LIGHTING AFRICA 2008

Development Marketplace Grant Competition

May 6-8, 2008 ■ Accra, Ghana

Summary of Finalist Proposals

"Lighting Africa's goal is to reach 250 million energy poor customers by 2030 with low cost, reliable lighting products. The Lighting Africa Development Marketplace seeks to advance this goal through the design and delivery of affordable, high quality, non-fossil fuel-based lighting products and services targeting low income consumers in Sub-Saharan Africa."

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Introduction

Development Marketplace (DM) is a competitive grant program administered by the World Bank and supported by various partners that identifies and funds innovative, early stage projects with high potential for achieving positive development impacts. DM competitions—held at the global, regional, and country level—attract ideas from a range of innovators, including civil society groups, social entrepreneurs, academia and businesses. Since 1998, the DM has awarded $46 million to over 1,000 groundbreaking projects.

This booklet briefly describes the finalist proposals selected for the Lighting Africa Development Marketplace (LADM) Competition held May 6-8, 2008, in Accra, Ghana. This event is an integral part of the World Bank Group's broader Lighting Africa Program which seeks to reach 250 million people with modern, affordable lighting by 2030. The LADM is supported by numerous donors: the Global Environment Facility; the Public-Private Infrastructure Advisory Facility; the Energy Sector Management Assistance Program; Good Energies, Inc.; the Renewable Energy and Energy Efficiency Partnership; the European Union; and the Governments of Norway, Luxembourg, the Netherlands, and the United Kingdom.

The LADM theme, *Innovations in Off-Grid Lighting Products and Services for Africa*, focuses on households, businesses, and community service providers without access to electricity. Today, global lighting is a $185 billion annual market, of which $38 billion is for kerosene lamps and other fuel-based lighting products which are costly, inefficient, polluting and often hazardous. Among the poor, lighting is often the most expensive of all energy uses.

The LADM provides a platform for accessing this market. Activities include:

- *Increasing the use of the latest technology products and services* through broader use of lighting technologies such as compact fluorescent light bulbs (CFLs) and light emitting diodes (LEDs) that promise clean, durable, lower cost, and high quality lighting. The LADM is technology-neutral and open to a number of modern, non fossil-based energy options such as renewable energy sources. It also promotes inclusion of multiple services such as mobile phone charging and powering of radios.
- *Strengthening manufacturing, marketing, and distribution supply chains* by improving access to information, enhancing capacities, building partnerships and networks, taking advantage of existing supply chains that are already providing a variety of goods and services throughout Africa, and through demand aggregation to cost-effectively reach customers.
- *Enhancing affordability* by reducing product cost and increasing access to financing.
- *Removing policy, regulatory, and other barriers* and thereby reducing transaction costs and mitigating market risks while promoting commercial discipline.

Proposal sub-themes fall into four areas:

- Service Delivery: Sustainable and large scale delivery of lighting products and services in Sub-Saharan Africa, including through removal of policy and other barriers.
- Product innovation: Responding to consumer and market needs by development and commercialization of high quality, durable, efficient, low cost lighting products and services.
- Environment: Using renewable energy, clean energy technologies, energy efficiency, and/or environmentally sustainable solutions to meet the lighting needs of households, small enterprises, communities, etc.
- Health: Protecting health from environmental risk factors, such as indoor air pollution and improper disposal of hazardous material.

Over 400 proposals on innovative solutions for off-grid lighting for Africa were received from 54 countries, including 38 African countries. Of these, 52 were selected to go on to the final round of the competition. Finalist teams will gather at the Lighting Africa 2008 Conference to make their case for funding to an international jury. The 20+ member jury is comprised of senior World Bank staff representatives, funding and technical partners, and specialists in the field of lighting and energy. Together, these jurors will award $2.7 million in grants to the winners of the LADM competition.

To learn more, please visit www.developmentmarketplace.org.

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Proposal Summaries

PROJECT NUMBER: 4669

Lighting Rural Benin through Hybrid Wind/Solar Generators

COUNTRY: Benin
SUB-THEME: Environment
ORGANIZATION: Greentecno SA
FUNDING REQUEST: $191,675
CONTACT: Alessandro Casaletti
TEL: +41 91 690 50 80
EMAIL: stefanoguidotti@greentecno.ch
WEBSITE: www.greentecno.ch

OBJECTIVE: To increase access to electricity in selected rural towns in Benin in a sustainable way, in order to facilitate the adoption of efficient, non-fossil lighting products.

RATIONALE: Modern lighting is linked to the availability of a reliable energy supply. One of the main reasons for the lack of modern lighting is often the lack of such a service. Electricity grids seldom reach remote rural areas, where people have to rely on diesel gen-sets that are polluting, expensive and un-reliable. In Benin the electrification rate is very low even if compared to neighbouring countries—at 22% of the population and less than the 2% in rural areas of the country.

INNOVATION/EXPECTED RESULTS: Greentecno SA has the mission to provide sustainable energy to rural areas of developing countries. Greentecno's hybrid wind/solar generator, the LWH, has been designed specifically to power up to 30 households through the creation of local, mini-grids in rural/urban areas of developing countries. Greentecno and the Ministry of Mining, Energy and Hydropower of Benin, will bring the LWH to 5 towns in Benin with a holistic project that will include a scheme of financial support mechanisms (microfinance, carbon credits, Governmental support) in order to give sustainability to the project while creating local ownership and employment. Local Independent Power Producers will sell the electricity generated by the LWH at an affordable rate, hence recovering the initial cost of purchasing the LWH. Moreover, they will be responsible for O&M of the local grid and for the provision of LED bulbs.

PROJECT NUMBER: 4335

Popularize a Local Solar Lantern

COUNTRY: Burkina Faso
SUB-THEME: Product Innovation
ORGANIZATION: CB Energie
FUNDING REQUEST: $92,200
CONTACT: Chabanne Arnaud
TEL: +00 226 20 52 10 02
EMAIL: cbenergie@yahoo.fr
WEBSITE: www.cb-energie.com

OBJECTIVE: More than 60 million persons in Sahelian countries are affected by the lack of electricity. People are accustomed to using mainly oil lamps and torchlight. These solutions are not sustainable and charge a high price for a bad service, so the project aims to popularize a local solar lantern with a cheap operating cost and a very low impact on the environment and public health.

RATIONALE: Solar solutions for lighting already exist but the equipment is expensive and often difficult to maintain. Producing less expensive local solar lanterns that are easy to maintain is a solution to give poorer populations a modern lightsource. It provides work and comfort in a rural area and creates new capability in solar energy.

INNOVATION/EXPECTED RESULTS: The expected result is to create small solar lanterns, totally autonomous, based on oil lamps and produced locally. Using modern and high quality equipment, the solar lantern has high efficiency and a long life. Because they are produced locally, some adapted models could be applied for particular uses, such as reading, small business, and light used for protection.

PROJECT NUMBER: 4265

Spiral Development of an Exponentially Expanding Rural Lighting Business Model

COUNTRY: Burkina Faso
SUB-THEME: Product Innovation
ORGANIZATION: University of Maryland
FUNDING REQUEST: $168,897
CONTACT: Jungho Kim
TEL: +1 301 405 5437
EMAIL: kimjh@umd.edu
WEBSITE: www.umd.edu

OBJECTIVE: The objective of the proposed work is to demonstrate a social business model that establishes solar PV-based local battery charging centers in rural areas so high quality home lighting can be provided to an exponentially growing number of rural households at a cost comparable to kerosene lamp use.

RATIONALE: A social business will be formed with the aim of maximizing the availability of lighting in rural households. This business will supply individuals and/or village co-ops (charging centers) with solar panels and associated equipment to charge batteries locally. A licensing fee will be collected monthly and used to purchase equipment to set up additional charging centers that will serve an exponentially growing number of households. The consumer is expected to purchase

the battery, but the costs for charging a battery and its replacement will be similar to the amount spent on kerosene over the expected battery life of two years.

INNOVATION/EXPECTED RESULTS: Modeling of the business has indicated that the proposed concept is financially sustainable after the initial investment. It is quite possible that an initial investment of 42 solar panels serving 294 households could result in about 183 panels serving 1,281 households at the end of 10 years, at costs that are comparable to the cost of fuel for kerosene lamps. It is proposed to apply spiral development concepts to the business every three to six months to modify the model as needed to maximize its effectiveness.

PROJECT NUMBER: 4535

Solar Energy Provision for Lighting and Portable Water Provision to the Low Income Rural Community of the Nganha Village in the Adamaoua Province of Cameroon

COUNTRY: Cameroon
SUB-THEME: Environment
ORGANIZATION: Global Village Cameroon
FUNDING REQUEST: $184,885
CONTACT: Dieudonne Thang
TEL: +237 22 23 31 52
EMAIL: thangda@yahoo.fr
WEBSITE: www.globalvillagecam.org

OBJECTIVE: To provide electricity and portable water to the low income village of Nganha from solar energy in order to promote the conservation of nature and socio-economic and cultural development of the village.

RATIONALE: To promote solar energy contribution, nature conservation, and poverty alleviation in Nganha. This project will reduce consumption of fossil fuels and firewood, dependency on the centralised national grid connection, increase school attendance, improve on health and sanitation, and promote local businesses and tourism.

INNOVATION/EXPECTED RESULTS: Provision of energy from solar makes this affordable for the majority of rural households in Nganha. Benefits of contributing to the functioning of the system promotes reliable servicing, gives consumers the flexibility of returning or changing the system to suit their needs, and creates local jobs through a services delivery mechanism. This project lights about 150 households, health centers, schools and offices. Water well pumps will be developed to provide portable water to the community to reduce mortality and cholera. Portable water and energy will also improve the reproductive health of women. Income generating activities in Nganha will increase leading to an associated increase in infrastructure, equipment and services that will attract tourists. Nganha is on the road leading to Chad and Central African Republic so will be a safe stopping point for travellers. There will be a local reduction in greenhouse emissions from firewood and kerosene used for lighting.

PROJECT NUMBER: 4540

Door-to-Door Service of Solar Lanterns in Ghana

COUNTRY: Ghana
SUB-THEME: Product Innovation
ORGANIZATION: Wilkins Engineering
FUNDING REQUEST: $198,880
CONTACT: Omane Frimpong
TEL: +233 21 235 671
EMAIL: wilkins@africaonline.com.gh
WEBSITE: www.wilkins-eng.com

Objective: To provide modern, cost effective and environmental friendly lighting sources to rural populations in Ghana by providing solar lanterns to displace 10% of the kerosene lanterns in the country over the next five years.

Rationale: The kerosene lantern is commonly used in rural and peri-urban Ghana for lighting. Even though the Government of Ghana's Rural Electrification Program has been successful, about 50% of the population has no access to grid electricity and relies solely on the kerosene lantern for lighting. The quality of light is abysmal, and the cost of fueling is around $30 annually. With all these factors, coupled with the health hazards associated with kerosene burning, the project seeks to replace the kerosene lantern with a modern, economical and environmental friendly means of lighting.

Innovation/Effectiveness: Apart from offering brighter light (20 lumens), as compared to the popular kerosene lantern (10 lumens), the solar lanterns prove to be more economical than kerosene lanterns or candles in a period of two years. The solar lantern is so designed with an appearance similar to the kerosene lantern for ease of acceptability. The solar lanterns have two levels of lighting: a) 0.1W LED with less than 5 lumens and b) 0.5W with output of 20 lumens. The 0.1W LED bulb, which gives almost as much lighting as the kerosene lantern, can be switched on for 100 hours continuously—more than five days of autonomy. Most rural people sleep with the lights on, with the illumination level reduced, so two levels of lighting have been adopted. The 0.5W LED can give continuous lighting for 20 hours. The 2W PV module can also be used to charge mobile phones, thereby increasing access to communication and reducing the burden of walking long distances to charge phones.

PROJECT NUMBER: 4735

Greenlight Ghana

COUNTRY: Ghana

SUB-THEME: Service Delivery
ORGANIZATION: Greenlight Ghana
FUNDING REQUEST: $184,950
CONTACT: Toby Heaps
TEL: +1 416 203 4674
EMAIL: info@corporateknights.ca

OBJECTIVE: To provide affordable, solar-powered lighting to low-income households and small businesses in Ghana that currently use kerosene lamps for lighting.

RATIONALE: Due to the lack of grid connection and intermittent electricity supplies, two in three households in Ghana use at least one kerosene wick lamp for at least three hours per evening. With Kerosene prices at $0.75/litre, and rising, this works out to over $5 per month for one kerosene lamp. An increasing portion of the low-income urban demographic cannot afford to keep the lights on for even three hours per night. Almost no one in Accra uses solar lighting because it is currently more expensive than the alternative, namely kerosene wick lamps.

INNOVATION/EFFECTIVENESS: By linking global best-technology and priced solar LED lamp with distribution system modeled on cell phone industry with a 6-month payback, the project puts a ceiling on the cost of night light that is independent of rising kerosene prices, which will enable a growing portion of the population who would not otherwise be able to afford the rising cost of kerosene-powered light to have night light, while providing significant cost savings to those who substitute the solar lights for kerosene wick lamps.

PROJECT NUMBER: 4723

Modern Lighting for Rural Ghana

COUNTRY: Ghana
SUB-THEME: Service Delivery
ORGANIZATION: Toyola Energy Limited
FUNDING REQUEST: $87,000
CONTACT: Ernest Kyei
TEL: +233 24 9857141
EMAIL: toyolaenergylt@yahoo.com

OBJECTIVE: To take modern solar lighting to rural areas of Ghana by building a sustainable supply chain using our existing network of over 60 retailers and agents in four regions as the basis. We will utilize the powerful visual effect of a Mobile Solar Store to educate, demonstrate and promote usage of this cleaner and healthier alternative source of lighting.

RATIONALE: Ghana's rural areas, where a majority of the population lives, lack access to quality lighting, thereby compelling them to resort to kerosene lamps and other traditional fuels, which are not only polluting but sometimes dangerous. These fuels involve high costs for the average rural household, spending up to US$75 per annum, a high figure for a country where the average annual income is under $500. Meeting lighting needs in this way contributes to the vicious cycle of poverty prevalent in these underserved communities. This makes compelling arguments for the need to provide better but affordable modern lighting in Ghana, especially for poor rural communities.

INNOVATION/EXPECTED RESULTS: By demonstrating and educating rural folks about solar lighting right in their own communities, the project de-mystifies the technology, creates awareness and provides ownership opportunities for people that otherwise would not have access. Also, flexible payment options incorporated into the project, like barter financing where customers can pay in staple crops in lieu of cash, or the traditional Susu scheme whereby buyers can pay in small daily/weekly payments, removes the constraint of relatively higher initial costs of solar equipments.

PROJECT NUMBER: 4256

One Child One Solar Light

COUNTRY: Ghana
SUB-THEME: Environment
ORGANIZATION: Solux E.V.
FUNDING REQUEST: $199,720
CONTACT: Juergen Meinecke
TEL: +49 9621 74489
EMAIL: meinecke@solux.org
WEBSITE: www.solux.org

OBJECTIVE: To provide portable solar lamps to school children and their families in rural areas who do not have access to the electrical grid. Teachers at the schools are to serve as contact points with the affected families in order to guarantee the success of the project.

RATIONALE: About 50% of all families in Ghana lack access to the electric grid; during evening hours kerosene lamps and similar light sources are only able to provide limited light. Having access to sufficient light opens up freedom for learning, working and communicating and is therefore an appropriate instrument for combating poverty.

INNOVATION/EXPECTED RESULTS: The project intends to use the existing infrastructure that schools provide to form the basis of a countrywide program to convince school children and their parents of the usefulness and cost effectiveness of solar lamps. Making information available through schools, and the introduction of micro credit, will aid in making this project viable. The long-term relationship between teachers and school children will ensure correct usage of lanterns and micro credit payback on schedule. The project will build up an independent sales organisation in cooperation with local companies and schools, to enable a sustainable sale of solar lamps based on the idea of social marketing. In addition, public relations work, cooperation with ministries, and partnerships with public figures will remove legal, fiscal, cultural and economic obstacles, which might otherwise complicate sale of solar lamps.

PROJECT NUMBER: 4304

Solar Electric Streetlighting Assembled and Installed in Ghana

COUNTRY: Ghana
SUB-THEME: Environment
ORGANIZATION: SEPCO-Solar Electric Power Company
FUNDING REQUEST: $200,000
CONTACT: Stephanie Robbins Holloran
TEL: +770 220 6615
EMAIL: info@sepconet.com
WEBSITE: www.sepconet.com

OBJECTIVE: Establish a local manufacturing facility in Accra, which will produce SEPCO solar lighting products. The products will provide roadway infrastructure by offering low-cost, high-quality solar street lighting. These systems will offer reliability for many decades. The project will help grow the current Ghanaian economy by renting a facility and providing employment for the local workforce in the recruiting and training of installation and maintenance technicians. The project will also help the overall safety of those traveling the roadways by providing illumination.

RATIONALE: Current social problems being addressed are providing renewable power to homes and supplying clean, safe water needs. While this is important, it is also important that larger infrastructure be addressed such as roadway illumination to strengthen security and provide safer roads for travel. If roads are safer and easier to travel, they will be used more frequently, thereby increasing traffic to local businesses.

INNOVATION/EXPECTED RESULTS: The project will provide a partnership with a local company to establish a manufacturing facility. The facility will hire local residents to market, build, install, and maintain the lighting systems. The project hopes to establish a well known facility which can be self-sufficient and provide the knowledge and experience needed to apply this method for establishing additional solar lighting manufacturing facilities in nearby countries.

PROJECT NUMBER: 4574

Bounce the Light Off a Bright Wall

COUNTRY: Kenya
SUB-THEME: Environment
ORGANIZATION: Self
FUNDING REQUEST: $52,470
CONTACT: James Kimani
TEL: +254 721 443128
EMAIL: jameskimani@hotmail.com
WEBSITE: ceip@yahoo.com

OBJECTIVE: To improve the reflective ability of low-income informal housing walls through installation of recyclable panel boards.

RATIONALE: Rapid population growth in Africa has placed an enormous strain on an already stretched infrastructure resulting in the proliferation of informal housing settlements. The problem of informal settlements in Kenya persist, owing to a high incidence of poverty. This forces low-income earners to rely mainly on affordable rental housing built out of readily available, semi-permanent building material—including mud, timber and grass—as opposed to more expensive and permanent bricks/stone and mortar. Moreover, poor solid waste management strategies in many areas in Kenya has led to the accumulation of huge piles of uncollected solid waste, especially thin plastics bags and other recyclable materials.

INNOVATION/EXPECTED RESULTS: A common denominator of informal housing in low-income sections of Kenya and Sub-Saharan Africa is the poor reflective ability of the walling. This feature, when combined with the low quality light emitted by fossil fuel lamps and the limited brightness of low cost LED lamps, makes evenings in these houses very dim. This project seeks to offer an affordable solution to the problem of poor reflection by walls in informal housing by using panel boards made out of recycled materials. The solution easily fits in existing informal houses, thereby improving lighting for this low-income market segment. Moreover, by using thin plastic bag waste to make the panel boards, this project seeks to offer a solution to the endemic problem of uncollected solid waste through recycling.

PROJECT NUMBER: 4217

Developing a Delivery Model to Support Consumer Financing Schemes for Solar Powered Lighting Systems

COUNTRY: Kenya
SUB-THEME: Service Delivery
ORGANIZATION: Energy for Sustainable Development AFRICA
FUNDING REQUEST: $195,200
CONTACT: Charles Muchunku
TEL: +254 20 3871027
EMAIL: charles.muchunku@esda.co.ke
WEBSITE: http://www.esda.co.ke

OBJECTIVE: This project will set up an Energy Product and Service Delivery Company dedicated to supporting Microfinance Institutions and Financial Cooperatives to effectively implement the consumer financing PV delivery model in Kenya.

RATIONALE: Unless there is a significant decrease in the upfront cost of solar lighting systems and other modern energy products, consumer financing will continue to be the only option to providing increased access to modern

energy products to a large majority of over 5 million rural households whose only other energy alternatives are traditional fuels and fossil fuels. Most approaches to developing and supporting consumer-financing delivery models in Kenya have not been successful. They have focused on the demand side, i.e., creating awareness and providing access to finance without paying much attention to the supply side. The assumption is that this could be easily filled by existing suppliers.

INNOVATION/EXPECTED RESULTS: This project will focus on the supply side by setting up a company that will reduce costs by redesigning PV systems to take advantage of new lighting technologies, simplifying installation procedures, and directly sourcing components from manufacturers to shorten the supply chain. The project will improve the delivery of installation and maintenance services to ensure system performance, at least over the duration of the solar PV loan, by using Kenya's existing network of practicing freelance solar technicians across the country. They will also develop and use carbon finance to support after-sales services.

PROJECT NUMBER: 4365

Intensive Biomass Production Technologies for Rural Electrification

COUNTRY: Kenya
SUB-THEME: Environment
ORGANIZATION: Kenya Forestry Research Institute
FUNDING REQUEST: $196,500
CONTACT: Phanuel Okeyo Oballa
TEL: +254 722369412
EMAIL: pooballa@yahoo.com
WEBSITE: www.kefri.org

OBJECTIVE: To provide off-grid electric power based on gasification technology and rechargeable portable lighting lanterns to rural households in Bar-Chando area using sustainably managed biomass production systems.

RATIONALE: Rural electrification is lacking in most villages in Kenya. Such villages miss benefits of electricity such as lighting and power to use in cottage industries. The widely used kerosene lighting is costly and has associated health problems. Kerosene lamps are major causes of domestic fires in rural areas. This project will develop a model to promote sustainable biomass production for power generation in rural areas. The power generated relies on rural poor to supply biomass with tangible benefits to them. Electricity generated is used to charge lanterns. Long-life LED lamps will be adopted. It is estimated that about 60,000 will benefit from the products and services.

INNOVATION/EXPECTED RESULTS: This project will transfer biomass gasification technology, which has worked successfully in India and Kenya. Electricity will be available in areas not supplied by power grids. The biomass produced locally guarantees a sustainable supply of electric and wood energy. The planting of biomass using tested agro-forestry techniques will ensure increased productivity of agricultural crops, poverty reduction, environmental protection and enhancement. Biomass gasification technology will provide avenues for using invasive woody species. The use of portable LED lanterns will support wide penetration of lighting systems to households far from the grids. The power generated will create good learning conditions and support other necessities such as mobile phones, IT cottage industries, and employment.

PROJECT NUMBER: 4374

Kodesha Mwangaza—Rent a Light

COUNTRY: Kenya
SUB-THEME: Product Innovation
ORGANIZATION: Solar World EA Ltd.
FUNDING REQUEST: $177,730
CONTACT: Charles Oteki Rioba
TEL: +254 20 3599
EMAIL: otekirioba@yahoo.com
WEBSITE: www.solarworldea.com

OBJECTIVE: To address the need for an affordable modern lighting solution among low-income communities by eliminating the biggest barrier to adoption of modern lighting solutions – cost, through use of powerpacks.

RATIONALE: Over 80% of Kenyans, particularly the vulnerable groups living in slum areas, lack access to the national grid and depend primarily on fossil fuels for their lighting needs, leading to respiratory diseases and environmental hazards associated with indoor air pollution. While there are several off-grid solutions available to this market, including solar energy, the initial cost of these alternatives prohibits their uptake on a large scale. Addressing the energy needs of this bottom segment requires innovative service delivery models that increase access to modern energy on a sustainable basis, while remaining affordable to the vast majority.

INNOVATION/EXPECTED RESULTS: By providing rental powerpacks, this project makes electricity affordable for the majority of urban poor, rural households and slum dwellers. The rental system allows the consumer flexibility of renting a fully charged Powerpack from designated distributors in the neighborhood without having to invest in an off-grid power source, such as a solar panel. The project will set up 100 distribution agents and 10 service centers for the powerpacks to reach approximately 8,000 households within 18 months. In addition the Powerpack will be used for mobile charging and powering radios, and it will create a new market concept for portable electrical energy distribution among the poor in Kenya.

PROJECT NUMBER: 4700

Rural Lighting Access Program

COUNTRY: Kenya
SUB-THEME: Service Delivery
ORGANIZATION: Gpower
FUNDING REQUEST: $193,344
CONTACT: Robert Mutsaers
TEL: +254 020 3566591
EMAIL: Greenpower@wananchi.com

OBJECTIVE: Through a customized Energy Access Model, work through community based organizations, establishing construction, implementation, operation and management of profitable power generation and lighting distribution facilities in rural areas of Africa.

RATIONALE: Only 3.6 percent of rural Kenyan households are connected to the national grid. Even if the annual connection rate would double to 10,000 per year, it would take 400 years to connect the rural population. In Kirinyaga district, communities depend on kerosene and firewood, which are expensive, harmful to the environment and have health consequences. Without affordable electricity, private sector development is stifled. Green Power provides an economically viable solution to the diverse socio-economic problems within Kirinyaga region.

INNOVATION/EXPECTED RESULTS: Green Power establishes micro-hydro renewable energy generation- and mini-grid systems connecting 800-1,600 households per community through a customized energy access model which is co-financed, constructed, owned and operated jointly with small-scale farmer shareholders. In collaboration with astute local engineering partners and local consultants, Green Power designs, manufactures and assembles energy generation units and distribution components, and it builds prime structures, sub-stations and distribution networks. Green Power's approach is environmentally friendly, cheaper than conventional micro-hydro electrification schemes, ensures knowledge transfers, and provides assets that the rural communities can utilize to access credit markets and promote enterprise and social development. For the construction of the turbines, Green Power partners with advanced engineering companies in Nairobi such as Numerical Machining Complex and Sintronics Ltd. On legal aspects, Green Power benefits from a pro bono support program by Linklaters Ltd., a large USA law firm.

PROJECT NUMBER: 4347

Technology Transfer and Development of Local Entrepreneurs in LED Based Home Lighting in Kenya

COUNTRY: Kenya
SUB-THEME: Service Delivery
ORGANIZATION: THRIVE
FUNDING REQUEST: $188,000
CONTACT: Ranganayakulu Bodavala
TEL: +91 40 23736995
EMAIL: rangathrive@yahoo.com
WEBSITE: www.thrive.in

OBJECTIVE: The overall objective of this project is to enhance opportunities and capacities for Kenyans to generate employment and income through sustainable, non-fossil fuel-based LED lighting solutions. Specifically, the project aims to transfer the requisite LED lamp technologies to Kenyan SME businesses; create micro, small, and medium energy service enterprises to manufacture, sell, and service LED lamps; and increase the local content of the LED lanterns from 0% to 80%.

RATIONALE: Kenya's population is estimated at about 36million in about 7million households (2006). 82.6% of households do not have access to good/affordable lighting. Lighting expenditures (for kerosene, half of disposable batteries and battery charging) account for approximately 11% of total non-food household expenditures.

INNOVATION/EXPECTED RESULTS: This project aims at developing around 10 entrepreneurs who will manufacture LED lights in Kenya and help install them in as many as 25,000 homes with the help of small local businesses within specified periods of time. THRIVE, an Indian NGO that spearheaded the LED lighting in India, along with the Kenyan Industrial Research Institute, will help transfer the technology of LED light making and installation to the local entrepreneurs. Good and efficient lighting will help Kenya enormously. Kenyan children located in remote and dark areas will now be able to extend their study time into the late evening, thus being able to progress further in life and contribute to Kenya's growth. Owners of Micro and Small businesses too can extend business hours into the night without risking their health. With LED lighting rapid efficiencies are a possibility.

PROJECT NUMBER: 4745

Working through Faith-Based Organizations to Provide Improved Lighting and Battery Charging for Low-Income Households and Street Vendors in Rural Communities

COUNTRY: Liberia
SUB-THEME: Service Delivery
ORGANIZATION: Center for Sustainable Energy Technology
FUNDING REQUEST: $199,550
CONTACT: Augustus Goanue
TEL: +231 655 9266
EMAIL: gusgoanue@yahoo.com

OBJECTIVE: To provide improved lighting for low-income households and street vendors in rural Liberia through the use of micro-financed solar/LED lanterns.

RATIONALE: The lack of quality lighting for low-income households and street vendors in rural Liberia is an impediment to improving social and economic well-being. Good quality lighting enhances evening studies, improves security, and increases evening business hours and therefore sales for street vendors. According to the Government's draft Poverty Reduction Strategy Paper, less than 2% of rural residents have access to electricity, produced mainly from private generator sets at prohibitive costs; the remainder depend on traditional sources of candles, kerosene, and palm oil for lighting. Since their expendable income is low, an innovative approach is needed in providing improved lighting.

INNOVATION/EXPECTED RESULTS: The idea is to develop a micro-credit financing mechanism in a post-conflict setting by utilizing and building upon the strength of the church–community relationship in Liberia's rural communities. A new but proven lighting technology will be introduced that is sustainable, high quality, and has multiple uses—phone charging, lighting, and other battery charging in areas lacking these services. Working through the social network of the church will ensure high repayment rates and effective advertising; this unique supply chain will create a rural market. Innovative financing will provide needed micro-credit services to rural communities, and will introduce solar/LED technologies on a commercial basis and at an economic level accessible to such communities. Finally, bringing a service-oriented NGO in partnership with a private sector enterprise creates a sustainable business model.

PROJECT NUMBER: 4523

Innovative Clean Energy Technology Based Delivery Channels for Lighting Up Africa and Creating Institutions for their Sustainability

COUNTRY: Malawi
SUB-THEME: Environment
ORGANIZATION: The Energy and Resources Institute
FUNDING REQUEST: $145,625
CONTACT: Akanksha Chaurey
TEL: +91 011 24682100
EMAIL: akanksha@teri.res.in
WEBSITE: www.teriin.org

OBJECTIVE: To provide modern energy services to the community in Malawi by setting up a solar multi-utility (SMU) through an entrepreneurial delivery model and to develop an institutional model for ensuring long-term sustainability with the strategy for replicating and up scaling.

RATIONALE: Absence of electricity is a major concern in the proposed region of Malawi. The existing energy options are inefficient and expensive. Therefore the purpose of this project is to provide reliable energy services at an affordable cost through SMU and to develop micro-enterprise through an entrepreneurial model. The entrepreneur(s) may find it difficult to create and sustain new energy-based micro-enterprises on their own and would need the support of several trailblazing activities. Therefore an institution shall be created which will act as an anchor to the entrepreneur.

INNOVATION/EXPECTED RESULTS: Along with lighting applications the project would also facilitate other income-generating activities by providing charging options for large batteries, mobile phones, water purifiers, etc. It is a fee-for-service model, where energy services would be provided on a rental basis. It encourages reliable and affordable services to the end-users at one end while generating income locally at the other end. SMU will be set up in Makuluni village where currently households are deprived of modern energy services. TERI's concept of Market Facilitation and Enterprise Development Organization (MFEDO) will be developed as an incubator for linking and strengthening the SMU-based entrepreneurial activities. Here, MMCT (Mulanje Mountain Conservation Trust) would act as MFEDO.

PROJECT NUMBER: 4466

Connecting the Future

COUNTRY: Mali
SUB-THEME: Environment
ORGANIZATION: Brodtech B.V.
FUNDING REQUEST: $199,997
CONTACT: Sander Robert van der Waal
TEL: +31 10 5060986
EMAIL: Brodtech@live.nl
WEBSITE: www.brodtech.nl

OBJECTIVE: To reduce poverty by providing clean low-carbon electric power in rural areas based on Jatropha oil - a local renewable energy source - for lighting and powering households, small businesses, education, and health care needs.

RATIONALE: In Sub-Saharan Africa, the distance between the big power suppliers and the rural villages is a problem. Also, it is a problem to get fuel for normal generators into this area. By setting up mini grids which get their power from converted Straight Vegetable Oil (SVO) generators, we can provide rural villages with cheap electric power and stimulate local economic growth and development with no restrictions.

INNOVATION/EXPECTED RESULTS: By using generators which run on locally produced SVO, the rural areas gain energy autonomy and security, and they are no longer dependent on expensive imported fossil fuels. The local people can produce oil bearing crops using intercropping techniques, which do not put food production in jeopardy. When they use intercropping, the Jatropha also has some benefits for the other crops. The generators used are old technology, with a new

modification to run on SVO. After installation the local people benefit in several ways. They can increase their revenues by producing and selling Jatropha seeds. The village will be lighted at night to enhance safety, and the people will have better conditions for education. Health care provision can also be improved through use of electrical equipment, and small businesses can be started as well.

PROJECT NUMBER: 4490

Selling Solar Lamps through Used Clothes Network

COUNTRY: Mozambique
SUB-THEME: Service Delivery
ORGANIZATION: ADPP Mozambique
FUNDING REQUEST: $197,500
CONTACT: Christian Fenger
TEL: +258 21 750106
EMAIL: info@gaia-movement.org
WEBSITE: www.humana.org

OBJECTIVE: The primary objective of the project is to provide people in off-grid communities with light, by selling affordable solar lanterns and torches through a network of used clothes dealers.

RATIONALE: The project is necessary because very few rural households (e.g., 1% in Mozambique) are connected to the electric grid. The renewable energy solutions currently available (e.g., conventional PV systems) are out of reach of rural households. Many households actually spend considerable funds on candles and kerosene and would buy solar lanterns if they had the option. This would also reduce the incidence of respiratory diseases.

INNOVATION/EXPECTED RESULTS: The project is innovative by linking the sale of the solar lamps with used clothes, one of the few products that reach far into rural areas. The project links Chinese producers of low-cost solar lanterns and torches (white LED technology), with a trading company with experience in China and southern Africa—and with the ADPP organizations in Mozambique and Angola which have vast experience in selling used clothes. The action will import different models and determine which of these are affordable, while also suited to the conditions in southern Africa. One Chinese model has been selected, but several others will also be chosen from the many ones available. ADPP will also use their large network of staff and volunteers within community development projects and use village teachers trained at their 20 colleges to promote the solar products in villages. The project expects to get solar light systems to 10,000 families during the 18 months.

PROJECT NUMBER: 4332

Powering Up Lights – and Human Resource Capacity – in Mozambique

COUNTRY: Mozambique
SUB-THEME: Product Innovation
ORGANIZATION: AHEAD Energy
FUNDING REQUEST: $191,640
CONTACT: Mary Jeanette Ebenhack
TEL: +585 275-7429
EMAIL: info@aheadenergy.org
WEBSITE: www.aheadenergy.org

OBJECTIVE: To increase access to electricity for Mozambicans in off-grid locations by providing young adults with technical and entrepreneurial knowledge/skills and by supporting them in launching promising energy businesses.

RATIONALE: It is unlikely that there is a single approach to providing lighting and electricity services that can be rapidly implemented throughout Africa. More likely, it will take a broad menu of technologies, business models, and applications to lead Africa incrementally toward an energy turning point. Increased understanding of the principles of modern energy technologies and business will enable the transition from biomass-dependence to modern energy services. This transition will enable people to provide products in ways that meet basic human needs and are, at the same time, safe, affordable, environmentally benign, culturally appropriate, and reliable. Africans equipped for careers in the energy sector can take prime responsibility for steering their country's energy development.

INNOVATION/EXPECTED RESULTS: The effectiveness of our methodology rests on developing and deepening a partnership—with the premier Mozambican NGO, the national University, AHEAD Energy, and two US research universities—to implement an applied curriculum at three Technical Institutes and a Pre-University School that develops human resource capacity in energy and entrepreneurship. Beginning with wind and solar, we optimize proven energy technologies through coupling. Over time we explore a variety of electricity-generating technologies and end uses. The innovation/effectiveness of our business model lies in mentoring young adults with promising business concepts. We then launch the enterprises by providing materials and no-interest loans administered by an existing public institution focused on rural energy development.

PROJECT NUMBER: 4737

Village Lighting Solutions to Improve Education, Health, Safety and Productivity in Rural Namibia

COUNTRY: Namibia
SUB-THEME: Product Innovation

ORGANIZATION: Lebone Solutions
FUNDING REQUEST: $198,877
CONTACT: Hugo Van Vuuren
TEL: +857 928 6482
EMAIL: hugo.vanvuuren@gmail.com
WEBSITE: hugo@seas.harvard.edu

OBJECTIVE: To bring lighting to rural households in Namibia by introducing a low-cost combination of microbial fuel cell (MFC) and polymer light emitting diode (PLED) technology, and thereby improve education, health, safety, quality of life, and income levels in rural villages.

RATIONALE: 1.3 million people in Namibia, 88% of the rural population, have no access to modern electricity. These households are paying high costs for inefficient forms of energy and lighting (such as candles, firewood, and paraffin) that are hazardous to health and safety and an obstacle to educational achievement and productivity for children and family businesses. The only clean energy alternative currently available to rural households in Namibia is solar power, but this requires a major multi-year investment to purchase and, despite subsidized loan schemes, has not been accessible to the 56% of Namibians who live on less than $2 a day.

INNOVATION/EXPECTED RESULTS: Lebônê Solutions, composed of graduates, students and professors of Harvard and MIT, have extensive personal experience and connections in Africa. They will use a bottom-up approach to lighting Namibia by working directly with a grassroots youth network to introduce a low-cost combination of emerging technologies – MFCs that passively generate energy from organic waste matter, and PLEDs that require low power inputs and are rugged, flexible, and highly adaptable to all lighting needs – into off-grid villages across Namibia. In 27 months, we will introduce lighting devices into 9,000 households in three regions of Namibia and will help 900 young entrepreneurs start profitable micro-enterprises.

PROJECT NUMBER: 4498

Consumer Microcredit Enabling Solar Lighting

COUNTRY: Nigeria
SUB-THEME: Service Delivery
ORGANIZATION: Glenergy, Inc.
FUNDING REQUEST: $197,630
CONTACT: Glen MacGillivray
TEL: +1 613 687 2310
EMAIL: glen@glenergy.ca
WEBSITE: www.glenergy.ca

OBJECTIVE: The project objectives are to get modern lights to as many people as possible who are currently burning fuel for lighting; establish the tools and processes for large-scale implementation of solar lighting using consumer microcredit; propagate these tools throughout the world via Rotary International; generate interest and raise donations to finance growth; and improve the technical and business capabilities of U-Squared and of Glenergy.

RATIONALE: The project will provide large financial benefits by using consumer microcredit to finance the rapid introduction of modern lighting, thereby reducing fuel expenditures. Additional benefits will include: improved indoor air quality, reduced environmental damage, reduced fire risk, and improved literacy rates.

INNOVATION/EXPECTED RESULTS: We will work with rotary clubs to finance and support consumer microcredit for the end users of the lights and lighting systems. We will build the necessary tools, processes, and infrastructure to allow very rapid expansion throughout Nigeria, with the bulk of the grant money being used to finance the end users by pre-purchasing suitable products and establishing an in-country inventory which can be loaned. We will obtain and qualify candidate villages through Rotarians in cities who can network to their home villages. Rotary brings matching grants and larger grant programs that will allow rapid growth throughout Africa and the rest of the developing world. Our model of establishing local procurement and distribution supported by third-party financing will be portable to other organizations and places.

PROJECT NUMBER: 4578

Deployment of Renewable Energy Technologies for Rural Lighting in Africa

COUNTRY: Nigeria
SUB-THEME: Environment
ORGANIZATION: Bestek Energy Limited – Bestek Energy Corporation
FUNDING REQUEST: $199,991
CONTACT: Dr. Dickson Ozokwelu
TEL: +202 459 0300
EMAIL: deozok@msn.com
WEBSITE: dozokwelu@yahoo.com

OBJECTIVE: To hasten the provision of electricity to rural households in Nigeria by demonstrating the deployment of lower cost, affordable Integrated Green Energy Systems (IGES) to serve as models for rural communities.

RATIONALE: There is severe shortage of electricity in Nigeria. About 4,000 MW installed generation capacity serves 140+ million people, including about 20% of the rural population. Lack of a reliable power supply adversely affects the living standards of Nigerians. Rural areas are hit the hardest. Plans are underway to construct large gas power plants, but this will benefit mostly urban and industrial areas. Hence Integrated Green Energy Systems (IGES) could provide an immediate solution for lighting rural areas.

INNOVATION/EXPECTED RESULTS: This project combines energy efficiency and renewable energy technologies to design lower cost, affordable direct

current electrical systems for deployment in rural areas. Designs integrate energy efficient electrical equipment and accessories to reduce electrical load in buildings prior to implementing renewable energy technologies. This brings down the cost of implementing renewable energy technologies by an order of magnitude. Two design concepts will be evaluated during the demonstration: (a) central solar/wind systems distributed by five mini-grids for 50 clustered homes, and (b) decentralized solar systems for 50 scattered individual homes. Five expected project outcomes to speed up the deployment of IGES are: (1) demonstrating the IGES concept, (2) determining IGES installation costs, (3) evaluating infrastructure required for replicating IGES installation, (4) developing indigenous technical capabilities for installation and maintenance of IGES, and (5) developing sustainable financing system for IGES installation.

PROJECT NUMBER: 4342

Lunar-Resonant Solar-Driven Wi-Fi Streetlights

COUNTRY: Nigeria
SUB-THEME: Product Innovation
ORGANIZATION: SwisNic Ltd.
FUNDING REQUEST: $197,070
CONTACT: Georges Wagner
TEL: +4917651429363
EMAIL: katelydon@hotmail.com
WEBSITE: www.civiltwilightcollective.com/index.htm

OBJECTIVE: To deliver low-cost, technologically advanced ecologically sustainable lighting and communications services to streets and public spaces in rural and semi-rural areas of Nigeria.

RATIONALE: Scarcity of outdoor lighting and the unreliability of grid-based lighting are major concerns for Africa's development. The provision of reliable, low-cost, sustainable lighting, in combination with communications infrastructure, will have a positive impact on local economies, social structures, and public safety. Solunar WiFi Streetlights improve existing commercial activity, make possible new commercial endeavors, permit safer nighttime travel/trade, boost education/business, and connect communities.

INNOVATION/EXPECTED RESULTS: This project proposes a pilot installation of Solunar WiFi Streetlights in the state of Ekiti, Nigeria. A 10-15 luminaire installation will provide off-grid, photovoltaic-powered lighting that is more reliable and costs much less than conventional street lights. The installation also offers integrated wireless communication nodes. Solunar WiFi Streetlights present a new way of thinking about public lighting. These lights sense and respond to ambient moonlight, dimming and brightening each month as the moon cycles through its phases. This innovation uses up to 90% less energy than conventional street lights, and is entirely solar-powered. The LED luminaire is powered by an ultra-compact photovoltaic/battery system, and requires minimal maintenance compared to conventional bulb technologies. Solunar WiFi Streetlights will be manufactured in Nigeria, thus benefiting the local economy. Our designers will work with local companies to utilize readily available local materials and fabrication techniques, in order to maximize cost effectiveness.

PROJECT NUMBER: 4260

Power to the Poor: Off-Grid Lighting from Cassava Waste in Nigeria

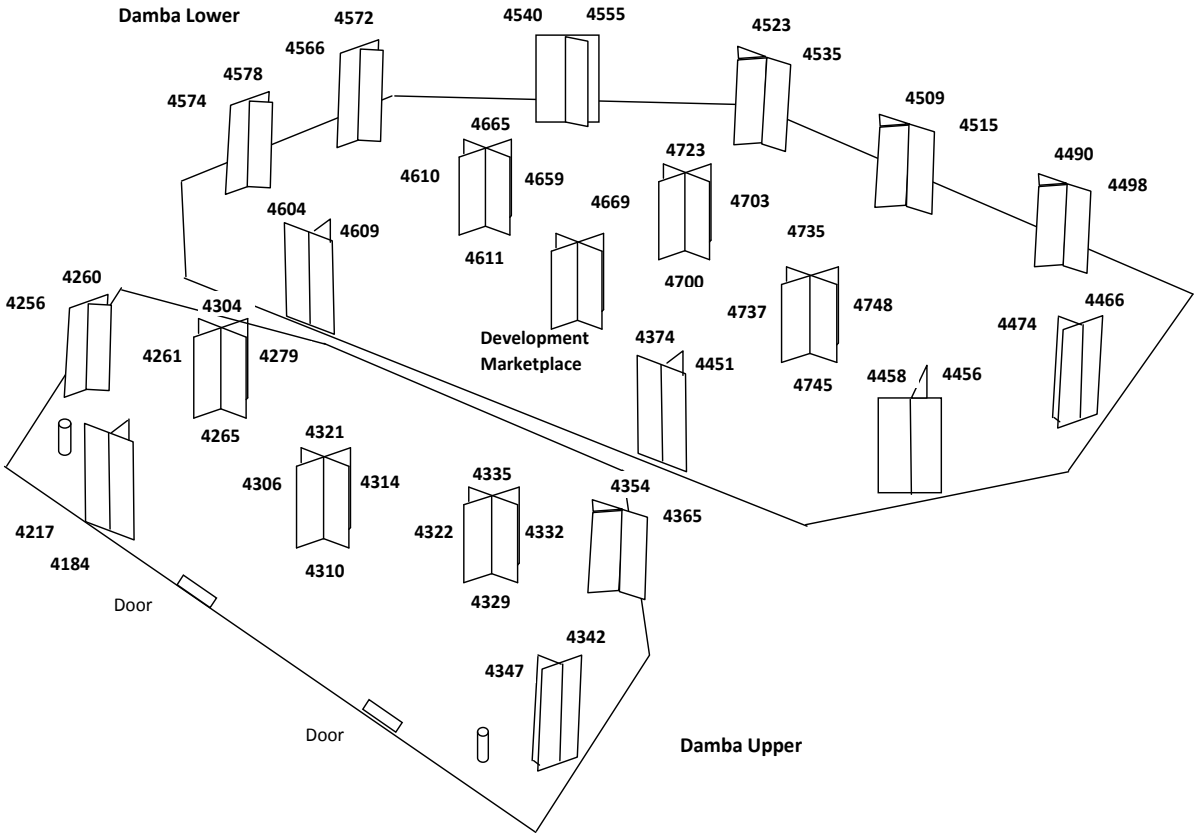
COUNTRY: Nigeria
SUB-THEME: Environment
ORGANIZATION: Global Network for Environment and Economic Development Research
FUNDING REQUEST: $200,000
CONTACT: Dr. Joseph Adelegan
TEL: +234 8062843428
EMAIL: dr_joseph_adelegan@yahoo.co.uk
WEBSITE: www.gneeder.org

OBJECTIVE: Nigeria, the largest world producer of cassava, produces 37-million metric tons yearly out of the 168-million metric tons of total world production, and it also generates US $5 billion in revenue annually. However, despite the economic and social benefits, cassava waste is a major public health issue in Nigeria, causing water pollution and greenhouse gas emissions.

RATIONALE: The idea is to abate pollution and mitigate GHG emissions, hence improving ecosystems and human health through investment in a sustainable biogas plant. Zero emission biogas technology treats cassava waste and produces biogas, to drive microturbines for low cost, safe and reliable off-grid energy efficient lighting to 2,250 peri-urban/rural poor homes. The sludge acts as environmentally safe organic fertilizer for low-income farmers.

INNOVATION/EXPECTED RESULTS: Existing interventions used the conventional anaerobic treatment process, which has several drawbacks, such as low treatment efficiency, odor, and long retention time. These obstacles are overcome by our proven and cutting-edge anaerobic fixed film biogas technology. Both the capital investment and operating costs are lowered, resulting in a more economic system. The project capital budget is US$310,000 with US$200,000 from LADM 2008 and US$ 110,000 from Cows to Kilowatts Partnership Limited. Pay-back period is 3.5 years, and the productive plant life is 15 years.

Lighting Africa Development Marketplace
Floor Plan



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PROJECT NUMBER: 4321

Renewable Electrification for the Rural Poor in Nigeria

COUNTRY: Nigeria
SUB-THEME: Service Delivery
ORGANIZATION: Rural Africa Renewable Energy Project
FUNDING REQUEST: $200,000
CONTACT: Anukam Stanley Onyewuchi
TEL: +2348037126996
EMAIL: rareproject1@yahoo.com

OBJECTIVE: The main objective of the overall LED solar home system program is to commercialize SHS across the country through the provision of affordable rechargeable and solar home systems to 50,000-100,000 Power and Fantsuam Foundation as a multi-skilled team. Barefoot Power has developed low cost products specifically for villages. Product features include a plug-and-play design, to allow system growth/expansion, charge with an AC charger for near-grid customers, and/or extra investment can be made to add a solar panel. Microfinance loans reduce upfront costs and will be piloted by Fantsuam Foundation, which has seven years of experience in microfinance loan collection at a 95-100% repayment and solar/ICT technical knowledge. Two microfinance ideas for rural electrification will be tested before RAREP replicates these in Imo State: end customers are offered 4-12 month $30-$100 loans and renewals to expand the kits as reward for timely repayments; and micro-entrepreneurs are offered 1-6 month loans of $100-300 and 5-10 month loans for $5-30 products, which are sold in a fortnight.

PROJECT NUMBER: 4515

Clean Electricity from Plant Matter

COUNTRY: Rwanda
SUB-THEME: Product Innovation
ORGANIZATION: BioVolt
FUNDING REQUEST: $174,950
CONTACT: Gerardo Jose la O'
TEL: +617 253 2692
EMAIL: gjlao@mit.edu

OBJECTIVE: BioVolt's GreenWatt provides low-cost, clean, renewable energy to rural households and business owners using a turn-key microbial fuel cell (MFC) technology. Our GreenWatt generates combustion-free electricity by directly extracting energy from cellulosic biomass. Together with GeoCO2, we will refine and deploy our technology in rural Rwanda, where only 5% of 10 million people have access to electricity.

RATIONALE: Lack of access to electricity has vast social, economic, and environmental impacts, constraining over a million people in Rwanda from enjoying a fuller life and engaging in productive nighttime activities. Current options reinforce the poverty cycle– hand-to-mouth families are trapped into buying hazardous, poor quality alternatives (i.e. batteries, kerosene, or burning) that are inefficient, that release soot particles and pollutants, and are prohibitively expensive in the long run.

INNOVATION/EXPECTED RESULTS: GreenWatt meets the power requirements and cost constraints of communities through superior technology, delivery, and financing. For technology, the novel solution uses benign, naturally abundant microbes as a catalyst. Readily available cellulosic plant matter (i.e., grass, leaves, agri-waste) serves as fuel, and low-cost oxide compounds are used to reduce oxygen and complete the fuel cell reaction. Our system allows for continuous 24-hour operation, a clear advantage over cyclic, fluctuating operations of solar and wind renewable systems. For delivery, our solution will contribute to increased local economic development through a market-based support system and increased productivity with electrification. In terms of financing, the project will achieve sustainability through a unique financial model that allows communities to trade carbon offsets.

PROJECT NUMBER: 4322

Providing Affordable Home and Business Lighting for Africa with Dye Sensitized Solar and Mesopic LED technology

COUNTRY: Rwanda
SUB-THEME: Product Innovation
ORGANIZATION: G24 Innovations Limited
FUNDING REQUEST: $198,925
CONTACT: David Slogan
TEL: +44 (0) 2920 837340
EMAIL: david.sogan@g24i.com
WEBSITE: www.g24i.com

OBJECTIVE: This project aims to use the breakthroughs in solar and LED technology to bring a reliable and

RATIONALE: Nigeria's poorest people are dependant on kerosene lamps, candles and battery flashlights at night, and typically spend 5% of income on lighting. This can be redirected to lighting systems that improve home safety, education, basic security, and builds the local economy, the home-asset base, and the nighttime micro-businesses.

INNOVATION/EXPECTED RESULTS: Rural Africa Renewable Energy Project (RAREP) will lead Barefoot

households in rural Nigeria via both cash-and-carry sales and micro-credit supported sales. However, so far SHS investment remains a non-commercial activity in Nigeria given the high upfront investment and technical constraints.

affordable renewable lighting solution to rural homes and businesses.

RATIONALE: There is enormous demand for home and small business lighting in Africa. However, many millions of rural dwellers remain dependent on kerosene lamps. To date, solar PV products have not experienced mass uptake in Africa because of prohibitively high entry costs, lack of availability, and the fragility of the systems. This product will meet the high demand for integrated lighting for small dwellings and businesses. We have chosen Rwanda as our launch country, but the product suitability and distribution methodology are easily replicable in any other country.

INNOVATION/EXPECTED RESULTS: The product uses a new, light, flexible, robust and cost-effective solar cell, which provides the opportunity for rapid price reduction over the next 3-5 years. The Light uses a new Mesopic LED light, which is tuned to the wavelengths most clearly seen by the human eye at low light levels. It offers more useable light for less energy, improving the business case for the product. The product will also function as a mobile phone charger, battery charger, and source of energy for a radio, offering added value to users. This multiple functionality will allow product deployment through the well established mobile phone channels.

PROJECT NUMBER: 4703

Photovoltaic Power to Light Dassilame, Senegal

COUNTRY: Senegal
SUB-THEME: Service Delivery, Environment
ORGANIZATION: Africa Web Services
FUNDING REQUEST: $199,900
CONTACT: Momar Dieng
TEL: +1 718 690 3513
EMAIL: momar.dieng@africawebservices.com
WEBSITE: www.africawebservices.com

OBJECTIVE: To offer a long-term, sustainable, environmentally responsible solution to the problem of rural electric power starting with household lighting.

RATIONALE: Lighting in households and community areas of villages is a basic prerequisite to any improvement in livelihood including many of the priorities outlined in the Millennium Development Goals. For example, universal primary education is impossible if children are not able to read and do homework at home after dark. Gender equality and women's empowerment often benefit from the greater safety afforded from lighting and the ability to conduct income-generating tasks in the evening.

INNOVATION/EFFECTIVENESS: A participating community - based approach will put beneficiaries in control of the project and give them complete ownership of the equipment. They will enter into a formal maintenance plan which will make use of technical competencies discovered in the area during the pilot phase and create employment and propagate the economic impact of the project well beyond the original target community. This will ensure proper servicing and upkeep of the units and create a greater stakeholder base for the project. A sustainability and growth strategy will tap into the global carbon trading mechanism to finance replacement costs for existing units over time and up-front costs for the purchase of new units in the expansion and replication phase to neighboring communities.

PROJECT NUMBER: 4261

Lighting for the Frankincense and Myrrh Industry in Somaliland

COUNTRY: Somalia
SUB-THEME: Environment
ORGANIZATION: Gund Institute
FUNDING REQUEST: $83,952
CONTACT: Gary Flomenhoft
TEL: +802 656 2906
EMAIL: gary.flo@uvm.edu
WEBSITE: www.uvm.edu/giee

OBJECTIVE: To improve the economic position and environmental health of the Erigavo harvesting community by providing solar-powered lighting.

RATIONALE: The lucrative resin trade has been active for thousands of years, however few technological improvements have been implemented to increase economic gain/efficiency, while protecting the limited output of the resin trees. Providing indoor lighting at the Bakaar (sorting station), during the evening—when temperatures are more tolerable—will allow for a cleaner, cooler and more controlled environment for sorting. This will increase productivity and strengthen quality control. Moreover, electricity will extend work and educational hours and free up time for other necessary daytime activities. Lastly, kerosene lanterns in use by the community in their homes are costly to operate and create significant indoor air pollution, which can lead to respiratory health problems.

INNOVATION/EXPECTED RESULTS: By installing solar photovoltaic-powered indoor lighting at the Erigavo Bakaar, a more productive work environment will be achieved. Lighting will increase efficiency and allow harvesters to sell a higher quality product that will increase their profits. This is especially significant in a region where the resin trade is the main industry and poverty is severe. Approximately 100 families currently use this Bakaar for resin sorting and drying. Self-charging portable solar lanterns will be rented to harvesters for home use. This will reduce their monthly lighting costs by over half while eliminating air pollution and improving health conditions. This design will serve as a replicable model for other Bakaars used by some 10,000 harvesting families across the Sanaag region.

PROJECT NUMBER: 4451

Reducing Investment Hurdles for PV Lighting – Development, Field-Testing, and Marketing of Intelligent Lighting Modules

COUNTRY: South Africa
SUB-THEME: Product Innovation
ORGANIZATION: Synopsis
FUNDING REQUEST: $196,260
CONTACT: Michael Grupp
TEL: +0033 467440410
EMAIL: mg@synopsis.org
WEBSITE: www.synopsis.org

OBJECTIVE: To facilitate increased affordability of electric lighting for rural households independent of subsidies and loans.

RATIONALE: The high up-front price of PV lighting is a hurdle for market introduction in DC. Potential clients feel that there is a risk involved to invest in an unknown technology. Also, the acquisition usually needs financing and/or subsidies, which adds another hurdle and complicates access.

INNOVATION/EXPECTED RESULTS: Hurdles can be lowered until the risk appears acceptable – particularly in the case of PV, a technology that works at any rating, from very small to big. The solution to be developed is an "intelligent lighting module" (ILM). The client can step up the power rating by adding as many ILM units as needed. Each unit typically illuminates a few m² of floor space, or a work- or reading space. In order to serve for the whole household, several units can be installed and interconnected. A special auto-diagnostic after-sales service capacity will be built into the system. We propose the development and field testing under market conditions of such a base unit. The project will optimise the ILM considering power rating, technical, practical, cost, marketing and maintenance aspects. It will develop the hardware for the field test phase and conduct the test, to which it will communicate results to potential stakeholders (manufacturers, distributors, users).

PROJECT NUMBER: 4665

Establishment of a Rural Microfinance Energy Division (ERMED) for the Microfinance Institution SEF based on the Grameen Shakti Model

COUNTRY: Tanzania
SUB-THEME: Service Delivery
ORGANIZATION: MicroEnergy International
FUNDING REQUEST: $185,000
CONTACT: Noara Zohra Kebir
TEL: +49 177 3987713
EMAIL: Noara.Kebir@MicroEnergy-International.com
WEBSITE: www.microenergy-international.com

OBJECTIVE: The objective of MicroEnergy International (MEI) during ERMED is to expand access to modern lighting in socially and structurally deprived areas through already established microfinance services.

RATIONALE: More than 80% of Tanzanians have no access to electricity. They depend on candles and fossil fuels like kerosene for lighting. Their expenditures for energy increase due to price developments on international markets. Solar kits based on photovoltaics are an appropriate solution for modern lighting in rural Tanzania. The light they offer is brighter, cleaner and more secure than lighting from kerosene lamps. Over the middle and long-term, solar lighting is even cheaper because of longer economic lifetime and low running costs. Though some local enterprises offer photovoltaic products, the initial costs are too high for the majority of Tanzanians.

INNOVATION/EXPECTED RESULTS: Microfinance Institutions (MFIs) are champions in supporting economical development on grassroots levels by offering small credits in socially and structurally deprived areas. ERMED will introduce a powerful innovation into the Tanzanian context, combining the development catalysers of microfinance and energy services. The Small Enterprise Foundation (SEF) is the ideal MFI to start with microfinanced energy services in Tanzania, because their rural clients are most ready for energy services. They have asked for solar credits without being specifically marketed in this direction. They already receive credit amounts comparable to solar credits and one-third have already signed to participate in a solar credit program. Through LADM2008-Funding, SEF will develop the business, training, and install a revolving fund through financing the first 250 systems.

PROJECT NUMBER: 4458

Family Pedal Power and Lighting Project—East Africa

COUNTRY: Tanzania
SUB-THEME: Service Delivery
ORGANIZATION: Dissigno
FUNDING REQUEST: $199,599
CONTACT: Gary R. Zieff
TEL: +001 415 601 3771
EMAIL: gary@dissigno.com
WEBSITE: www.dissigno.com

OBJECTIVE: To create a sustainable, community-based, distributed lighting and power service that provides an alternative to dangerous kerosene lanterns currently in use in Africa.

RATIONALE: Lighting contributes directly to the improvement of education, health, and living conditions, especially for women and children. Lighting contributes

to the development of economic activities and wealth generation. Light allows students to study after dark, shops to stay open later, and adults to engage in wealth-generation activities. Kerosene and candlelight produce toxic smoke, inferior luminescence and present burning risk. Improved lighting is critical to reducing toxins, fire danger, and eye strain. Environmentally benign electricity allows isolated communities access to improved lighting, which can also foster additional business opportunities. Improved lighting coupled with environmentally friendly electricity, supported by a sustainable enterprise, will directly address Millennium Development Goals.

INNOVATION/EXPECTED RESULTS: Pedal Project will provide the service of light to replace kerosene lanterns and candles. Battery-powered lights, supported by human-powered generators, will be rented to community members at price parity with kerosene cost. Project plans will install 20 generators and 3,000 lights through local NGO partnerships. Revenue-generated user fees will support Pedal Power enterprise operations and expansion. Other community enterprises will benefit from available investment capital and employment opportunities. Given the urgency of the Millennium Development Goals, this project can help reduce child mortality, improve maternal health, eradicate poverty and create economic opportunities. Based on prior experience in Haiti, Pedal Power can financially break even by year two, allowing re-investment for market growth.

PROJECT NUMBER: 4659

Finance and Improved Market Access for Rural Solar Lighting

COUNTRY: Tanzania
SUB-THEME: Product Innovation
ORGANIZATION: Tujijenge Tanzania
FUNDING REQUEST: $193,670
CONTACT: Felistas Coutinho
TEL: +255 22 2701025
EMAIL: cfelistas@yahoo.com
WEBSITE: www.tujijengeafrika.org

OBJECTIVE: To provide microfinance to the rural populations in off-grid regions of Arusha, Manyara, and Kilimanjaro so they can install solar home systems to enable them to have clean lighting, charge their mobile phones, and listen to the radio in an affordable way.

RATIONALE: Only 10% of the rural Tanzanian population has access to grid power, while 90% of the population uses alternatives that are not clean, such as paraffin lamps and generators. Rural households spend an average of $20 a month on basic needs, lighting homes with local paraffin lamps and charging a phone once or twice a week at a $0.5 per charge. Using dry-cell batteries to run the home radio is considered a luxury. Providing a loan for a basic solar system to cover the above basic needs will improve the quality of their lives, thus meeting Tujijenge Tanzania's vision of "Improving lives through microfinance." Repayments would be pegged on income flows and average expenditure on lighting before installation of the solar unit.

INNOVATION/EXPECTED RESULTS: Innovation is in providing finance to rural and banked populations through local Financial Service Providers (FSPs), such as SACCOS and Village Banks. The interest rate charged is shared between the local FSP and Tujijenge Tanzania (TTZ). A linkage is made with the local technicians so that money is directly paid to the technicians to install a turnkey system and provide after service. A total of 150 systems will be installed in 18 months, reaching out to 900 people and to 300 systems in three years.

PROJECT NUMBER: 4611

Longoi Village Low Cost Lighting Project

COUNTRY: Tanzania
SUB-THEME: Service Delivery
ORGANIZATION: Ensol (T) Ltd.
FUNDING REQUEST: $199,960
CONTACT: Prosper Remmy Magali
TEL: +255 22 2450468
EMAIL: ensolut@yahoo.com

OBJECTIVE: The project main objective is to "design and implement a successful credit delivery business model of low cost, high quality Solar Home Systems (SHS) for Longoi village low income consumers."

RATIONALE: In Tanzania, 75% of the population lives in rural areas and only about 2% of them have access to grid electricity. Alternatives such as solar resources continue to remain untapped and inaccessible for the rural inhabitants. While affordability is a big question especially for the rural poor, ENSOL is aiming to mitigate this issue by opening up the products through a credit system. At the same time, recognizing the need for PV systems to reach the rural market, the company is also looking at the creation of designing simpler high-quality PV systems.

INNOVATION/EXPECTED RESULTS: In Tanzania, providing SHS packages direct to end users on a credit delivery scheme is a new step to take. A thorough assessment was conducted by ENSOL prior to the full proposal being written. The payback is imminent as the source of consumer income is commercial farming of fruits and vegetables cultivated in valleys under the slopes of Usambara Mountains. The potential beneficiaries of the project are 3,723 people and 906 households of Longoi village. The project shall set up an office at the heart of the district, a move that shall guarantee a further potential of 334,922 people in rural Lushoto a reliable, accessible supply to solar equipment and services. The targets could also be higher by scaling the credit initiative to other surrounding villages and cash selling of high quality, low cost products.

PROJECT NUMBER: 4572

Nishati Ya Kijiji

COUNTRY: Tanzania
SUB-THEME: Service Delivery
ORGANIZATION: German-Tanzanian Partnership
FUNDING REQUEST: $110,416
CONTACT: Andrea Karsten
TEL: +49 (0) 406047717
EMAIL: andreakarsten@gmx.de
WEBSITE: www.d-t-p-ev.de

OBJECTIVE: To combine training of young people in sustainable energy and to create a new one-hand microfinance model for solar technology in cooperation with PRIDE, the largest and most experienced microfinance organization in Tanzania.

RATIONALE: No grid – no light – no development. Tanzania is a very large country with poor infrastructure. Rural and urban areas in Zanzibar / Pemba as well as mainland Tanzania suffer because of the lack of electricity. Strong sunlight is plentiful, dependable, and would be the ideal source for local power supply. Today, solar technology is widely known, even in rural areas. But there are hardly any resellers, no knowledge about technical issues and maintenance, and no functioning model for financing purchases. Training and financial tools are needed to overcome these economic challenges and all other obstacles.

INNOVATION/EXPECTED RESULTS: The DTP project "Youth for Climate Protection and Intercultural Exchange" yields astounding results. Young people in Tanzania looking for new jobs represent a huge development potential. Since the project started in 2000, a new solar generation has emerged, growing every year—in Tanzania and in Germany. The project has now reached the point where it would make sense to work with the most experienced microfinance organization in Tanzania to overcome the financial obstacles, which stand in the way of a desire for clean, independent and sustainable energy. The development of a new microfinance model similar to Grameen Shakti in Bangladesh in cooperation with PRIDE ZANZIBAR and PRIDE Tanzania will cover a lot of field work and training.

PROJECT NUMBER: 4509

Providing Affordable and Reliable Solar Systems in Northern Tanzania

COUNTRY: Tanzania
SUB-THEME: Environment
ORGANIZATION: Zara Solar Limited
FUNDING REQUEST: $200,000
CONTACT: Mohamedrafik Parpia
TEL: +255 28 2502910
EMAIL: zarasolar@yahoo.com
WEBSITE: www.zarasolar.com

OBJECTIVE: Using solar photovoltaic to provide electricity to rural households and for income generating activities in northern Tanzania using Savings and Credit Cooperative Societies (SACCOS).

RATIONALE: A majority of Tanzanians live in areas without electricity and depend on increasingly expensive kerosene for lighting. Grid electricity is not expected to be available for many years to come, making solar photovoltaic systems a viable option. The availability of electricity will help in reaching some of the MDG goals. Presently, major barriers hindering the rapid use of solar photovoltaic systems are high initial costs and lack of access to loans from financial institutions. Another setback is that the available micro finance institutions that could help are few. They are located in urban areas and charge exorbitant interest rates, making solar systems very expensive.

INNOVATION/EXPECTED RESULTS: SACCOS are established by people who live in the same locality and know each other or work together - like teachers, nurses, civil servants, etc. The government encourages the formation of SACCOS and fully supports them. There is a bank CRDB, which supports SACCOS by giving them loans at lower interest rates. As SACCOS become located in remote rural areas and charge lower interest rates to their members, using them will enable many people to have solar systems. What is needed is to convince SACCOS to finance PV which is considered risky. This project aims to use SACCOS, a network of solar technicians, and reasonably priced solar systems to reach remote areas where solar dealers are not present.

PROJECT NUMBER: 4748

Using Photovoltaic Kits to Improve Rural Women's Economy and Social Status in Southern Togo

COUNTRY: Togo
SUB-THEME: Environment
ORGANIZATION: Jeunes Volontaires pour l'Environnement
FUNDING REQUEST: $198,750
CONTACT: Alouka Sena
TEL: +228 2200112
EMAIL: yvetogo@hotmail.com
WEBSITE: www.ong-jve.org

OBJECTIVE: Empower rural women to play a greater role in community development through access to affordable and reliable photovoltaic kits, small, interest-free loans and adequate capacity-building.

RATIONALE: According to a recent survey, about 82% of the women of southern Togo strongly believe that access to a clean and affordable sources of energy will drastically improve their livelihoods. Further, 96% are convinced that access to small, low-interest loans will positively change their social status and enable them to

gain a greater voice both at the family and community level. The Directorate of Energy estimates that the electricity grid will not reach those communities before 2030. Unfortunately, the socio-economic crisis from which the country is striving to recover disallowed them from purchasing expensive solar equipment. Providing 10,000 users with solar lighting equipment—payable in small tranches and giving access to light, information and communication facilities—will undoubtedly address the roots of the gender-based poverty.

INNOVATION/EXPECTED RESULTS: By combining the well-known potential of micro-credit solar electricity to that of women empowerment, this project is designed to sustainably address poverty and climate change. With a minimum initial deposit, women will be trained, granted a small loan to kick-start an organized business, have access to a tailored PV kit and join the Solar Women's Group (SWG). This will open unlimited windows of opportunities: jobs, longer night markets, longer study hours, better health services, adult night schools, etc. Importantly, a Local Project Management Committee (LPMC) will ensure ownership, extension, supervision of the equipment and organization of eco-friendly activities.

PROJECT NUMBER: 4474

Creation of Supply Chains and Distribution Networks of Solar Energy Systems and Energy Efficient LED and Other Solid State Lighting Products for Off-Grid Applications in Uganda

COUNTRY: Uganda
SUB-THEME: Service Delivery
ORGANIZATION: Energy Plus, Ltd.
FUNDING REQUEST: $200,000
CONTACT: Livingstone Bangi
TEL: +256 77 2441953
EMAIL: cdk-eng@utlonline.co.ug

OBJECTIVE: To commercially distribute electricity in off-grid areas using reliable and cost-effective solar electricity and to increase energy efficiency in lighting on-grid areas.

RATIONALE: For lighting purposes, 4,700,000 households and businesses in off-grid areas use kerosene. This source of lighting is of poor quality, causes health hazards and contributes to GHG emissions. Our main strategy is to substitute the kerosene lighting with modern lighting using reliable and cost-effective combinations of solar energy, LED lights and electricity storage systems. Benefits of the project include providing lights for clinics and health centers; providing electricity for activities at night such as studying, business, security, power for communication; and creating jobs for the service providers.

INNOVATION/EXPECTED RESULTS: Our innovation is to provide lighting services that save energy costs, provide higher quality light with minimum maintenance, and mitigate the health and safety hazards.

We have a Memorandum of Understanding (MoU) with various institutions to facilitate our project: Private Sector Foundation Uganda, Uganda Christian University, banks, and reliable product suppliers.

PROJECT NUMBER: 4456

Light Up Rural Uganda

COUNTRY: Uganda
SUB-THEME: Product Innovation
ORGANIZATION: Uganda Development Trust
FUNDING REQUEST: $199,900
CONTACT: Garakumbe Innocent
TEL: +256 41 4533626
EMAIL: igarakumbe@udet.co.ug
WEBSITE: www.udet.co.ug

OBJECTIVE: To increase solar energy access for rural poor communities in Uganda by setting up a simple and user-friendly Solar Loan Fund.

RATIONALE: Out of 27 million people in Uganda, about 3-5% of the population have access to grid-supplied electricity coupled with an annual growth in demand of 7-8%. Uganda had one of the lowest per capita electricity consumption rates of 58 kwh/year in 2003, compared with China's 2,140 in 2006 and the United States' 12,187 in 2006.

INNOVATION/EXPECTED RESULTS: The innovativeness/effectiveness of the project is embedded in its ability to reach people who are in dire need of solar energy, especially those that live in rural areas. This will be achieved by setting up a Solar Loan Fund that will provide small loans in the form of equipment. Loans will be paid over 9 months and no collateral will be required. Interest charged on the loans will only be used to cover some operational costs of the fund so as to ensure sustainability. The service will be provided at the client's door-steps. The solar systems will be tailored to the needs of poor communities. A pool of community-based solar systems maintenance technicians will be trained to handle minor technical issues. The teaming up/partnering with an experienced private solar company will enable the management team to achieve the project's objectives. It is important to note that this is a tested business model because Uganda Development Trust (UDET) is currently implementing a similar project, and the proposed project will be a replica of the existing initiative.

PROJECT NUMBER: 4306

Pico Hydro for Rural Lighting and Electrification

COUNTRY: Uganda
SUB-THEME: Environment
ORGANIZATION: Pico Energy Ltd.
FUNDING REQUEST: $183,810
CONTACT: Phillip Maher
TEL: +44 (0) 1884 841794
EMAIL: phil@picoenergy.co.uk
WEBSITE: www.picoenergy.co.uk

OBJECTIVE: To promote the use of modern lighting in rural Uganda and the wider region through the introduction of low cost, mini-distribution grids, using small-scale hydropower as the energy source.

RATIONALE: According to Government figures, just 5% of the Ugandan population has access to electricity. Current efforts to electrify rural areas are progressing only very slowly and barely keeping pace with population growth. Recent programs such as increased subsidies for solar power systems will go some way to providing an alternative to grid extension but are still only likely to be taken up by relatively affluent consumers. Mini-distribution grids powered by pico hydro offer a further alternative at approximately one tenth of the cost per kilowatt-hour of typical solar systems.

INNOVATION/EXPECTED RESULTS: Two demonstration schemes connecting around 200 households will be implemented in rural Uganda. Demand surveys using the concept of a 'light package' will enable each scheme and distribution system to be appropriately sized. Households at all income levels within a given radius of the generator should be able to afford a connection and are encouraged to join. The community contributes labor and cash for connection and house-wiring when power has been demonstrated at the generator. Local engineers will be trained to make and install the turbine-generator unit so that the skills and technology are available to install further schemes. Further innovation will include digital meters for rapid flow and head assessment, GPS site mapping, and bespoke software tools for optimized scheme design.

PROJECT NUMBER: 4184

Pilot Landfill Gas System and Plant Based on Bio-digestion of Piggery Manure

COUNTRY: Uganda
SUB-THEME: Product Innovation
ORGANIZATION: Cabreri Farm Products Limited
FUNDING REQUEST: $168,085
CONTACT: Charles Akulep
TEL: +256 772 587995
EMAIL: Charles_akulep@yahoo.co.uk

OBJECTIVE: To popularize use of biogas systems for small -- medium scale electricity generation based on landfill gas system and energy plants.

RATIONALE: In Uganda, over 90% of households have no access to electricity. A majority of schools in rural areas are not connected to the national grid, even when they are close to power lines, due to non-affordability. Use of biogas to generate electricity based on landfill gas system and energy plants is a well-established technology, though it is under-exploited in the tropics, where humidity and temperatures make the technology naturally suitable. The burning of vegetative matter to operate steam engines is much more common though it involves environmental destruction.

INNOVATION/EXPECTED RESULTS: The project will demonstrate cost-benefits of integrating electricity generation in on-farm waste management. Use of on-farm models will be extrapolated to demonstrate the potential benefits of establishing similar plants in public institutions such as schools, hospitals, etc. Findings of the project should stimulate increased investment in the area for provision of clean energy among poor communities in Africa. It will establish an on-farm pilot landfill gas system and energy plants in rural Uganda to generate 145 KVA of electricity, and establish systems and structures for sustained spread of the technology. This will include building local capacity in the management of Biogas electricity generation plants; increasing awareness on Biogas powered electricity generation in Uganda; and advocating for creating a policy framework to increase access to landfill gas systems and energy plants' technologies by potential stakeholders.

PROJECT NUMBER: 4329

Recharging Fees for Lamps Can Buy Hours of Solar Light

COUNTRY: Uganda
SUB-THEME: Service Delivery
ORGANIZATION: Sunlabob Renewable Energies Co., Ltd.
FUNDING REQUEST: $199,662
CONTACT: Andy Schroeter
TEL: + 856 21 313 874
EMAIL: andy.schroeter@sunlabob.com
WEBSITE: www.sunlabob.com

OBJECTIVE: Rural households in Uganda can afford electric lighting with the same small incremental payments they are accustomed to making for bottles of kerosene, but with solar light they pay less per hour for better light.

RATIONALE: Kerosene for lighting is a steady cash drain on rural households. However, when they buy solar lamps, they own expensive equipment for which they must repay loans and must account for maintenance and servicing by repairmen who may often not be

reliable or trustworthy. Solar lighting for households must therefore: a) allow households to pay with small incremental expenses like they already do for kerosene, b) servicing and replacements must be such that households don't have to worry about it, and c) the delivery system must be a commercially viable service in order to allow sustainability and growth.

INNOVATION/EXPECTED RESULTS: Sunlabob-TSSD rents large solar charging stations to small village entrepreneurs who are specifically trained to service the equipment. The small entrepreneurs own solar lamps. Households can then take a charged lamp to their home, and a microprocessor in each lamp safeguards the battery against misuse and deep discharge. Households pay a fee to exchange depleted lamps for charged ones. With the income from these fees, the entrepreneur pays the rent for the charging station, the depreciation of the lamps, and the operational expenses. A franchise arrangement maintains the relationship between entrepreneurs and TSSD-Sunlabob and is designed to spread throughout Uganda and East Africa.

PROJECT NUMBER: 4279

Lighting the Way

COUNTRY: Zambia
SUB-THEME: Product Innovation
ORGANIZATION: The Regents of the University of California Office of Research
FUNDING REQUEST: $199,800
CONTACT: Kurt Kornbluth
TEL: +530 304 0012
EMAIL: kkorn@ucdavis.edu
WEBSITE: http://eec.ucdavis.edu/

OBJECTIVE: The goal of the project is to design and distribute an inexpensive, modular white LED lighting system that can displace or supplement kerosene lighting in Sub-Saharan Africa through existing market-based mechanisms.

RATIONALE: Although widespread, typical kerosene lamps provide poor light and contribute to respiratory problems when used indoors. In Zambia 98% of the non-electrified households use kerosene lamps as their primary lighting source. By providing a renewable-based lighting alternative, these households will have better light for less money with a lower environmental and public health impact. With better quality light, shops can stay open and children and adults can study and learn after dark.

INNOVATION/EXPECTED RESULTS: To avoid dependency on micro-finance or charitable dissemination models, *Lighting the Way Zambia* will focus on developing a lighting system that can be purchased in increments, in much the same way that kerosene fuel is currently purchased in the developing world. The objective is to mimic the economics of how kerosene fuel is bought and sold, focusing on advanced lighting and micro-power technologies. The final product will cost less that $3 per module and $25 per watt, yielding a minimum of 50% reduction in life-cycle carbon emissions, and provide better light than a kerosene lamp. Initial roll out during the LADM support period will be to 5,000 households in rural and urban communities in Zambia, and then will be scaled up. In five years, we anticipate a half-million new light-emitting diode (LED) customers will benefit from better lighting, improved indoor air quality, and the potential reduction of CO_2 by 10,000 tons.

PROJECT NUMBER: 4314

Cell Phone Light Station

COUNTRY: Multi-Country
SUB-THEME: Product Innovation
ORGANIZATION: Carmanah Technologies Corporation
FUNDING REQUEST: $199,940
CONTACT: Richard Chesson
TEL: +250 412 8383
EMAIL: rchesson@carmanah.com
WEBSITE: www.carmanah.com

OBJECTIVE: To provide outdoor lighting to African communities without reliable electricity supplies, by combining innovative technology with an innovative business model. Such a combination will be self-financing and can replicate quickly to make a definitive change in the lighting situation in sub-Saharan Africa.

RATIONALE: Most of Africa suffers from a lack of clean, reliable lighting both privately and publicly. Electrical grids are often unavailable in rural areas or are unreliable (frequent blackouts). The alternatives—fuel lamps or diesel generator-supplied incandescent lights—are inefficient, expensive to operate, polluting, and are noisy and in need of regular maintenance in the case of generators. Reliable lighting enables people to work and study at night and enhances public safety.

INNOVATION/EXPECTED RESULTS: The core concept behind our proposal is to join forces with cellular phone operators to deploy 60 Cell Phone Light Stations in Kenya, Tanzania, and Nigeria that combine lighting with cell phone services—battery charging, public phone, internet access, and advertising. These services enable a micro-entrepreneur to own and operate the Cell Phone Light Station profitably and then to repay the cost of ownership over a period of three years. This project will accelerate the deployment to rural African communities of highly efficient, reliable, pollution-free solar-powered outdoor lighting with significantly lower lifecycle costs than conventional fuel-powered lights. It will increase revenue opportunities and provide light to African micro-entrepreneurs. The project will leverage cellular operator's micro-entrepreneur networks to overcome capital cost and distribution barriers to widespread deployment of solar outdoor lighting.

PROJECT NUMBER: 4609

Distribution of Solid-State Kerosene-Replacement Lighting: Large-Scale Dissemination of a Micro-Scale Technology

COUNTRY: Multi-Country
SUB-THEME: Product Innovation
ORGANIZATION: Sympletek, LLC
FUNDING REQUEST: $147,300
CONTACT: Chadi Depelchin
TEL: +510 282 8683
EMAIL: sympletek@gmail.com
WEBSITE: www.sympletek.com

OBJECTIVE: This commercial partnership between an innovative new manufacturer, an eager African distributor, and an established grass-roots NGO will allow widespread distribution of ultra-affordable solar-LED lanterns in at least six Sub-Saharan nations. The innovative product being introduced into Africa for the first time, the SolarFlare, was designed at the University of Illinois (home of Professor Nick Holonyak, the inventor of the LED) after thousands of hours of on-the-ground research and development in rural India. SolarFlare prototypes were purchased without subsidization by villagers in India at a 3X markup, and the product is expected be a revolutionary introduction in analogous African markets.

RATIONALE: This partnership deals only with technologies that are paid for by economically disadvantaged consumers themselves. It disregards unsustainable systems that rely on hand-outs or scope-limiting subsidies. As such, the partnership is entirely self-sufficient, profit-motivated, and driven by consumers' preferences to create social, environmental, and financial returns on investment.

INNOVATION/EXPECTED RESULTS: Using several distinct and proven supply chains, the partnership will commercially distribute 150,000 lanterns over the one-year project period, scaling up to 800,000 units in the second year, and projecting annual sales of at least 1.2 million units in subsequent years.

PROJECT NUMBER: 4604

Lights for Life in Sub-Saharan Africa

COUNTRY: Multi-Country: Kenya, Rwanda, and Uganda
SUB-THEME: Environment
ORGANIZATION: Lights for Life International
FUNDING REQUEST: $199,275
CONTACT: Sameer Hajee
TEL: +1 647 8661934
EMAIL: sameer_hajee@yahoo.com
WEBSITE: www.lightsforlife.org

OBJECTIVE: To light up rural households in Sub-Saharan Africa by delivering an innovative, affordable, low-maintenance, off-grid LED lighting system.

RATIONALE: Like much of Sub-Saharan Africa (SSA), Rwanda, Uganda and Kenya face an electricity supply crisis. The problem is especially dismal in Rwanda where fewer than 2 percent of the 8.4 million people, who live mostly in rural areas, have access to lighting after dark. Most attempts to address the need for rural lighting in these countries have been unsuccessful, as they have either involved the slow and expensive extension of an already under-provisioned electricity grid to rural areas or the development of expensive, difficult-to-scale and maintain small-scale projects from hydro, wind, solar and biomass resources. Lighting and poverty are inextricably linked in SSA. Lighting facilitates many productive activities and significantly contributes to human development. An off-grid lighting solution that is affordable and easy to scale and maintain can help break the poverty cycle.

INNOVATION/EXPECTED RESULTS: LFL's 'Nuru' (meaning "Light" in Swahili) is a state-of-the-art, grid-independent, modular, portable lighting system, offering dependable lighting anywhere and anytime. Co-created with local beneficiaries and stakeholders, Nuru will address rural lighting like no other product in the marketplace. Prototypes of the Nuru lighting system will be field tested in Rwanda, Uganda and Kenya through two delivery mechanisms. In Kenya, LFL and UNICEF will provide Nuru to rural schools. In Rwanda and Uganda, LFL will set-up rural lighting microfranchises that will each provide fee-based lighting services to rural communities.

PROJECT NUMBER: 4354

New Light from Old Batteries

COUNTRY: Multi-Country: RD Congo and Mali
SUB-THEME: Product Innovation
ORGANIZATION: Antenna Technologies Geneva
FUNDING REQUEST: $199,000
CONTACT: Urs Heierli
TEL: +41 (0)22 731 10 34
EMAIL: uheierli@antenna.ch
WEBSITE: www.antenna.ch

OBJECTIVE: To provide affordable and reliable lighting solutions to rural households and to develop a tested and replicable business model for scaling-up in Africa through technologies that can produce good light using all kinds of old batteries, either by pumping their remaining energy content or by giving them a new life as part of a special rechargeable lighting device.

RATIONALE: By making LED lighting solutions suited to consume the remaining energy in used batteries, one can lower the costs for rural lighting and other applications. Antenna's networks in Africa are geared

towards activities similar to rural lighting, and it would like to identify suitable partners for large-scale dissemination beyond its partners in Asia.

INNOVATION/EXPECTED RESULTS: There are lots of used small or large batteries that cannot serve to start an engine or power a normal light bulb. Antenna has developed technologies that can make use of the remaining energy in a battery through two innovations: a) a micro-chip that can regulate the voltage for an LED lamp from 0.8 to 12 volts and b) an ultra-low cost device to make use of the remaining energy in a car battery when it is incapable of starting an engine. In cooperation with SELCO and Solar Tuki in Asia, reliable lanterns are developed that could be tested and used in Africa. Of special interest is a multi-purpose charging station that could not only produce LED lighting but also connect other applications such as a radio, charge cell phones, and connect a small electro-chlorinator already developed by Antenna.

PROJECT NUMBER: 4610

PedalPower and Light

COUNTRY: Multi-Country
SUB-THEME: Product Innovation
ORGANIZATION: Village Tech Solutions
FUNDING REQUEST: $199,830
CONTACT: Owen David Sowerwine
TEL: +650 853 1713
EMAIL: dhsowerwine@earthlink.net
WEBSITE: http://villagetechsolutions.org

OBJECTIVE: To make the EcoPower system available in Africa as inexpensive as possible through a network of licensed dealers and village-level entrepreneurs.

RATIONALE: Worldwide, many areas need a minimum 'lifeline' of electric power. In 2005 VillageTech/ EcoSystems Nepal created the EcoPower system of energy generation, storage, distribution, and battery management. It captures off-peak power if available, supplements it with human-generated power, carefully protects the batteries, meters the energy delivered, and makes available 0.1-120 watts anywhere, anytime. DM2006 grant 3340 helped field test and broaden the system.

INNOVATION/EXPECTED RESULTS: This DM project offers the opportunity to shape a marketing plan and dealer network appropriate for local energy needs and business infrastructure so that many more Africans may benefit from access to electricity. This overcomes the expense to conduct due diligence, prepare marketing plans, build and manage a dealer network, and build confidence in a novel product, which can discourage for-profit firms from developing products for the poor. Success will be visible in schools in the form of lights and A/V education equipment, in illuminated health posts, in mini-business centers, in easily-recharged cell phones, and of course in villages with clean light, music and news in every home -- from electricity. Beneficiaries will include students, health care patients, business customers and households where grid or conventional renewable energy is otherwise unavailable, unreliable or unaffordable.

PROJECT NUMBER: 4310

Quality DC CFLs for Off-Grid Markets

COUNTRY: Multi-Country
SUB-THEME: Environment
ORGANIZATION: ELI
FUNDING REQUEST: $164,000
CONTACT: Uwe Weber
TEL: +86 10 82800935
EMAIL: weber@efficientlighting.net

OBJECTIVE: The project will support sustainable development and will reduce indoor air pollution and CO_2 emissions within African rural communities by facilitating the transition from traditional lighting sources such as kerosene, wood, etc., to off-grid electric lighting via performance specification and quality assurance of off-grid 12V DC Compact Fluorescent Lamps (CFLs).

RATIONALE: Users need to accept new electric lights to sustain the change from fuel-based lighting to CFLs. If shoddy lamps would disappoint users, they will likely revert to inefficient, but reliable lighting sources. The problem today is that many substandard quality CFLs enter developing countries' markets. In protecting end users and support program managers, quality standards play an important role.

INNOVATION/EXPECTED RESULTS: ELI, together with its partner SABS, will develop a quality performance specification for DC CFLs and enhance local market surveillance and technical test capacity. Independent lighting experts will develop the performance specification in close dialogue with stakeholders. Partners will facilitate this stakeholder dialogue, and in parallel, conduct and support capacity building for local lighting laboratories. This platform, once established, could also facilitate other lighting quality related work in the context of the Lighting Africa program. Finally, the quality specification will be marketed to manufacturers, regulators, and program managers. Lighting program managers will use this specification to minimize CFL-quality related projects in bulk purchasing and CFL promotion campaigns. End users can trust the ELI certification label when purchasing replacement products. In the end, the project will facilitate and ensure the transition to efficient off-grid electric lighting in rural Africa.

PROJECT NUMBER: 4555

Recyclo Solar

COUNTRY: Multi-Country: Togo, Mali, Senegal, Cameroon, Ivory Coast, Nigeria, and Republic of Guinea
SUB-THEME: Product Innovation
ORGANIZATION: AGROPARK CLIMAT Association
FUNDING REQUEST: $199,285
CONTACT: Rudy Forstmair
TEL: +33 6 89258924
EMAIL: agropark06@yahoo.fr
WEBSITE: http://ip21st.tripod.com/france

OBJECTIVE: This project is to provide traditional houses in rural villages in Africa with the energy efficient off-grid power system RECYCLO SOLAR for small appliances and lighting.

RATIONALE: The lack of electrification is a major concern of rural villages. The availability of electricity-dependent lighting and communication equipment can have a direct impact on poverty and education. As promoted in the Millennium Development Goals, electrification is expected to reach all the localities. Lighting enables the population to extend activities after dark and insures especially for women a more secure environment. Therefore, AGROPARK CLIMAT Association has formed a partnership with LES AMIS DE LA TERRE-TOGO or FRIENDS OF THE EARTH (in English) and 3 other Partners to promote AGROPARK's RECYCLO SOLAR and wishes to electrify with it the rural village of Zooti-Atchanve.

INNOVATION/EXPECTED RESULTS: In African countries where sunshine is prevalent, there is a well-known energy deficit in rural areas, as is the case with Zooti-Atchanve. Usually the Togolese people are subject to the state's services, through the intervention of the Compangnie Energie Electrique du Togo for their various needs in electrical power. This service does not yet totally cover the needs of the inhabitants of the capital and other major cities. So, it is difficult to believe that this service will one day be available in the villages. However, the sun can provide cost-effective energy for energy efficient lighting and small appliances. The project RECYCLO SOLAR is therefore an unexpected opportunity and solar power remains a major innovation in lighting in Togo.

PROJECT NUMBER: 4566

Umeme Kwa Wote – "Energy for Everyone"

COUNTRY: Multi-Country: Kenya and Uganda
SUB-THEME: Product Innovation
ORGANIZATION: OSRAM GmbH
FUNDING REQUEST: $200,000
CONTACT: Rodd Eddy
TEL: +49 89 62132656
EMAIL: r.eddy@osram.com
WEBSITE: www.osram.com

OBJECTIVE: To enable rural East African community's access to portable solar generated light and clean drinking water, reduce carbon emissions, improve quality of life, and improve the economical situation by replacing traditional kerosene lanterns with solar lamps charged through an energy hub.

RATIONALE: An unavailable grid due to lack of affordability and electrification reach has meant rural communities utilise kerosene as fuel for light production. Access to consistent quality electric light increases the potential for activities after dark—for example night fishing—further education, improved health conditions, and abatement of carbon emissions. Due to existing initial cost outlay, people are unable to afford reliable high quality systems that can have positive impacts both environmentally and socially. Furthermore, with increasing and unstable oil prices, potential poverty alleviation is limited. Furthermore, the livelihoods of people like night fisherman depend on light.

INNOVATION/EXPECTED RESULTS: An energy hub access to portable solar generated electrical light at a lower litre equivalent cost than kerosene is possible. The per charge basis will enable affordability, flexibility and reliability for light products. Users have the ability to improve their quality of life, secure additional income through lower costs, improve budgeting, provide ability for further education, provide affordability for basic commodities, and/or re-investment into locally owned businesses. Local partnership with micro-finance organizations enables better financial planning assistance with community based organizations. Clean drinking water reduces contact with bacterial born diseases, reducing the burden on families and communities for healthcare, and carbon emissions abatement limits inhalation of potential toxic kerosene fumes and improved environmental conditions

About the Jurors

Juror Chairperson

Dr. Richard H. Hosier, *Team Leader, Climate and Chemicals, Global Environment Facility.* Dr. Richard Hosier has served as the Team Leader for Climate and Chemicals at the Global Environment Facility (GEF) Secretariat since 2004. Prior to that, he spent 10 years as the Principal Technical Adviser on Climate Change for the United Nations Development Program's GEF Unit. Dr. Hosier has actively participated in the UN Framework Convention on Climate Change since 1994. For nine years he served as an Assistant Professor of Energy Management and Policy and International Development and Appropriate Technology at the University of Pennsylvania.

Juror Facilitator

Ms. Judy Siegel, President*, Energy and Security Group /Lighting Africa Project Manager.* Ms. Siegel brings 30 years experience in renewable energy financing, policy and technology. She has worked in over 60 countries worldwide and has extensive experience in developing and implementing clean energy projects in rural settings. She has served as President of the US Export Council for Renewable Energy (representing over 1600 industry members), Deputy Director of the World Bank Asia Alternative Energy Program (ASTAE), and Managing Director of the Winrock International Clean Energy Group. She currently manages the Lighting Africa Program operations and leads the LADM competition. Ms. Siegel has a BA in Economics and Masters in Public Administration.

Development Marketplace Jurors

Mr. Clement Gwalania Abavana, *Ghana Energy Development and Access Project, Ministry of Energy.* From 1998-2003, Mr. Abavana played a pivotal role in his country's development as the coordinator for its Renewable Energy Services Project. This project supplied PV systems to homes, schools and clinics across the country and provided water pumping to rural communities in Northern Ghana. Currently, Mr. Abavana is Project Coordinator for the Ghana Energy Development and ACCESS Project (GEDAP) at the Ghana Ministry of Energy. He received his Masters of Public Administration from Harvard University in 1997.

Ms. Merunisha Ahmid, *Business Line Leader for Environmental and Social Sustainability Advisory Services, International Finance Corporation (IFC).* Ms. Ahmid heads the E&S product business line for IFC's Advisory Services operations in Africa, with a particular focus on Sustainable Energy and Cleaner Technologies products and services. She joined IFC in Washington, DC in 1992 and has been based in Johannesburg since 2005. She is a lawyer and Fellow of the Chartered Insurance Institute.

Ms. Harriette Amissah-Arthur, *Director, the Kumasi Institute of Technology and Environment (KITE).* Ms. Amissah-Arthur has 25 years of working experience; of which 19 has been spent serving in various capacities with the Volta River Authority (VRA), Ghana's Power Generation and Transmission Utility. Since May 2000, Ms. Amissah-Arthur has managed the African Rural Energy Enterprise Development (AREED) Program and has considerable experience in enterprise development, especially with small and medium scale energy enterprises. She has championed, promoted and managed a number of development projects in the areas of Energy and the Environment including Energy, Gender and Poverty, and the Clean Development Mechanism.

Mr. Moutaïrou Raoufou Badarou, *Conseiller Technique aux Ressources Energétique et Minière, Ministère des Mines, de l'Energie et de l'Eau Cotonou.* For five years Mr. Badarou served as General Director of Energy in Benin where he set the policy and implementation of the Country Electrification Project and contributed to the Energy Consumption Control Programme. Currently, Mr. Badarou is a technical adviser in the Ministry of Energy, Mining and Water. Since 2004 he has also served as a coordinator of the Energy Service Purchase Project.

Mr. Amare Hadgu, *Project Coordinator, Rural Electrification Fund, Ethiopian Rural Electrification Executive Secretariat.* Mr. Hadgu has worked as an electrical engineer and consultant in different assignments in Ethiopia, including with the Ethiopian Electric Power Corporation, Midroc Construction, and The World Bank. Currently, he serves as Project Coordinator for the Rural Electrification Fund, secured from WB, GEF and the Ethiopian Government. He holds M.Sc. degrees in Electrical Engineering from Odessa Polytechnic Institute Ukraine and in Electricity Industry Management and Technology from the University of Strathclyde, UK.

Ms. Patricia Kawagga, *Coordinator of Special Projects, FINCA Uganda.* Ms. Kawagga is Coordinator of Special Projects at FINCA Uganda, where she is responsible for coordinating all non-financial loan products, including energy. She is a member of the product development team working on product design, pilot testing, monitoring and evaluation of all FINCA Uganda products. She has specialized in micro finance and service delivery of energy products to rural communities. Ms. Kawagga is currently pursuing a Masters of Business Administration.

Joel Kolker, *Regional Program Leader for East and Southern Africa, Public-Private Investment Advisory Facility.* Joel has lived and worked in Africa for over 20 years. He has experience in power generation, transmission and distribution and has worked in the water, sanitation and housing sectors in sub-Saharan Africa. Currently, he supports PPIAF which provides public sector assistance to facilitate private investment in infrastructure, including in the energy sector.

Mr. Marlon Lezama, *Senior Financial Specialist and Global Small and Medium Enterprise (SME) Program Coordinator, Water and Sanitation Program (WSP) and the Energy Sector Management Assistance Program (ESMAP), The World Bank.* Mr. Lezama is the Senior Financial Specialist and Global SME Program Coordinator, helping to engage the domestic private sector in the delivery of water, sanitation and energy services. Prior, he was based in South Asia as Program Manager - Business Enabling Environment, with the IFC on a US$42 million multi-donor SME Development Facility covering Bangladesh, Bhutan, Nepal, North East India, Sri Lanka and Maldives. Before IFC, he was Chief Program Officer (Trade and Investment) at the Commonwealth Secretariat in London where he spent 16 years working with governments, NGO's and SMEs in over 40 countries in Africa, Asia, The Mediterranean, the Pacific and the Caribbean.

Dr. Ellen Morris, *President and Co-Founder, Sustainable Energy Solutions; Co-Founder, Arc.* Dr. Morris founded Sustainable Energy Solutions in 1996, a consulting firm engaged in international development, policy analysis, and research on energy issues for national governments, development agencies, foundations, and the private sector. In 2008, she is launching Arc, an organization that will promote and expand access to financing for modern energy, water and other basic needs to build the income/assets of poor people around the world. Dr. Morris has a BS degree in Geophysical Engineering from the Colorado School of Mines and a doctoral degree in Marine Geophysics from the University of Rhode Island.

Mr. George M. Nchwali, *Director of Finance and Administration, Rural Energy Agency.* Mr. Nchwali was appointed as Director in October 2007. Prior, he worked as the Finance & Administration Manager for National Examinations Council of Tanzania starting in 2006. Serving in both in public and private institutions, he has 16 years experience in the petroleum industry, including six as the Administration Manager and Company Secretary for the Tanzanian & Italian Petroleum Refining Company. Mr. Nchwali holds an MBA from the University of Dar es Salaam and a Diploma in Accounting from the Dar es Salaam School of Accountancy.

Mr. Christopher Neyor, *Principal Energy Expert, Liberian Reconstruction and Development Committee (LRDC).* Mr. Neyor advises President Sirleaf and the Minister of Lands, Mines and Energy on energy policy and strategy for reconstruction of Liberia's energy infrastructure following 14 years of civil conflict. Prior, Mr. Neyor was in private consulting practice in Texas. He spent a decade with the Liberia Electricity Corporation and as Managing Director at the start of the Liberian civil war. Mr. Neyor was also a visiting scholar in the early 90s at the Center for Energy and the Environment of the University of Pennsylvania. He graduated in Electrical Engineering from Wright State University in Dayton, Ohio, and obtained a MS degree in energy economics from the University of Denver and MBA in Management from Stanford University's Graduate School of Business. He is a registered P.E. in New Jersey and Texas.

Dr. Marianne Osterkorn, *International Director, Renewable Energy and Energy Efficiency Partnership.* As Director since 2004, Dr. Osterkorn is responsible for REEEP's global operational management. Prior, she served as Head of the Executive Office of Austrian Power Trading and Head of Organizational Development and Divisional Manager for International Relations. Here, she was active in the development of the EU renewable directive and the European renewable certificate system. Dr. Osterkorn has a Ph.D. in Business Administration from the University of Economics in Vienna and Masters of Arts in Industrial Psychology from Western Michigan University.

Ms. Dana Rysankova, *Senior Energy Specialist, Africa Energy Unit, World Bank.* Ms. Rysankova brings extensive experience in rural energy access programs in Latin America and Africa Regions and has led projects and analysis related to electricity access expansion, renewable energy and carbon finance in Bolivia, Brazil, Honduras, Tanzania, Kenya, and Guinea. Ms. Rysankova holds a Masters in International Economics and European Studies from John Hopkins University.

Ms. Jyoti Shukla, *Program Manager, Public-Private Investment Advisory Facility.* Ms. Shukla serves as Program Manager of PPIAF, which is managed by the World Bank. Ms. Shukla manages a portfolio of technical assistance grants to over 100 countries. Prior, she worked for the World Bank on private sector development, infrastructure and public-private partnerships. Ms. Shukla holds a Masters Degree in Economics from the Delhi School of Economics and a Masters in Public Affairs from Princeton University.

Ms. Richenda Van Leeuwen, *Senior Adviser, Good Energies.* Ms. Van Leeuwen's work with Good Energies focuses on the nexus between renewable energy investing and poverty alleviation. Prior, she served as Senior Advisor to Argidius Foundation and was responsible for overseeing the strategic re-structuring of the foundation and its project portfolio in international development and sustainable employment creation in W. Africa, Central America and Eastern Europe. She holds an MBA degree from the University of Durham.

Jurors for Whom Bios Were Not Available at Time of Print

Mr. Tcharabalo Abiyou, *Directeur General, Ministère des Mines, de l'Energie et de L'Eau, Togo*

Mme. Bah Kadiatou Balde, *Directrice Nationale Adjointe de l'Energie, Ministère de l'Energie et de l'Hydraulique, Guinea*

Mr. Vincent Loh, *Chairman, Kenya Renewable Energy Association*

Mr. Nava Toure, *Director, Bureau d'Electrification Rurale Décentralisée, Guinea*

Mr. Godfrey Turyahikayo, *Executive Director, Rural Electrification Agency, Uganda*

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