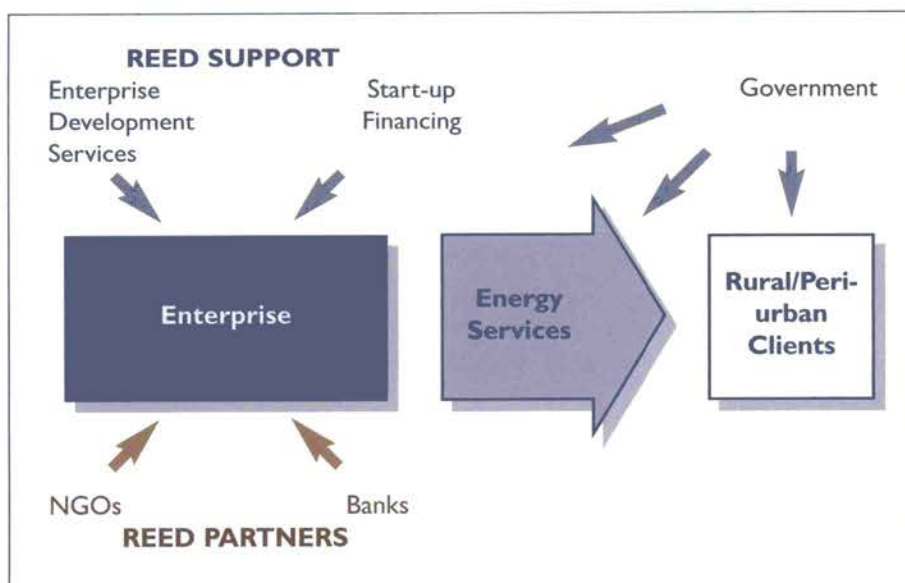
provide clean, modern and reliable forms of energy. Today, the focus has shifted from one of technology, demonstrations and gifts to that of *empowerment, markets and investments*. Under new forces of market restructuring, the focus of governments is also shifting from centrally-planned programmes to public-private partnerships and to the creation of competitive environments conducive to the private sector.

Today, real opportunities exist for small enterprises to produce and deliver clean, modern and affordable energy services to the nearly 2 billion people who do not have them. There is now a general recognition that one of the most potent engines in this shift towards a local human capacity to produce and distribute modern energy services is an *enterprise* powered by an *entrepreneur*.

This is the heart of an *energy enterprise development* model focused on delivering energy services via *renewable energy* and *energy efficiency* to rural and peri-urban areas – referred to commonly as *REED*. The model has been pioneered by E+Co – a non-profit clean energy investor – and advanced by a partnership between E+Co, the United Nations Environment Programme (UNEP), the United Nations Foundation (UNF), and a diverse group of in-country NGO partners (see ‘Strength in Partnership’ page 9). This new model targets innovative clean energy enterprises that have difficulty gaining access to traditional financial institutions. The lack of investment at the earliest stages of a business – and the lack of guidance to find the right investment – often leads to a slow ‘starvation’ of the money new and promising enterprises need to test new business approaches and grow.

WHAT IS A REED ENTERPRISE?

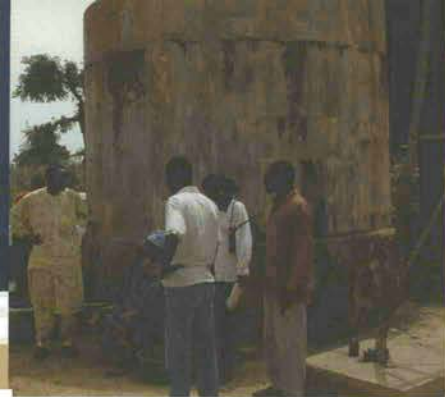
The type of enterprise of interest to REED is one that uses a clean energy technology to provide a sustainable energy service to unserved communities, and one that is cleaner than the status quo. The enterprise need not be a private entity, but the service provided must be ‘business-like’ and its business plan financially viable.



Photos

More efficient cookstoves can reduce fuel use and indoor pollution. In some designs, the process begins with a clay liner (top left) that is then fired in a kiln (top right) and then inserted into the stove casing (bottom right).





Photos

In Senegal, many of the country's windpumps (above) do not work due to lack of maintenance and spare parts. VEV is a small company (top) using REED support to expand its business repairing and servicing these windpumps.

REED provides support to enterprises through a combination of extensive business development services and 'seed financing'. Together, this combination creates the opportunity for new businesses to test and refine their new enterprises to the point where they will interest outside investors. This combination of entrepreneurial mentoring and initial seed financing forms a missing link to sustainable development; creating a bridge from an idea to a capable commercial enterprise.

The REED Approach

Successful enterprises are usually a combination of good business skills, a verifiable demand for a particular good or service, and the financial resources to innovate and take risks. Often, an entrepreneur will attempt to launch a new venture without addressing all three elements, which greatly lowers their potential for success.

To increase the likelihood that clean energy ventures will succeed, REED offers a package of services designed to nurture entrepreneurs, their ideas, and the new businesses they create. These services are delivered through a *country enterprise development partner*⁽¹⁾ who builds a relationship with the entrepreneur that extends through the entire cycle of enterprise development.

This relationship usually begins with a formal training session, but then advances quickly – if the entrepreneur is ready – to one-on-one mentoring that takes him or her through the process of assessing business feasibility and eventually to the preparation of a business plan.

Working with E+Co and the country partner, an entrepreneur with a business plan meeting certain criteria can receive seed financing to start or expand a business. The form of this seed finance depends both on the needs of the enterprise and its capacity to repay a financial obligation. In some cases, the finance is provided as a loan to be repaid over a term that matches the revenue projections of the new enterprise. Alternatively, REED can become a true partner

with the company by taking an *equity* position; in essence, buying part of the company. Both methods are positioned to help move the business forward in the most productive and profitable way. In certain circumstances, REED may also share financial risk with a local bank through a partial financial guarantee of an entrepreneur's loan or a customer credit facility.

REED programmes operate financially as revolving funds (where financial returns from one enterprise are invested in other enterprises), which target more broadly defined *development* outputs than simple

PUMPING UP BUSINESS IN SENEGAL

VEV is a small company with a market niche in the repair and maintenance of wind-powered water pumps (windpumps). There is a good market for this service as about 90% of the country's windpumps are inoperative. Although the company has been operating profitably for the last 8 years, a lack of working capital has limited its capacity to stock spare parts and thus provide a timely service. With a \$17,000 REED loan and enterprise development support from REED country partner, Enda Energie, VEV is expanding its inventory, shortening service times, and offering short-term credit to qualified customers. Together, these services should help to ensure that most windpumps in Senegal become – and remain – able to supply vital water for rural communities.



financial returns. Consequently, REED financing is *patient* and can be tailored more directly to the actual needs of a young enterprise.

This is a form of concessional finance, but it should *not* be considered 'easy money'. Helping an enterprise and an entrepreneur build a credible financial track record is a necessary pre-requisite to be considered *creditworthy* by conventional financial institutions. As REED assistance usually does not provide all of the finance an enterprise may require to reach commercial success, the terms of the financing package are usually designed with a 'second stage' investor in mind (see 'Enabling Financial Institutions' in next chapter).

Building a revenue base while repaying a REED loan creates the type of financial profile needed to attract more conventional forms of finance. Achieving this goal would be less likely to occur if REED provided grants or zero interest finance. This is because the banks would see the enterprise as a demonstration project; not a real business for commercial investment. REED's 'concession' is less in the terms of finance (the interest rate terms may be similar, for example) than in the level of risk it is willing to bear – risk that allows an entrepreneur to experiment and innovate with new approaches to the delivery of clean energy services.

In the case of Mr. Phiri and Rasma Engineering, the REED programme in Africa, AREED (see REED Programmes, page 10), provided a modest loan of \$20,000⁽²⁾ to expand his cookstove production to meet increasing demand. AREED is also providing Mr. Phiri with longer-term business development skills, including exposure to the experience of other REED investments. The REED country partner in Zambia – the Centre for Energy, Environment and Engineering (CEEEZ) – maintains a close relationship with Mr. Phiri and works in collaboration with E+Co to help position Rasma Engineering for possible 'second-stage' investment.

Mr. Phiri is a good example of an innovative energy entrepreneur contributing to the development of new methods, new markets and new industries to meet the diverse challenge of providing the energy for sustainable development. Each REED enterprise is structured to offer some form of clean energy product or service in a commercially sustainable manner, such as fee-for-service PV electrification,⁽³⁾ efficient cookstoves or solar-dried food products. In some cases, the enterprise works with government agencies to provide these services; thus demonstrating new models of public-private partnership.

While the local country partners work with E+Co to support the entrepreneurs, they also work directly with UNEP to help governments create and implement policies that favour the development of the clean energy enterprise sector. REED aims to assist government agencies and other institutions to consider, develop and implement policies that remove market barriers and address market failures, including the removal of import duties, measures to encourage finance and tax incentives.

(1) For the remainder of this document we refer to these organizations as simply 'country partners'.

(2) Unless otherwise noted, all monetary amounts in this document are in US dollars.

(3) Fee-for-service PV electrification is a business model where a PV system is installed on a home or building, but the customer pays only a monthly or quarterly fee for the electricity it produces.



Photos

A key strength of REED programmes is the partnerships with local NGO's (above opposite) who act as country partners to deliver enterprise development services to prospective entrepreneurs (above).

Seed, Patient and Commercial Capital

A key element of REED is providing a small initial financial investment called *seed capital* (also called *start-up capital* or *seed finance*) to transform a good idea – and a capable entrepreneur – into a specific business that delivers improved energy services. This concept should not be confused with that of 'microfinance', which is targeted at smaller economic activities such as the purchase of individual livestock. By contrast, REED is targeted at developing small to mid-sized companies. The amount of seed capital can start at several thousand dollars, particularly if a new enterprise needs the funds to simply pilot a new business activity, or reach \$120,000 to take a new enterprise from a tested approach to a proven commercial business.

INVESTMENT PHILOSOPHY

The REED Seed Finance facilities provide early stage debt or equity investments to energy enterprises identified and supported through REED programmes. Investments are placed in higher risk enterprises that cannot be funded through conventional sources. The willingness to take more risk than conventional sources, combined with the provision of enterprise development services, are the main concessional aspects of REED financing.

Equity investments are structured to provide returns commensurate with project risk that are consistent with "pilot" or early stage capital. Wherever possible, investments are structured for REED to exit the equity investment, including options to allow the future sale of the equity shareholding to the founders or other interested parties.

Debt investments are structured with reasonable terms and conditions. Terms and conditions include the interest rate, currency of repayment, length of loan, grace period and security. The interest rate is determined based on a number of factors, including: the current market rates available for small and medium start up enterprises in each country; the underlying "risk" of the enterprise investment; and the cash flow of the enterprise (what can it afford).

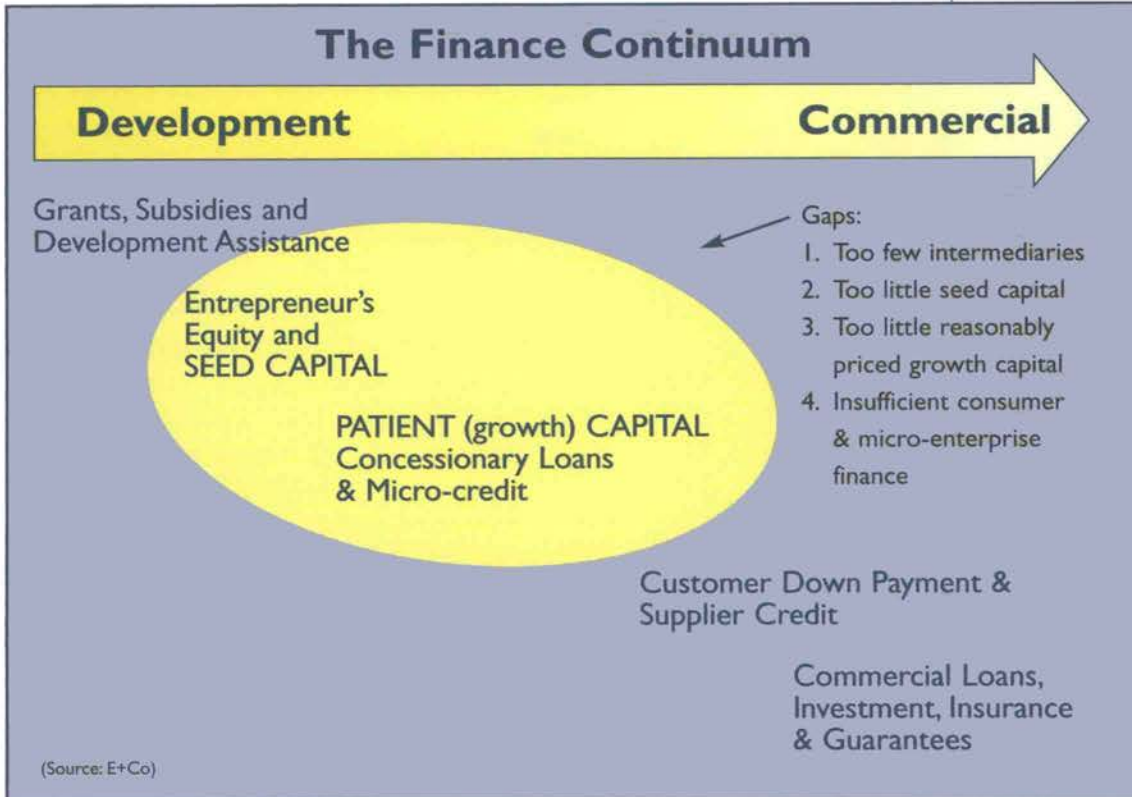
Although the amount of seed capital needed for these enterprises is often modest, the lack of such capital is what hinders the progress of many energy enterprises. This funding is not readily available from conventional financial institutions for a number of reasons: without proven business plans, new companies are perceived as too risky; the technology too new; rural communities too poor; and the transactions costs too high for the small amount of financing required.

Further, if the money can be found at all, the interest rates and required collateral often put it beyond reach of these new enterprises. This is why flexible seed capital from sources such as REED is important.

Once a business is operating, more capital is often needed to expand from a small start-up business to one that can grow and reach commercial viability. This phase generally requires second stage, or 'patient capital', and is an essential element in new markets where additional time may be required to refine business models, take risks, and innovate. This capital generally carries similar interest rates to commercial forms of finance, but is concessional in terms of extended payback periods and softer collateral requirements.

The ultimate goal of an enterprise development programme is to help entrepreneurs create ventures that are attractive to conventional investors, including traditional financial institutions. Obtaining this commercial capital often requires a substantial long-term effort to help new businesses meet the stringent requirements of more traditional forms of finance as well as activities to help financial institutions and other investors understand the benefits and risks of new markets for clean energy services.

The chart opposite maps the finance continuum from early stage grants and subsidies to commercial forms of finance and highlights some of the gaps that initiatives like REED are trying to fill.



Strength in Partnership

Each REED partner brings a different set of skills to the challenge of clean energy enterprise development. **E+Co** brings the experience of investing \$9.5 million in 70 enterprises in 34 developing countries, 24 of which are now delivering clean and sustainable energy services to more than 200,000 people. E+Co's role in REED programmes is to manage the seed finance funds and to work with country partners to provide enterprise development services.

UNEP and its Collaborating Centre on Energy and Environment (**UCCEE**) bring a policy component to REED, focused on accelerating the switch to cleaner, less carbon-intensive and renewable forms of energy. To achieve this goal, UNEP Energy promotes new approaches to financing and implementing clean energy service delivery. UNEP also provides overall REED programme management.

The **United Nations Foundation** (UNF), with funding from Ted Turner, the W.Alton Jones Foundation and The Nature Conservancy, financially support the REED programme through their Climate Change/Sustainable Energy Program. The program is designed to develop and demonstrate the commercial and sustainable delivery of community-based energy services via renewable energy technologies. The UNF's role is to support programme development, through the UN Fund for International Partnerships (UNFIP), for projects that can lead to larger replication and can lever additional resources.



COUNTRY PARTNERS

Africa

- **Tanzania Traditional Energy Development and Environment (TaTEDO)** is a coalition of professionals, individuals, artisans, farmers, and community-based organizations working to sustain the environment and enhance socio-economic development of communities.
- **ENDA TM** is working in Senegal to create a better technical, economic, and socio-economic understanding of the energy challenge in Africa.
- **Kumasi Institute of Technology and Environment (KITE)** is headquartered in Ghana and committed to developing the technical capacity of clean energy technologies and industrial development through enterprise development and policy formation.
- **Mali-Folkcenter (MFC)** promotes the use of renewable energy and technologies to restore environmental values, with a special focus in rural areas.
- **Centre for Energy, Environment & Engineering Zambia Ltd (CEEEZ)** collaborates with government and other institutions in the fields of energy, environment and engineering.

Brazil

- **Brasil Sustentável (BRASUS)** is working in the northeast of Brazil to promote integrated sustainable development through business-orientated, multi-disciplined and locally-based methods.
- **Instituto Eco-Engenho (IEE)** brings substantial technical expertise to renewable energy and sustainable development projects in the Alagoas region, including the PV programme, Projecto Luz do Sol.

China

- **The Nature Conservancy (TNC)** works with international partners to protect biodiversity in many countries around the world and through a number of innovative programmes.

The strength of the REED programmes is also very much based on **country partners** for local delivery of enterprise development services. These partnerships with non-governmental organizations (NGOs) are described in the box on the left.

REED Programmes

REED's enterprise-centred model is based on E+Co's experience and modified with the specific knowledge and experience of local country partners and institutions. In Africa, these country partners include Enda-TM (Senegal), KITE (Ghana), Mali-Folkcenter (Mali), CEEEZ (Zambia) and TaTEDO (Tanzania) – all organisations with significant energy and environmental expertise.

The essential elements of the REED approach at both the enterprise and program level are the same: services and capital provided over time to small and medium sized local entrepreneurs through a partnership of enterprise development stakeholders. However, REED is flexible enough to accommodate a broad range of enterprises reflecting different energy resources, technology options, economic environments and regulatory conditions.

Within each country or region where a REED programme is underway, UNEP and E+Co work with the country partner to develop, seed finance, and launch a number of commercially sustainable enterprises. Successful enterprises showcase new ways to deliver clean energy and create an awareness of the potential for

this type of commercial activity among local financial and governmental institutions.

REED is primarily focused on enterprises delivering rural energy services via renewable energy or energy efficiency. The choice, however, is not whether a technology is renewable, but whether it can provide a substantial environmental improvement. For example, an enterprise distributing liquefied petroleum gas (LPG) bottles to replace unsustainable wood fuel use could be supported.

In terms of customers, REED is mainly focused on businesses providing services to rural areas, but non-rural (urban and peri-urban) markets can also be supported if the businesses are particularly innovative and also deliver substantial environmental improvement.



Although innovation is a key element of the REED approach, the programmes are not centred on *technical* innovation as non-commercial technologies are not appropriate for new markets in regions where REED is focused. Instead of refining a technology, REED focuses on refining the *business approach* to the delivery of clean energy services to unserved *customers*. Often, this innovation is linked to new business or finance models, particularly innovative methods to finance new ventures or help customers pay for new clean energy services.

SOLAR CROP DRYING IN MALI

Since 1990, **USISS** has been processing and selling dried meat, mangoes and onions using a solar drying technology developed through a former German Technology Cooperation (GTZ) project. The need for food preservation is substantial in Mali where a considerable portion of the harvest is lost to food spoilage. **AREED** financing will help USISS grow its business through the purchase of additional dryers and the implementation of a marketing strategy in Bamako and surrounding areas. Helping expand development projects into fully commercial operations is a common **AREED** enterprise development strategy.

Further, although the REED model is replicable, it is not 'cut and paste' – what works in Zambia may not necessarily work in China. However, the REED approach does work best in countries with policies and economic environments that reward entrepreneurialism and are conducive to small enterprise development.

The first effort under the REED umbrella is the **Africa Rural Energy Enterprise Development (AREED)** programme. Since 2000, a total of \$4.3 million has been committed to **AREED** by the United Nations Foundation (UNF) and targeted at the African countries of Ghana, Mali, Senegal, Tanzania and Zambia. New energy services – and energy entrepreneurs – are particularly important for Africa where nine out of ten people have no access to electricity and three-fourths of the current energy comes from dwindling supplies of traditional biomass fuels, such as wood and dung.

In 2001, UNF committed an additional \$4.3 million (including \$400,000 from W. Alton Jones Foundation and \$500,000 from The Nature Conservancy) to develop two new programmes in Brazil and China.

The Brazil Rural Energy Enterprise Development (B-REED) programme is aimed at new enterprises that target the 20 million rural poor in northeastern Brazil who lack access to modern energy services. B-REED is also integrated with Brazil's broader aims of sustainable development, particularly for women and children.

The China Rural Energy Enterprise Development (CREED) programme is undertaking a slightly different approach. The aim of the programme is to protect biodiversity through investments in entrepreneurs who provide energy services or products that reduce the use of fuelwood taken unsustainably from local forests. In the country's western province of Yunnan, CREED is focused on new businesses that manufacture and sell fuels, such as briquettes from crop wastes, and clean energy products and services such as efficient cookstoves and biogas digesters.

Photos

With REED support, new business USISS is using solar dryers (above left) to preserve local foodstuffs, which are then packed (above right) and sold in local markets (below).





PART 2

REED in Action

“One of the principal barriers to increased deployment of renewables... is access to finance at all levels. Current approaches to financing renewable energy are inadequate... multiple approaches are needed.”

- G-8 Renewable Energy Task Force (2001)

REED Enterprise Development Services (EDS)

Through training activities and other enterprise development services, REED provides the information, tools, consulting, and direct assistance that entrepreneurs need to develop business skills and wisely invest the time and capital needed to build a sustainable business.

The Process

Identifying entrepreneurs with the potential to turn ideas into successful enterprises is a challenging process. REED works with entrepreneurs who are often new to business or unfamiliar with clean energy technologies. Most of these entrepreneurs need a great deal of assistance to meet the demands of developing a new business and satisfying customers. They also need assistance to:

- understand commercial markets and marketing
- gather information and prepare feasibility analyses, proposals and business plans
- develop commercial contracts and revenue collection mechanisms
- develop the expertise to build commercial partnerships, and
- negotiate with credit providers, lenders and investors.

Training new entrepreneurs is a multi-stage process (see diagram opposite page), which usually begins when an entrepreneur approaches a REED partner with a *business idea* – often based more on intuition and observation than a hard analysis of utilizing a particular energy resource or technology to satisfy consumers in a specific energy market.

One of the most crucial stages during the preparatory phase is *fact-finding* – gathering information about the business idea. Prospective entrepreneurs participate in an initial REED training workshop where they are assisted (as needed) to identify and access the necessary information to test the *feasibility* of their concept and refine it into a more complete and precise business strategy. Entrepreneurs with the

most promising and refined business ideas are invited to work with REED partners to define a program of *business planning* to take them from a core idea to successful implementation when REED seed finance can be made available. Once an enterprise is operating and ready for expansion into fully commercial operation, second-stage financing from an outside investor can be sourced with REED support.

Throughout the process of creating the new enterprise, each entrepreneur is able to access customized training and enterprise development services, such as business feasibility analyses, business plan documentation, business implementation, and growth-oriented business management support.





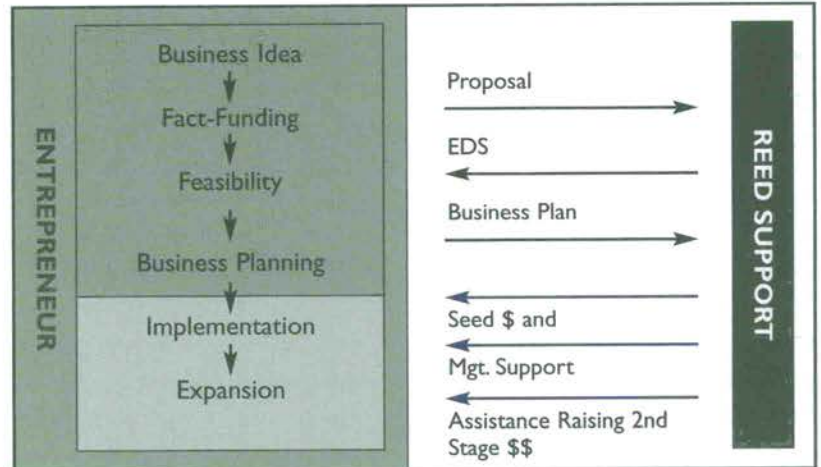
To fund the creation or expansion of an energy business, or keep it operating, REED may provide a working capital loan on a cost-sharing basis with the business owner(s). These loans typically range from US\$20,000 to \$120,000. In this initial period, significant in-kind support is often provided, including a REED representative working closely with the company's management. This support increases the probability that a more 'bankable' enterprise can eventually be presented to mainstream financial institutions and investors. Success is gained once REED assistance is no longer needed and the enterprise is financially sustainable or is capable of attracting outside investment.

The Role of REED Country Partners

Creating a few new companies in a region is only the beginning of the REED process. The ultimate aim of these programmes is to create the regional capacity to support a continuous development of new rural energy enterprises. In the REED initiatives, this is the role of the country partner, the local *enterprise developer* who may operate as an NGO or non-profit organization, although one with a strong commercial focus. Experience has shown that, even if financial expertise must initially be brought into the country, a strong local partner is essential to the long-term deployment of the energy enterprise development approach in that country.

Together with E+Co, the REED country partner works with entrepreneurs to develop their business plans, manage the provision of early stage finance and, when required, assist entrepreneurs to secure further capital from local or international financial institutions.

This 'hands-on' aspect is a key element of the REED approach. Although a local organisation can access some of the theory behind enterprise development using resource materials, only the hands-on experience of working with other REED partners to prepare, make, and manage REED investments can turn a knowledgeable organisation into a capable enterprise developer. Part of their role is to transfer expertise about successful clean



Photos

Encouraging the use of biogas digesters (opposite page) is part of the REED strategy in China. REED support can help new entrepreneurs (above) finance the tools and equipment to offer clean energy services to rural areas.

THE REED TOOLKIT

The toolkit covers a wide range of issues and is divided into four sections: Writing a Business Description, Fact-Finding, Feasibility Analysis and Composing the Business Plan.

The toolkit also contains:

- an introduction to renewable energy and energy efficiency technologies
- clean energy enterprise and project examples
- pre-feasibility reports and feasibility analyses
- technology deployment models
- sample business plans
- risk analysis and due diligence 'starter' checklists
- an introduction to financial analysis
- articles on business planning
- sources of technical assistance and finance.

This tool is available in English, Portuguese and French versions and can be found on AREED's website, www.AREED.org/training



The role of REED is not just to train entrepreneurs, but to help them train each other. There is no better way for a cookstove manufacturer in Zambia to refine his business model than to learn from a successful entrepreneur in Tanzania.

- Jurie Willemse,
E+Co South Africa

energy business models to other countries or regions. This is a continuous and integral process of REED.

Ultimately, the success of a REED programme is measured by two factors: the establishment of a few financially sustainable enterprises stimulating the market and the local or regional capacity to create more enterprises.

AREED/KITE Partnership in Ghana

"To make these products and services more affordable, we are working with the government to 'level the playing field' by, for example, removing taxes on renewable energy equipment. We are also focused on more productive uses of energy, such as food preservation industries because food spoils very easily here. These types of productive uses can be more useful to generate income, which increases the ability to repay loans for these systems."

- Ms. Harriet Amisshah-Arthur, KITE senior project manager

AREED/Mali-Folkecenter Partnership in Mali

"In our country, energy is a very big issue and the catalyst for development. About 12 million people – seventy-five percent of the population – live in rural areas. Only one percent of these people have access to electricity.

Lots of people say funding is the main problem, but the main problem is really having a good business plan. If entrepreneurs have good business plans, they can get access to finance.

Financial institutions in general do not understand the energy situation, so we work with them through workshops and other training activities to help them understand the commercial opportunities in this sector. Working with REED and E+Co allows us to use their experience financing a diverse range of clean energy enterprises to approach our financial institutions and encourage them to support small companies with good ideas."

- Mr. Ibrahim Togola, Executive Director, Mali-Folkecenter

AREED/TaTEDO Partnership in Tanzania

Our enterprise development efforts start with households and small-scale industries using efficient biomass, energy efficiency, solar PV, and biogas technologies. There is also some small hydropower capability.

AREED is important for entrepreneurs but it is also important for us as an organisation. With a staff of 28 distributed through 5 regional programmes, the training and workshop activities to increase entrepreneur skills also help to increase our knowledge. This helps us to grow and be more effective as an organization.

- Mr. E. N. Sowe, Director, TaTEDO

“The role of AREED is not just to train entrepreneurs, but to help them train each other”

TNC/CREED Partnership in China

The main goal of the REED partner in China, The Nature Conservancy (TNC), is to protect biodiversity. In the USA, TNC's strategy has been to purchase and preserve tracts of forest. In China's Yunnan province, TNC formed a partnership with REED to try a new approach; investing in entrepreneurs who can provide a cleaner energy service using improved technology and alternative fuels to the wood collected from local forests. This approach includes new businesses that manufacture and sell fuels such as briquettes from crop wastes and clean energy products and services, such as efficient cookstoves and biogas digesters.

TNC is particularly interested in this new approach because the remote Yunnan province on the border with Tibet and Burma is a 'biodiversity hotspot' intersected by four major rivers. E+Co's representative for CREED, Jeff Dickinson, explains that past logging has seriously degraded the available wood supply, which is creating a substantial problem for villagers who rely on wood fuel while creating environmental hazards such as increased flooding. On average, each villager spends an entire month of each year collecting enough wood to fill eleven small trucks. At the current rate of consumption, the forest cover of oak, pine, fir and spruce may be gone in as little as 40 to 50 years. "They know that collecting fuelwood is degrading their quality of life," he says.

Through new businesses marketing more fuel-efficient stoves, the amount of wood needed from local forests could be reduced by 60 to 80 percent, which would also protect biodiversity and reduce emissions such as carbon dioxide and exposure to health-damaging smoke and soot. This type of partnership also illustrates the potential to 'leverage' one investment to create additional returns in other areas, such as the environment.

TNC's China programme director, Ms. Rose Niu, says that although an 'entrepreneurial spirit' is part of the local culture, encouraging rural energy enterprises in such a spirit is new to China and a very different approach to other programmes, including projects and programmes of the national government. Further, she believes that the development of enterprises in the rural energy sector can have a major positive impact on other sectors, such as processing local exotic foods and traditional herbal medicines. "If we can build up enterprises in the rural energy sector, then other entrepreneurs will learn and hopefully copy this approach," she says.

The CREED programme will also differ from both the AREED and B-REED programmes in the availability of a micro-credit facility for customers of REED entrepreneurs. The REED approach in China illustrates the potential for innovation and the substantial links between energy, poverty, and environmental degradation.



“As the rural poor get access to modern energy services, local economic activity increases and basic health and education improve, without detriment to the environment”

- Ms. Ruth Cardoso
Chair, Comunidade Solidaria
Brasilia, Brazil



Photos

In Mali, diesel-powered, multi-purpose platforms (opposite page) are used to support village energy needs, such as milling (above) and battery-charging. A local entrepreneur is using REED Financing to own and operate these machines on a biofuel produced from the local jatropha plant.



B-REED – Breaking the Traditional Mindset

The biggest challenge is to break out of the traditional mold. We don't have to be radical, just able to think more flexibly.

We are using the REED approach to work in parallel with financial institutions in a very practical way to show all the steps being taken to create viable renewable energy enterprises, which carries so many risks inherent in saying just those three words. And sometimes you have to say when it won't work.

- Ms. Suzanne B. Maia,
President, Brasil Sustainável
(BRASUS)

REED Investments

AREED in Zambia

Initially, Mr. Fred Musondu ran a successful export business in the Democratic Republic of Congo, but when war broke out he had to close and move to Zambia. Looking for new opportunities, he noticed that Zambian wood milling companies were producing large amounts of waste in the production of wood products for the country's mining industry.

When he saw the waste subsequently burned, Mr. Musondu also saw an opportunity to convert this waste to charcoal for domestic use. The idea made sense for a number of reasons. About 80 percent of Zambian households do not have access to electricity and rely on charcoal for cooking and heating. Total annual demand for charcoal is almost 900,000 metric tonnes and consumes 4% of the country's GDP.

AREED's Zambian partners, E+Co and CEEEZ, helped him to create a business plan that would allow his business to supply and distribute charcoal in one province of about 300,000 households, and then scale-up as the business and demand grew. The plan involves the construction of fifteen Argentine Half Orange Brick Kilns and the development of a marketing and distribution network. Long-term agreements to secure a supply of waste wood and land tenure underlie the expansion plan that will allow Mr. Musondu's company, **KPBS** to increase charcoal production to 2700 tons annually. With this plan completed, Mr. Musondu secured a loan of \$73,000 from REED to expand, aiming to supply one percent of the charcoal market. By making use of a waste product and applying a conversion process 2.5 times more efficient than traditional methods, KPBS is a clean energy enterprise that solves both economic and environmental problems, and makes good business sense.

AREED in Senegal

Water heating in the capital of Senegal, Dakar, is a year round need. Most water heaters are electric, which constitutes a significant load on the electricity grid. In the late 1970's, the Senegalese government promoted solar water heating in Dakar through a public programme supported by international development assistance and legislation. In 1991, however, the legislation was rescinded; collapsing the new industry. This collapse resulted in a large number of system failures and damaged the public's perception of solar water heating systems.

A group of ex-government employees who previously administered the public programme saw a business opportunity to maintain and repair these systems and formed a private company called **AME**. With electricity rates more expensive than in most developed nations, solar water heaters (SWH) should be an attractive investment in Senegal. However, the company realized that without a reliable service infrastructure the industry could not grow. Offering this service was the business opportunity that would give customers confidence in solar



water heating and help AME grow a business marketing the local manufacture, sales, installation, and maintenance of SWHs.

To reach their goal, AME sought AREED support, including assistance with market research and preparation of a business plan. AREED's subsequent \$41,500 finance package to AME has two parts: the first part of the loan is being used to purchase equipment, to prepare a detailed market study and to secure a number of service contracts for commercial SWH installations. The second part of the loan is conditional on securing these contracts.

In addition to a financial investment, AREED is working with the company to monitor its progress, ensure the business is successful, and grow sustainably over the initial years of operation.

Photos

In Ghana, the construction and use of biogas digesters (opposite) can convert animal and human waste into a useful clean fuel. An entrepreneur in Zambia is using REED support to convert sawmill waste (above) into charcoal.

Sample of AREED Investments			
Enterprise Country	Business Activity	Enterprise Description	AREED Financing
Rasma <i>Zambia</i>	Mfc. Efficient Cookstoves	Company produces and sells efficient cook stoves	\$20,00 Equity
AME <i>Senegal</i>	Maintenance of Solar Heating Systems	The provision of maintenance services for solar water heaters in the residential and commercial sector, both urban and rural	\$41,500 3 year local currency loan dispersed in 2 tranches
ABM <i>Ghana</i>	Power Factor Correction	Existing energy efficiency company that will develop power factor correction business	\$120,000 5 year USD denominated loan
VEV <i>Senegal</i>	Wind pumps	Servicing existing wind pumps in rural areas	\$17,000 5 year local currency loan
USISS <i>Mali</i>	Solar Crop Drying	Drying meat, mangoes and onions	\$18,000 5 year local currency loan
KPBS <i>Zambia</i>	Charcoal production	Company uses sawmill waste and efficient kilns to produce charcoal briquettes	\$74,000 5 year USD denominated loan dispersed in 3 tranches
Bagani <i>Mali</i>	Multifunction Platform	Company runs a biofuel-powered diesel engine for grinding, milling and battery-charging	\$15,000 5 year local currency loan
Anisset <i>Ghana</i>	LPG	Company operates a peri-urban LPG charging station; looking to expand to rural areas	\$38,000 4 year USD denominated loan



“There is definitely a market, but only if you can put your arms around the proper business plan”

AREED in Ghana

Ghana’s electricity sector is typical of many in the region, with a power grid straining to meet demand growth. In a recent power crisis VRA, the national electric utility, had to sign emergency power purchase agreements to acquire electricity from expensive barge-mounted diesel generators. To optimize the capacity of its grid, VRA charges large energy users a penalty for ‘low power factor’ electrical loads.

MISCONCEPTIONS

“The biggest misconception is that there is no money available for these types of businesses. Most people end up at a commercial bank with no business plan and 95 % of good ideas die at that stage.

The reaction is just to blame failure on the lack of available finance. That’s where we come in and play an important role. First, we equip people with the tools to understand what’s needed in their business plan to secure funding. Then, to a lesser extent, we can provide early stage financing that might not otherwise be available.

But if you haven’t got a good business plan, you won’t get financed.

More and more it’s becoming clear that this (enterprise development) is the way to go – even from an institutional point of view. We have to invest and set up more sustainable businesses. My experience from 15 years in the solar market proves that there is real business out there in this sector.

Too many people jump to the conclusion that people don’t have money to pay for new energy services. There is definitely a market, but only if you can put your arms around the proper business plan.

- Mr. Jurie Willemse, E+Co South Africa

AB Management (ABM) is building a new business to address this problem. Using an AREED \$120,000 financing package (advanced in 2001) and enterprise development support from AREED country partner KITE, ABM is creating a market for power factor correction equipment in Ghana.

“We started by ourselves but came to the point where we wanted to expand and we needed capital. The banks turned us down, so we turned to AREED,” says the principal of the company, Mr. Fred Agyeman-Berko.

The business is lucrative because the required capital investment for these devices is usually repaid quickly⁽⁴⁾ and leads to significant cost-savings.

For a typical customer, a \$20,000 investment can contribute \$250,000 to a company’s ‘bottom line’ profits over ten years. “We have many customers, but because they too face finance hurdles, they are often not able to purchase this equipment outright”, says Mr. Agyeman-Berko.

The company’s strategy is to finance 27 installations themselves (using the AREED loan) and then to use the proceeds from these customers to expand the business to more than one hundred other companies over the following four years. Concurrently, AB Management is marketing other energy efficiency improvements to its customer base.

“These companies know they are wasting energy and money. We are helping them to reduce this waste,” he says.

For Mr. Agyeman-Berko, AREED is helping him to develop and refine his business approach. “It is a first step and we are hoping to expand,” he says.

(4) The ‘pay-back’ period on average ranges from 6 to 18 months for ABM’s target customer group.



E+Co in El Salvador

Empresa Eléctrica del Norte (EEN), the electric utility in the Central American country of El Salvador, initiated the first thermoelectric plant in the region relying completely on biomass resources, principally sugar cane waste called 'bagasse'. The project uses 3,800 metric tons of bagasse daily to power the sugar mill and feed excess electricity into the power grid.

Before investors would finance the 5 megawatt (MW) project, EEN needed to prepare the mechanical engineering designs. In 1995, EEN completed this work using an E+Co \$75,000 loan, which was repaid after a \$7.2 million finance package was secured from outside investors. Agreements with other local sugar mills were negotiated to secure additional fuel supplies as well as a 10-year power purchase agreement (PPA) with a large distribution company, Compañía de Alumbrado Eléctrico de San Salvador (CAESS).

EEN has successfully demonstrated the reliability of biomass as a fuel source to meet the growing energy needs of El Salvador. Feeding the plant's excess power into the grid helps address the nation's need for 900 MW of new capacity by 2010.

E+Co in Morocco

Noor Holding Company (or NOOR meaning 'light' in Arabic) is a rural energy development and services company headquartered in Marrakech, Morocco. NOOR's core business mission is to implement and finance small solar energy enterprises that deliver modern energy services within the more than 30,000 unelectrified Moroccan villages that lack any realistic promise of grid connection within a decade. NOOR completed an extensive market survey and developed an operating model that positioned the company as a key player in this part of the Moroccan energy sector.

Since July 1995, E+Co has helped to provide NOOR with multiple stages of capital finance, totaling \$250,000, to develop its business plan, implement proof-of-concept, and conduct business operations. E+Co also provided extensive enterprise

Photos

Small-scale and micro hydropower systems (above) have the potential to supply clean power in many developing countries.

PIPELINE

The establishment of a 'pipeline' of good investment projects in rural areas is particularly important. However, as Mr. Sawe of TaTEDO describes, the situation is complex.

"We face a challenge in that most of the business infrastructure is urban but the clients are in rural areas. However, the market for clean energy is quite broad – households, businesses, and small domestic industries all need energy. Providing electricity in areas where it doesn't currently exist also allows other industries to develop".

The REED pipeline for new investments include:

- Manufacture and sale of biogas production plants
- Solar bakeries
- Efficient cookstoves
- Solar water heater manufacture, sale, installation and service
- Solar PV system sales, installation and service
- Production and sale of biomass waste pellets
- Manufacture and sale of biomass briquettes
- LPG Distribution
- General renewable energy sales and service
- Municipal solid waste gas generation and power production
- Energy-efficient lighting
- Consumer credit for energy services
- Fuel oil production from biomass
- Battery charging
- Wind energy equipment manufacture, assembly and service
- Production, sale and installation of biolatrines



FOCUSING ON SUSTAINABLE ENERGY TRANSACTIONS

REED programmes are not reserved only for the private sector – REED works with many types of organisations, including community based organisations (CBOs) and NGOs. However, REED brings an innovation element that helps these organisations structure energy services that are business oriented, and therefore self-sustaining, replicable and expandable.

“The trick is to offer a PV energy service at a price that is close to what people currently pay for a lower quality energy service via kerosene or batteries”

- John Rogers, Soluz.

Photos

Photovoltaic (PV) systems that convert sunlight to electricity can provide cost-effective power in rural areas unserved by conventional electricity grids. In Brazil, B-REED is working with a number of solar companies to promote the use of photovoltaic (PV) systems (above and opposite) for village power and water pumping.

development support and served as the lead negotiator between NOOR, Shell International Renewables, and two prominent local Moroccan investors. In 2000, NOOR secured \$750,000 of equity investment from these investors, including a 39% shareholding from Shell International. NOOR is currently undertaking a major contract with the Moroccan national electric utility (ONE) to install 15,000 solar home systems in the Taroudant region to power lights and small appliances. The systems are being sold on credit over three years with a \$200 down payment and a monthly fee of \$5. As of January 2002, 3000 solar home systems have been installed in Taroudant and NOOR has maintained a healthy credit portfolio.

Chairman of NOOR's board, Mr. Frederick Vreeland, says that finding outside investors is 'difficult' and requires companies to operate with astute management at the local level. A company must also be willing to “knock on a lot of doors” and be patient enough to wait for the right investor. Accepting 'risk' in a renewable energy venture, he adds, is a concept not easily accepted by local banks. “Even if you approach a bank in Morocco with a partner institution who will meet 80% of the risk, they will ask you who will cover the other 20%,” he says.

Enabling Governments

In any programme to develop new enterprises, government agencies are essential partners. In addition to assisting entrepreneurs and their new enterprises, REED activities are also focused on assisting government and development agencies to test and promote new approaches to the delivery of energy services in rural and peri-urban areas.

Generally, government ministries have been very receptive to REED's 'private-sector led' approach. This approach does not pre-suppose that governments have no role to play in the provision of rural energy services, but that in many areas, the private sector may deliver some of these services more efficiently. In addition to conserving scarce government resources, this approach also has the potential to widen the economic base. The openness to new energy enterprises provides governments with fresh opportunities to experience, develop and implement energy sector reforms in the context of sustainable development.

Public Private Partnerships

REED activities also encourage partnerships between the public and private sectors to deliver government-sanctioned energy services. For example, a company providing electricity via solar photovoltaic (PV) systems can partner with a government-owned or regulated electric utility to deliver clean energy services in off-grid areas, as is the case with NOOR in Morocco.



Sample of E+Co Investments

Enterprise Name, Country	Business Activity	Enterprise Description	Financing E+Co (other)	Second Stage Investors	Achievements
Soluz Dominicana, Dominican Republic	Solar Rural Electrification, using a PV leasing model	PV leasing company that provides energy services on an affordable fee-for-service basis. http://www.soluz.net/	\$300,000 loan (\$835,000)	Calvert World Values Fund, EAAF and Sunlight	Its approach is recognized as highly innovative and is being imitated in many countries.
Empresa Eléctrica del Norte (EEN), El Salvador	5 MW Biomass	Independent power producer, with 5 MW generating capacity fueled by bagasse.	\$75,000 loan (\$7.2 million)	Banco Agrícola Comercial, CABEL	First thermoelectric plant in Central America to rely completely on biomass resources. Plant became operational in 2000.
Noor Web, Morocco	Solar Rural Electrification, using a franchising model	Energy services company providing PV installation and after sales services in rural areas and support to village-level solar entrepreneurs.	\$250,000 equity (\$750,000)	Shell Solar, Two Moroccan industrialists	3,000 SHS financed and installed as part of 15,000 SHS partnership with National Electric Utility (ONE). Attained profitability in 2001.
Kanata Hydro Electric, Bolivia	7.4 MW high head hydroelectric plant	The plant harnesses the outflow from a high-altitude water reservoir.	\$250,000 loan (\$5.2 million)	GiroCredit, Austria, Cidre, Styrcon Ges	Plant has been operating near capacity since 1999, producing 23.6 GWh in the past year.
RAPS Energy Stores, South Africa	Solar Rural Electrification delivery company	Establishes energy franchises that rent solar systems and provide service and maintenance. http://www.raps.co.za	\$243,895 equity and loan (\$1 million)	NUON, Solar Development Foundation (SDF)	50,000 SHS concession contract signed with ESKOM South Africa.
CleanTHAI, Thailand	Waste to energy biogas systems	Develops methane gas recovery and waste-to-energy projects in the livestock and food & beverage sectors.	\$150,000 equity (\$1.4 million)	Renewable Energy, Energy Efficiency Fund (REEF) Al Tayyar	The first REEF project approved for investment.



“Without adequate enterprise development support, you won’t have many businesses succeed”

LEVERAGE

The story of the Clean Energy Development Company, Thailand (CleanThai) illustrates how small amounts of seed capital can leverage secondary finance.

In March 2000, E+Co invested \$150,000 in Clean Thai for a 20% ownership of the company. Clean Thai used this equity and its own funds to develop cassava waste biogas projects in Thailand. At that point, all Clean Thai had was some of its own funds, an acceptable business plan, good technology and great leads for customers. Also at that time, Thailand was in a period of significant economic uncertainty as GDP grew only 0.8% in 1999.

One year later, E+Co lent Clean Thai an additional \$35,000 to develop Clean Thai/Korat – a project to replace the fuel oil burned to power a cassava plant processing facility with biogas produced from its own waste effluent. In December 2001, E+Co introduced CleanThai to outside investors who agreed to invest \$1.4 million in the company. This equates to \$8 of additional investment by later stage investors for every dollar that E+Co invested at the start-up phase of the business.

The results are not always so lucrative, but the E+Co experience demonstrates that for every dollar they invest, on average an additional five dollars is raised in 2nd stage co-financing from other investors.

Many governments are actively seeking to provide needed energy services in rural areas, but sustainable energy options and private sector efforts to deliver those services are often poorly understood or poorly utilised. An important aspect of energy enterprise development, therefore, is to identify institutional niches where public-private partnerships are the best model to deliver energy services.

Within the AREED programme and with the support of the French Government, UNEP’s AREED Institutional Action Programme (AIAP) helps to strengthen the links between government agencies and AREED enterprise development activities. The AIAP is designed to help:

- institutional stakeholders understand the approach of using small and medium enterprises to drive the delivery of energy services
- diagnose and remove institutional barriers affecting the development or growth of clean energy enterprises, and
- create constructive and stronger links between local and international institutions through joint activities.

Enabling Financial Institutions

REED seed finance to new entrepreneurs can usually only provide the capital they need to start their enterprises. Seldom is this capital sufficient for the new enterprise to achieve long-term profitability. New clean energy enterprises must therefore be able to attract later-stage finance from traditional institutions, such as banks, or commercial investors.

To achieve an improved financial environment for clean energy enterprise investments, REED programmes also work directly with local financial institutions and outside investors; offering workshops, information services and the opportunity to co-finance investments (and thus share the risk).

With this ‘hands-on’ approach, REED partners engage financial institutions to negotiate with new clean energy entrepreneurs who have ‘bankable’ business plans, experience and a track record; and who are ready to deal with a traditional financial institution or investor.

Developing New Financing Mechanisms

REED work with banks also often targets the creation of new (or extended) loan products that specifically provide financing for clean energy systems. In both Africa and Brazil, REED programmes are working with local banks to create loan facilities for the purchase of solar home systems, sometimes including partial risk guarantees. These types of facilities generally require the capacity to manage new

“In the past 40 years, our government’s energy policies have provided electricity to only eight to 10 percent of Mali communities. It is time to change our approach.”-

- Aboubakary Coulidaly,
former Minister of
Energy, Mali

Photos

REED support helps entrepreneurs (above) prepare their businesses for investment from conventional financiers (above right).



types of loans, including developing appropriate terms and conditions, and new methods for evaluating and managing risks.

In China, part of the CREED programme is aimed at helping direct existing Chinese Government micro-finance schemes toward rural energy services so that poor families will have the means - and incentive - to purchase and use cleaner energy alternatives. This approach is based on the realisation that entrepreneurs can often only provide an affordable energy service when sufficient end-user financing options are made available.

At the regional level, work has also begun with the Global Environment Facility to establish a REED enterprise development facility that will aggregate a variety of resources (grants, loans, investment, etc) into patient capital financing mechanisms hosted by regional development banks. This effort will be a prototype that, if successful, could lead to an expansion of sustainable energy financing through the REED approach, either by the GEF, financial institutions, social investors or bilateral donors.

Partnerships

The impact of REED is leveraged through partnerships with financial institutions and organizations capable of co-financing new enterprises. For example, a partnership with the Development Bank of South Africa is investing funds for enterprise development and activities, and building an institutional capacity to foster enterprise development (see page 24). In another partnership,

“Without adequate enterprise development support, you won’t have many new businesses succeed. The challenge is how to most effectively deliver the enterprise development services. AREED is trying to meet this challenge through the development of resource materials, training and transferring skills across enterprise development organisations. In this way, entrepreneurs have more opportunities to receive help and we can service more at one time. This is part of developing our own economies-of-scale to lower the cost of delivering these services and is critical if we are to replicate the process.”

- Ms. Annika Lundgren,
E+Co Africa

Matching Finance to Enterprise Development

“Our experience is that there are several distinct stages at which enterprises operate [see table]. The role of the finance community is to understand the distinct needs of these different stages, and to respond with financial instruments that apply appropriate terms and conditions. Thus the challenge of supplying rural energy services in developing countries is not the availability of technology, business models, capital or the ability to pay; it is the mismatch between the needs of the enterprise and the types of financing currently available. That is, an entrepreneur who requires high-risk, early-stage capital, and management hand holding, will most probably not succeed in accessing the low risk corporate finance typically available to more advanced businesses.”

- Mr. Phil LaRocco, Executive Director, E+Co.

Different Stages of Enterprise Development

	Stage 1: Small & very risky (e.g., <1,000 solar home systems)	Stage 2: Medium size still risky (e.g., 1,000- 10,000 solar systems)	Stage 3: Investment grade (e.g., >10,000 solar home systems)
Strategy	Demonstrate the market	Build the brand	Scale-up
Source of finance	Own funds and seed capital	Growth or ‘Patient’ Capital	Later stage capital and debt
Investor role (management support)	Hand holding	When needed	Arms length



“From our strong development mandate, we see energy enterprise development as an important activity to bring entrepreneurs to a point where they may be able to access our capital in the future. However, in our loans to municipalities and other public agencies for energy projects, AREED is also potentially important to develop a set of entrepreneurs who can service these projects. We then get the whole value chain being built. We are very much at the beginning. These are new areas and we are looking for a track record. AREED can help new enterprises build track records and is part of the whole process to create successful development.”

- Rob Short, Environmental Specialist, Development Bank of South Africa

AREED assistance in Tanzania is being combined with funds from the US Department of Energy (DOE) and the US Agency for International Development (AID) to leverage new, clean energy investment in 2002 and 2003.

The DOE programme is a technical assistance project to facilitate the deployment of clean energy services in South Africa, Tanzania, and Ethiopia with a specific focus on activities that generate income or economic activity. The project team, currently operating at various levels in the region, is using the project as the vehicle to build new links between the DOE, local development groups, and entrepreneurs.

The REED programme is not, however, only for financing projects or entrepreneurs and does not displace the role of conventional financial institutions. Rather, it is a new approach to create real and sustainable enterprises in the energy sector and to increase the capacity of countries to foster energy enterprise development based on clean energy technologies.

Reducing CO₂

As a practical approach to sustainable development, clean energy enterprises also have some impact on meeting the challenge of climate change since most enterprises reduce CO₂ emissions in some way. By improving the delivery of clean energy services, clean energy enterprise development efforts can increase the capacity of the private sector to develop sustainable projects that attract investors using international agreements such as the Kyoto Protocol's Clean Development Mechanism (CDM).

AN ENTREPRENEURIAL 'PIPELINE' IN ZAMBIA

Building a good 'pipeline' of new entrepreneurs is an essential aspect of enterprise development. One AREED strategy to accomplish this is an institutional partnership initiative bringing together public agencies managing rural infrastructure with REED entrepreneurs.

To facilitate the creation of the energy enterprise pipeline in Zambia, representatives from 14 government and development organisations met in August 2001. Often these organizations are working in the same area and either duplicating programmes and services, or missing critical links that could forge a more integrated approach to rural development.

For example, the Zambian Government's Rural Investment Fund is often used to build dams in rural areas for domestic and agricultural water supplies. With new links to energy enterprises, there is now the potential to fit hydroelectric systems to these dams when there is a market for the electricity. This 'synergy' between energy enterprises and the Zambian Government could then provide more benefits to rural people than simply a dam for water supply alone.

Some REED enterprises have the potential to *dramatically* reduce greenhouse gas emissions – particularly carbon dioxide – through the use of efficient cookstoves or waste-to-energy projects. In the case of Rasma Engineering in Zambia, for example, the company's sales of more efficient cookstoves could reduce carbon emissions by an estimated 166,000 tonnes over nine years. At a value of \$1.5/tonne of CO₂, this benefit is worth \$250,000 – 12 times the cost of the \$20,000 AREED investment.



Photos

Efficient woodstoves (above left) have the potential to substantially reduce the amount of needed woodfuel and carbon dioxide emissions.

Even if these new enterprises could not qualify as CDM projects⁽⁵⁾, they present an opportunity for organizations and institutions to invest voluntarily in carbon offsets as a contribution to sustainable development. In essence, this creates another form of seed finance because the carbon investment can help the entrepreneur to create a clean energy (and lower carbon) enterprise. In the medium term, these investments can demonstrate how such business models can be integrated into the 'flexible mechanisms' of the Kyoto Protocol.

CLEAN ENERGY DEVELOPMENT IN CENTRAL AMERICA

Financiamiento de Empresas Energéticas en Centro América (FENERCA) is a USAID-funded programme, begun in 2001, to increase the use of renewable energy in Central America. With the assistance of E+Co and other partners, the programme has facilitated the investment of \$2.25 million in new clean energy businesses, with two of those businesses now delivering clean energy services.

Sample of Potential CO₂ Reductions from REED Investments

Company	Business Activity	Country	CO ₂ Reductions	Total est. value ⁽⁶⁾	REED support
AME	Solar Hot Water	Senegal	1,966	\$13,000	\$41,500
KBPS	Waste to charcoal	Zambia	33,661	\$50,000	\$63,000
Rasma	Energy Efficient Stoves	Zambia	166,341	\$250,000	\$20,000
ZED	PV Solar Home Systems	Mali	2,523	\$16,397	\$45,000

(5) At the practical level, the CDM is not yet applicable to many REED investments due to their size, distributed business models, and because woodfuel displacement projects are not yet eligible for CDM accreditation.

(6) Based on \$6.5/ton CO₂ for electricity displacement activities, and \$1.5/ton CO₂ for wood fuel consumption displacement activities.



EPIDIOLOGUE

Success, Failure and an Invitation to Both

Technology is not the problem. Business models are not the problem. Demand for the product is not the problem. Ability to pay is not the problem. The problem is a shortage of seed capital, insufficient funding to provide services to enterprises, and too little next stage patient capital.

– E+Co

We conclude by posing a question: how much clean energy does \$30,000 buy? In traditional development programmes, the money could purchase and install a few solar PV water pumps, or possibly a dozen windpumps. In a REED programme, the money could provide seed finance for an entrepreneur to launch an enterprise that could eventually install, maintain and service a hundred pumps or more. Further, with the right support the entrepreneur may be able to eventually attract substantially more finance from conventional financial institutions.

A key difference between the two approaches is the nature and extent of *risk* and the potential for much greater returns in the long-term. In a traditional development programme, the risk is that the *technology* will fail, while in a REED programme, the risk is that the *entrepreneur* will fail.

It is a basic fact of business that not all ventures succeed. It is also a fact that risk is an inherent and accepted element of doing business. The risk of failure – and the potential for profit – is what drives entrepreneurs to use their resources efficiently and constantly seek new ways to deliver an improved product or service. It is also true that not all development programmes succeed, although few programmes have embraced the strategy of using different risk – the enterprise approach – to deliver clean energy where it is needed.

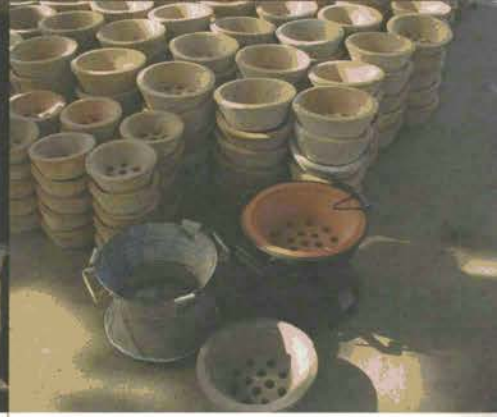
This publication strongly advocates a strategy of taking this type of risk to deliver clean energy for sustainable development. We firmly believe that assisting entrepreneurs to take risks, to innovate the way they deliver goods and services, and to continuously refine their business models, is an effective way to gain public trust while attracting commercial investment into the sustainable energy sector.

The REED approach we have described in these pages is working to create a small number of clean energy enterprises, each building some innovative approach to the delivery of clean energy services. Each enterprise that succeeds is a model that can be replicated; both locally and in other countries or regions with similar challenges. This *demonstration effect* can be powerful, particularly when the effect is a clean energy service from an entrepreneur making money. This is a more powerful method of technology transfer than a simpler, short-term approach of ‘dropping’ a technology into a region and hoping it will succeed.

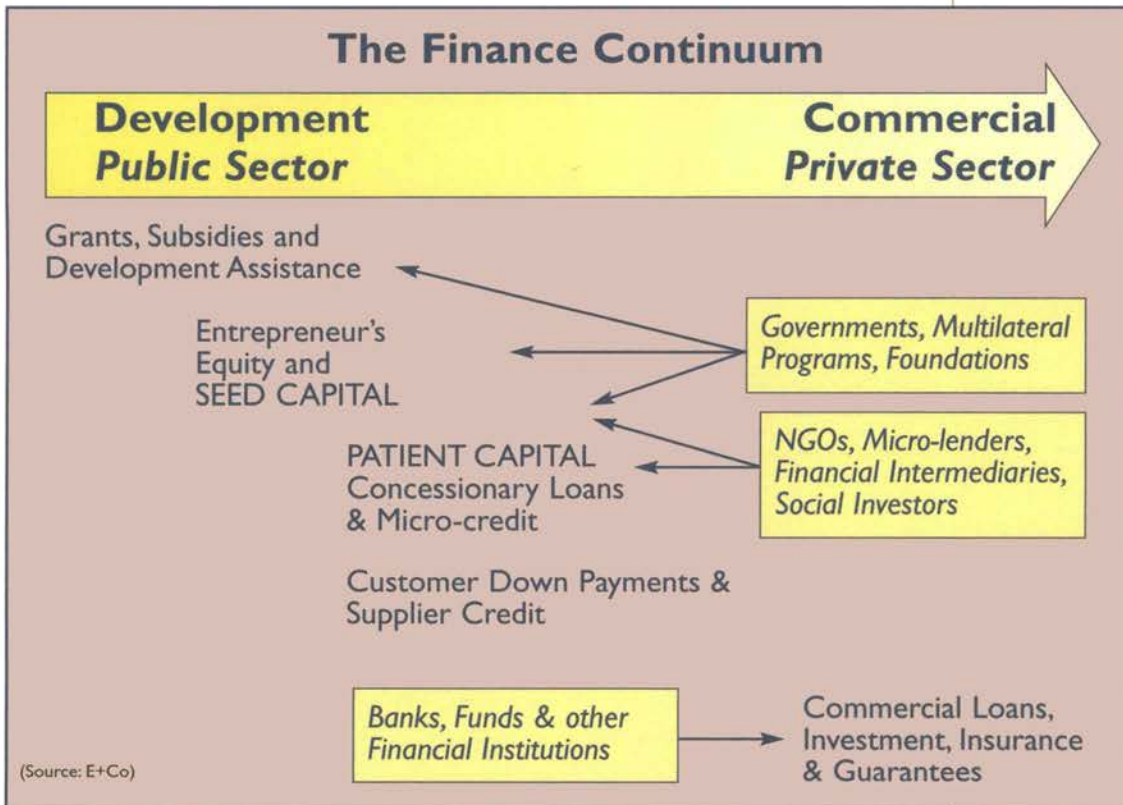
THE BODY SHOP INVESTS IN AREED

Through E+Co, The Body Shop International, a manufacturer and retailer of health and bodycare products, will invest \$75,000 in AREED enterprises. According to The Body Shop spokesperson, Bill Eyres, the company believes it can make a useful contribution “to support strategic issues that will enable people in the developing world to access renewable energy”. Half of the amount will be invested in KBPS to help expand the company’s production of charcoal from sawmill waste.

To have any significant impact on energy poverty, thousands of new clean energy enterprises will be needed – more than could ever be created or even conceived within one programme or approach. Clearly, there is a need for a substantial number of organisations to play a role, in both the public and private sectors. The diagram on the right, similar to the one shown in section 2, describes the roles different participants can take in the overall enterprise development path – from early stage grant making through seed and patient capital, and eventually to commercial investment.



Photos
There is tremendous scope to create new enterprises to produce cleaner products and fuels, such as solar dried crops and cookstoves (above) and briquettes from agricultural wastes (opposite).



Why should development organisations embrace this approach? Because the creation of clean energy enterprises produces more than simple financial returns. The potential benefits of each investment in a clean energy enterprise include not just the *direct* financial returns of interest to the entrepreneur and their commercial backers, but also *indirect* returns such as job creation, environmental improvement and rural development. There are also the *induced* returns, such as changes in government policy and/or attracting other entrepreneurs into the clean energy sector.

The entrepreneur described in Section 1, Mr. Phiri, and his company Rasma is a good example of these additional returns. The combination of woodfuel savings and reduced indoor air pollution from using an efficient cookstove is a very attractive 'return on investment' for an environmental organisation such as UNEP. In the case of VEV, the repair of village windpumps allows water to irrigate market gardens that can provide both better nutrition and additional income. Thus, REED-type programmes catalysing clean energy services in a local and commercial context demonstrate how small amounts of targeted support can be leveraged to solve several pressing issues at the same time.

This is good news for sustainable development.

THE SOLAR DEVELOPMENT GROUP (SDG)

SDG (www.solardevelopment.org) is another example of energy enterprise development and was established to accelerate the growth of off-grid renewable energy in developing countries, with a focus on PV technologies. SDG joins with the PV industry's local pioneering entrepreneurs to position their companies for expansion and profitability.

SDG is composed of two entities: the Solar Development Foundation, providing technical and business assistance to enterprises in preparation for larger-scale private investment, including 'seed' finance for business development activities on flexible terms; and Solar Development Capital, a 10-year, \$28.75 million private equity fund to invest globally in solar photovoltaic (PV) and PV-related businesses.



A REED investment can produce a powerful 'demonstration effect', particularly when the effect is a clean energy service and an entrepreneur making money.

At the same time, we emphasize that small energy enterprises are *not* a panacea. Rather, they are one more possible channel to deliver desperately needed energy services, and often in ways that complement the more traditional and centralized utility model – a model that is under considerable stress in many countries. When companies offering clean energy services become more active in rural areas, however, some of the responsibility and burden to improve energy access and delivery is removed from government, which also demonstrates different 'avenues' to liberalised energy markets.

We also caution that rural energy enterprise development does not happen quickly; the nature of these investments means that results will only come over the medium to long-term. However, the success of past E+Co investments gives some indication that such investments can sustainably deliver clean energy to new areas and in new ways.

We believe REED is a demonstrated approach to successfully deliver the energy for sustainable development. It is not the solution to every development challenge, but many development challenges can derive some benefit from the lessons of REED investments.

We invite you to join us on this exciting and worthwhile venture.

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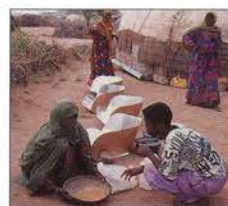
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