LIGHTING AFRICA

Catalyzing Markets for Modern Lighting

AN INNOVATION OF IFC International Finance Corporation World Bank Group

THE WORLD BANK

2nd International Business Conference and Trade Fair

Conference Report

May 18-20, 2010

Final printing: July, 2011

Lighting Africa

Lighting Africa, a joint World Bank and IFC program, seeks to accelerate the development of markets for modern off-grid lighting products in Sub Saharan Africa where an estimated 10 to 30 percent of household incomes is spent on hazardous and low quality fuel-based lighting products. The goal is to mobilize and provide support to the private sector to supply quality, affordable and safe lighting to 2.5 million people by facilitating the sale of 500,000 off-grid lighting units by 2012 while, at the same time, creating a sustainable commercial platform that will realize the vision of providing 250 million people with modern off-grid lighting products by 2030. Promoting the use of improved low cost off-grid lighting technology will provide an avenue for social, health and economic development; especially for households and small businesses that will realize significant cost savings and increases in productivity from the transition.

Lighting Africa is implemented in partnership with: the Global Environment Facility (GEF), the Energy Sector Management Assistance (ESMAP), The UK Department for International Development (DFID), Good Energies Inc., Luxemburg, The Netherlands, The Norwegian Ministry of Foreign Affairs, The Public-Private Infrastructure Advisory Facility (PPIAF), The Renewable Energy & Energy Efficiency Partnership (REEEP), and the Asia Sustainable and Alternative Energy Program (ASTAE).

About the World Bank

The World Bank is a vital source of financial and technical assistance to developing countries around the world, with the mission of global poverty reduction and the improvement of living standards. It is not a bank in the common sense. It is made up of two unique development institutions owned by 185 member countries — the International Bank for Reconstruction and Development (IBRD) and the International Development Association (IDA). Each institution plays a different but supportive role in this mission. The IBRD focuses on middle income and creditworthy poor countries, while IDA focuses on the poorest countries in the world. Together, they provide low-interest loans, interest-free credit, and grants to developing countries for education, health, infrastructure, communications, and many other purposes. By doing so, the World Bank concentrates on building the climate for investment, jobs and sustainable growth, so that economies will grow, and investing in and empowering poor people to participate in development. For more information, please visit www.worldbank.org.

About IFC

IFC, a member of the World Bank Group, creates opportunity for people to escape poverty and improve their lives. IFC fosters sustainable economic growth in developing countries by supporting private sector development, mobilizing capital for private enterprise, and providing advisory and risk mitigation services to businesses and governments. New investments totaled US$14.5 billion in fiscal 2009, helping channel capital into developing countries during the financial crisis. For more information, visit www.ifc.org.

Acknowledgements

Lighting Africa wishes to acknowledge its donors and partners for their ongoing support and commitment. These include the Africa Renewable Energy Access Grants Program, the Asia Sustainable and Alternative Energy Program, the Energy Sector Management Assistance Program, the Global Environmental Facility, Good Energies Inc., the Public-Private Infrastructure Advisory Facility, the Renewable Energy and Energy Efficiency Partnership, and the Governments of Italy, Luxembourg, the Netherlands, and Norway.

Special thanks also go to our Conference sponsors/contributors:

- Platinum sponsor: **Philips**
- Gold sponsor: **The Schneider Electric Group**
- Bronze sponsor: **Glenergy**

We also wish to thank the Government of Kenya for their participation in the event, led by Mr. Patrick M. Nyoike, Permanent Secretary, Ministry of Energy, and Mr. Zachary Ayieko, Chief Executive Officer, Rural Electrification Agency; Mr. Johannes Zutt, World Bank Country Director for Kenya, who took part in the Opening Ceremony; Mr. John Barorot, Chief Technical Officer, Safaricom, who provided the keynote address; Mr. Jean Philippe Prosper, Director Eastern and Southern Africa, who hosted the Product Awards Ceremony; Mr. Ogunlade R. Davidson, Minister of Energy and Water Resources for Sierra Leone who provided closing remarks on Day 1; and Mr. Vijay Iyer, World Bank Energy Sector Manager, and Ms. Khetsiwe Dlamini, IFC Regional Manager (Africa) Sustainability, who closed the event.

Finally, we want to acknowledge all the conference speakers, attendees, and exhibitors who provided invaluable insights and inputs throughout the three conference days.

Table of Contents

List of Acronyms

ADB	Asian Development Bank
AEI	Africa Electrification Initiative
APDF	Africa Project Development Facility
ARPU	average revenue per user
ASER	Agence Sénégalaise d'Electrification Rurale, Senegal
BAU	Business as Usual
BiP	Business-Innovation-People
BoP	Base of the Pyramid
CDM	Clean Development Mechanism
CER	Certified Emission Reductions
CFL	Compact Fluorescent Lamps
CO_2	Carbon Dioxide
COMESA	Common Market for Eastern and Southern Africa
DRC	Democratic Republic of the Congo
EAC	East Africa Commission
ECOWAS	Economic Community of Western African States (ECOWAS)
GEF	Global Environment Facility
GHG	Greenhouse Gas
GTZ	German Technical Cooperation
ICT	Information and Communications Technology
IEA	International Energy Agency
IFC	International Finance Corporation
IIEC	International Institute for Energy Conservation
km	Kilometer
LA	Lighting Africa
LED	Light Emitting Diode
LOI	Letter of Intent
MFI	Micro Finance Institution
MNE	Multi National Enterprise
NGO	Non Government Organization
OPV	Organic PV system
PV	Photovoltaic
QA	Quality Assurance
R&D	Research and Development
REA	Rural Electrification (Energy) Authority, Kenya
REK	Rural Energy Kiosk
RPS	Remote Power Solutions
SHS	Solar Home Systems
SME	Small and Medium Enterprise
SPL	Solar Portable Lights
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations Children's Fund
UNIDO	United Nations Industrial Development Organization
USAID	US Agency for International Development
VER	Verified Emission Reductions
WCED	World Commission on Environment and Development
Wp	watt peak

Executive Summary

Held May 18-20, 2010, in Nairobi, Kenya, Lighting Africa's 2nd International Business Conference and Trade Fair maintained its reputation as the premier event in promoting low cost, high quality off-grid lighting products and services in Sub Saharan Africa—with a target of low income populations. The first Lighting Africa Conference and Trade Fair was held in Accra, Ghana, in May 2008.

Lighting Africa 2010 gathered together more than 600 participants and 50 exhibitors, representing 51 countries from around the world. Since the first conference just two years prior, significant market developments have taken place, driven by the off-grid lighting sector and characterized by technical ingenuity, business model innovation, products tailored to meet consumer need, and stakeholder collaborations (industry, private and public sectors). Lighting Africa 2010 was a living manifestation of the momentum and enthusiasm that continues to mobilize and energize the sector to progress towards the provision of enhanced lighting solutions for Africa.

The Event Offered a Unique Platform to:

- Acquire industry insights on critical business and technology matters.
- Learn innovative business and service delivery models to tap into this new market where consumers spend US$18 billion annually on fuel-based lighting.
- Preview the latest industry and market trends, and forecasts including opportunities and challenges.
- Understand consumer preferences in off-grid lighting with respect to service, quality and affordability.
- Understand critical quality standards and certification issues.
- Assess policy challenges and solutions.
- Identify the latest off-grid lighting products, services, and technology innovations.

Key Outcomes

Conducted the first Lighting Africa Product Awards Competition, selecting five innovative products as the best able to deliver safe, reliable and cost-effective lighting to millions of people in Africa. Lighting Africa's Outstanding Product Awards mark the beginning of a process that will help consumers identify good quality lighting products more easily and demonstrate that quality products can be made available at affordable prices.

Several participants signed a letter of intent to form an Industry Association dedicated to off-grid lighting solutions. The signatories agreed to establish an association of off-grid lighting market stakeholders who will collectively pursue common interests in support of the sustainable development of the market.

Moved Africa to the center of the off-grid lighting sector. In 2008, there were few products specifically developed for the African market. Today, there are more than 70 products from 50 manufacturers. There is also a wide variety of goods between US$25-50, and a growing number of good products under US$25.

Exhibited a new generation of lighting products that can help satisfy lighting needs in cleaner, more efficient and affordable ways and complement government electrification efforts.

Provided numerous networking opportunities between key stakeholders at local, regional, and international levels. Delegates across the supply chain—manufacturers, assemblers, distributors and importers—mingled with policymakers to include Ministers, Government agencies, standards organizations and utility companies; financial institutions; NGOs, such as environmental, women and trade associations; research and academic institutions; multilateral and international organizations and others.

Generated a significant body of new reports and materials to document and enhance information and share knowledge on this rapidly advancing sector.

Summary Meeting Highlights

Market Overview

- The initial phase of the Base of the Pyramid (BoP) lighting market was characterized by larger solar home systems marketed commercially in countries like Kenya and Tanzania, used to provide fee-for-service electricity in markets such as South Africa, and supported by many donors as an option for off-grid electrification across the continent.
- These programs are continuing throughout Sub Saharan Africa, and are an important and growing component of the market; nonetheless, a significant portion of the population remains unserved.
- The lighting market has entered a new growth phase, led by solar portable lamp entrepreneurs, often relying on purely market-based models, utilizing the latest technology and designing based on consumer needs.
- However, market scale remains small, prices—though dropping— continue to be a barrier, technology and product quality can be improved, and a majority of consumers have not been reached.
- The next five years will experience substantial growth in modern off-grid lighting due to technology improvements yielding more and better light, reduced manufacturing and distribution costs and lower prices to the consumer, maturation of business models, expansion of industry players, and increase of private sector investment in the market, as well as projected increases in kerosene prices.

African Market Poised for Growth

- While electrification levels across the world are growing, Africa is still an exception. Africa's non-electrified populations are expected to increase from 110 million to 120 million households and more than 10 million small businesses (comprised of roughly 630 million people by 2015). Grid expansion in the region is not keeping pace with population growth.
- Further, even grid connected customers (60 million African households in 2008) provide an opportunity for improved lighting given issues of poor quality and often unreliable grid supply (e.g., frequent power outages) which affects at least a third of the population and in some cases even more.

- African BoP households and small businesses currently spend equivalent to more than US$10 billion on lighting annually, primarily for poor quality lighting products. Today, burning kerosene is the primary light source for African households, despite relatively high costs and associated environmental and health issues.
- Based on current trends, the off-grid lighting market, led by solar portable lighting (SPL), will experience 40-50% growth by 2015, roughly 5-6 million households, with more aggressive projections doubling this figure. In that only 600,000 SPLs were sold in Africa at the time of the Conference, these systems are only at the starting line.
- Yet, challenges remain: access to finance across the value chain; cost effective distribution channels to reach unserved and often informal markets, especially in remote rural regions; high tariffs and taxes in a number of countries; market spoilage from poor quality products prevalent in the market; and lack of consumer awareness about high quality products and the benefits they offer.

Why Modern Lighting?

- Extend the working day for small and medium enterprises (SMEs), thus expanding production, enriching income opportunities, improving working conditions, and increasing customers.
- Enhance safety and security via outdoor lighting for personal, business, and community activities.
- Create conditions to attract teachers, retain students, expand time for student reading and studying, and improve grades and school retention rates.
- Provide opportunities for adult literacy and higher education programs.
- Improve health services delivery and thus reduce productivity loss due to illnesses.
- Reduce harmful emissions from kerosene and other fuel based lighting alternatives in households and business that contribute to harmful health issues and environmental damage.

What is Lighting Africa Doing?

Lighting Africa, a joint World Bank and IFC program, is mobilizing the private sector to build sustainable markets that provide safe, affordable, and modern off-grid lighting in Africa. The program works to increase energy access for and provide better lighting to 2.5 million people by 2012 and 250 million by 2020. This is accomplished through five, often overlapping, activities:

- ***Market Intelligence***: Lowers entry barriers into the market, helps inform design of appropriate products for the African market, and provides regular insights and trends to facilitate market comprehension and entry into new markets.
- ***Product Quality Assurance***: Mitigates market spoilage and promotes quality off-grid products by establishing recommended performance targets and product testing methodologies that support sustainable market development.
- ***Business Support Services Access to Finance***: Helps create a vibrant market for innovative products by supporting manufacturers, distributors, and retailers and helping them access funding.
- ***Consumer Education***: Educates and informs consumers, creates awareness, and generates demand for off-grid lighting products while mitigating market spoilage.
- ***Policy and Public Sector Operations***: Engages country governments to harmonize lighting efforts (on and off-grid) to create a favorable environment for entry and growth of new off-grid lighting product markets.

The program works with product manufacturers and distributors, consumers, financial institutions, development partners, and governments to help build markets for reliable off-grid lighting products. Comments received on Lighting Africa activities during one-on-one interviews at the Conference are provided in the table below.

Conference Participant Perspectives on Lighting Africa Core Components

Lighting Africa Activities	Conference Participant Response
Market Intelligence	*"Even if there was not a development marketplace grant competition, nor a product awards program, just getting these people together in the same building for two days to cross fertilize; give each other ideas; and for people who have good ideas or bad ideas to be TOLD what is valuable and what is not is useful. And when you are working as we are, in a market that is totally different, the business culture is very different, and it is very easy to make mistakes and then fail for reasons that someone already thought of, having the benefit of experience and hindsight is important"* **Glenergy, LA Conference Participant**
Product Quality Assurance	*As part of our core product development operations, "I tell Lighting Africa, 'this is what we are working on' and then I take Lighting Africa's input straight to our development department to inform them in the creation of the new generation of products. It is very important to ensure that quality products get into the market as part of the market is already spoiled by bad quality. Today we have standards for on-grid lighting; we need to do the same for off-grid. And we need to base the quality standards on end-users so that we know where the minimum standard should be set and can move up from there. That will help all the companies that are producing good quality products because it will reduce competition [from bad products]. The Lighting Africa approach to focus on quality is crucial. Once there are standards, the solutions that end up in the market will be much better than before for everyone, and end-users will be more satisfied."* **Philips, Conference Participant**
Business Support Services and Access to Finance	*"Of course, it should be the companies that drive the ideas and want to put money into them and then, of course, you want the big financial institutions to help provide access to finance, consumer credit and so forth and finance to help launch pilot projects. Consumer finance is very important. Many people cannot yet afford to pay for lighting systems on their own."* **Ubbink Solar, Conference Participant**
Consumer Education	*"The market is just beginning. The people in Africa need to improve their lives and lighting is very important for this— the market potential is huge."* **Oasis New Energy, Conference Participant**
Policy and Public Sector Operations	*"Right now we have a situation where high quality products are prohibited by taxes while you have poor quality products coming in at the low end of the market that are immune from these restrictions as they are not on the customs radar screens. For whatever reason, they are missing. Driving quality up and working on changing prohibitive policies will help bring prices down."* **ToughStuff, Conference Participant**

About the Products

- At present, a range of products are available in the marketplace serving a variety of customer needs.
- These include: portable handheld devices such as *flashlights and torches*; portable or stationary handheld devices such as *task lamps and work lights*; portable or stationary devices such as *lamps or lanterns*; portable or stationary *multifunction devices that provide lighting and other value added features* including mobile phone recharging; and micro solar home systems (SHS) that are semi-portable.
- Mobile off-grid power, for phone charging, powering fans, running radios, or other small appliances is a key demand driver in Africa.
- Over the past few years product quality has been increasing. During the Conference, the first *Lighting Africa Product Awards Competition* was held resulting in product winners in the following award categories:
    - *Task Lighting:* First Place, Greenlight Planet Sun King and Second Place, Barefoot Power Firefly 12 Mobile.
    - *Ambient/Room Lighting:* First Place, Barefoot Power PowaPack and Second Place, d.Light Design NovaS200.
    - *Top Performance*: First Place, Barefoot Power PowaPack and Second Place, SunTransfer 2.
    - *Best Value:* First Place, Barefoot Power Firefly 12 Mobile and Second Place, Greenlight Planet Sun King.
    - In addition, two other products passed the product award specifications, Philips Udaymini and Solux's LED-50.
- Meanwhile, product prices have been declining. In 2008, products retailing above US$50 dominated the market, while the Conference trade fair demonstrated a range of quality products available from US$25-50. These prices are expected to continue to decline as solar lighting product components improve their technical efficiency and performance.

Consumer Perspectives

- Resulting from over 10,000 consumer interviews conducted in five countries—Ethiopia, Ghana, Kenya, Tanzania, and Zambia— a better understanding of household and small business needs for off-grid lighting is emerging. This is important information for manufacturers to inform product design and development as well as for distributors and retailers wishing to stock product that will yield good returns.
- Key concerns are light intensity, costs, and health problems (from burns due to emitted smoke and safety).
- Most consumers consider their houses to be under lit; almost two-thirds say that not all areas in the house that need lighting have it.
- Lack of lighting restricts important activities such as reading, doing homework, preparing food, visiting family and friends, and taking care of livestock needs.
- Most respondents identified a desire for better lighting, however, lack of available funds or absence of better lighting alternatives in the marketplace lead to no options being purchased. This is indicative of the strong market potential for improved products.
    - Regarding income, the average household monthly income in the countries studied range from US$90 to US$154. In general, optimal purchase prices for consumers and traders based on initial reactions were below existing at the retail level. However, after consumer

testing of improved products for five nights in homes and businesses, their willingness to pay moved closer to recommended retail prices.
    - For improved lighting products, consumer awareness of solar and improved lighting products was low and thus they did not have an appreciation of the value of these new innovations. There was also concern about the ability to charge solar-powered batteries in the rainy season.
- Recommendations:
    - Design of successful off-grid lighting products should focus on durability, ease of use, affordability, and be solar charged. They should be portable (where appropriate), have a long battery life, and be safe and secure; multi-functional devices and those that can be used in two rooms simultaneously are also desirable.
    - Consumer education is critical in demonstrating the value of good quality lighting to initially sceptical customers.
    - Prices should fall in the acceptable range indicated by respondents; and even if this is the case, financing options (e.g., microfinance) may be needed.

Role for Governments in Off-Grid Lighting

- In general, government policies and financing supports grid extension as the primary electricity option. Some countries support solar home systems for rural markets and kerosene is often subsidized for lighting and other applications. There is a lack of effective policy solutions to achieve mass access to low cost, safe lighting.

- Key policy barriers to modern off-grid lighting:
    - Lack of political will to engage on modern lighting issues, the magnitude of the market, available products, and development of a strategy to address this market as a complement to other electrification activities.
    - Regulatory barriers that hinder trade in modern lighting technologies or support inferior solutions.
    - Quality-related issues that prevent modern lighting devices from building a sustainable market.
    - Obstacles to the development of a sustainable supply chain for modern lighting products reaching into rural areas.
    - Affordability issues that prevent consumers, traders, distributors and manufacturers from investing in modern lighting solutions.

- Proposed policy solutions include:
    - Make political commitment to off-grid lighting.
    - Incorporate modern lighting strategies into overall Government development and poverty reduction strategy.
    - Eliminate kerosene subsidies.
    - Remove value added taxes and duties on modern lighting components/products.
    - Adjust regulatory environments to favor modern lighting solutions.
    - Support a market transition to high quality products.
    - Facilitate a competitively priced supply chain that delivers lighting products to all segments of the market.

- Ensure that the widest possible access to modern lighting is achieved, particularly among the poor.

- It is recognized that there is no "one-size-fits-all" program for modern lighting. Each country will need to develop an off-grid strategy/program based on local needs and conditions. Policy changes will require careful sequencing in regards to the different market segments. Commercial markets could be developed first. This will allow the private sector to gear up to supply products without major investments in remote areas. More remote markets and lower income groups can be addressed with different tools if necessary.

What Did Attendees Say About the LA 2010 Conference and Trade Fair?

Lighting Africa 2010 conference feedback was formalized in an on line survey conducted following the event. As demonstrated, the conference was considered highly successful overall, particularly with regard to networking. All sessions were rated three or greater out of a total score of five, with the bulk rated 3.5 or higher. Many importers and distributors surveyed forged partnerships and identified prospective business leads (with 37% of respondents meeting 15 or more serious leads as a result of the event). The survey also showed that over 50% of participants had used Lighting Africa marketing information/ reports with 64% of manufacturers drawing on these materials. Additional comments provided by survey respondents are summarized below.

General Comments on the Conference and Lighting Africa Program

- The conference was educational, well organized/managed, and had good content.
- Speakers were well versed in topic areas and stayed on the agenda and timing.
- Provided a good platform for developing creative marketing strategies and forging partnerships.
- It was a good forum for networking and learning about new products in the market.
- Helped boost business.
- The Conference provided a very important consultation and exchange of research on quality of life intended for the poor. It is also a meeting of senior experts in technology. The approach of the World Bank to require high quality products for the poor is key.
- I was awed by the support the IFC, WB and the various African governments are providing to push the agenda forward.
- I came with many questions and all of them were addressed!
- It is so great to see where we have come in just two years.
- If it were not for Lighting Africa, the continent would still be in the dark.
- Good initiative; lets maintain the momentum.

What Additional Areas Would You Like Addressed in Future Lighting Africa Conferences/Events?

- Promotion of more local African lighting enterprises.
- Investment awareness meetings and exhibitions by various manufacturers.
- More government policy makers and policy implementers, including at a regional/sub regional level.
- Financing across the value chain.
- Beyond solar, focus on other energy sources for off-grid lighting (micro hydro, wind, biomass, etc.).
- Address environmental issues and social aspects (gender) of off-grid lighting.
- Include a rural site visit and present success stories on how off-grid lighting is improving lives.

- Increase the number of days that the exhibition is open.
- Provide more information on the latest products available and other innovations.
- Provide a list of solar product retailers in Africa to facilitate communication.
- Offer a platform for retailers and other organizations at the grassroots level to present their experiences.
- Impact analysis—what happens after lights are introduced into communities?
- More incisive and aggressive market analysis, especially on the creation of distribution channels.
- Additional support for distributors, helping them make products available to the people.
- Expand conference/program to other regions of the world.
- Make delegate information available prior to the event to facilitate one-on-one meetings.
- More open forum discussions as opposed to power point presentations with Q&A. The value is in the discussion!
- More emphasis on French speaking countries.

Full survey results are provided in Appendix VI.

Remainder of Document

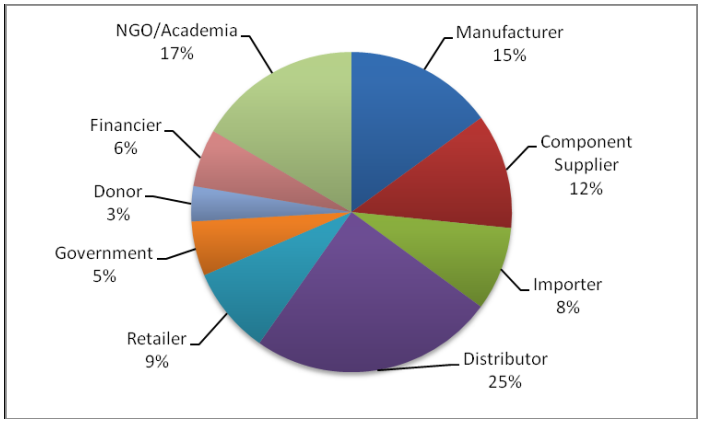
The remainder of this document provides more detailed information on meeting sessions, including key issues, highlights, and conclusions for the 2-day meeting. Appendices provided address the following:

- Appendix I: Conference Program for 2 day conference, side events, and other activities.
- Appendix II: Summary of the Product Award Ceremony.
- Appendix III: Letter of Intent to Create an International Off-Grid Lighting Stakeholder Association.
- Appendix IV: Conference Registration List.
- Appendix V: Lighting Africa Trade Fair, Exhibitors and Contact Information.
- Appendix VI: Lighting Africa 2010 Conference Questionnaire Results.

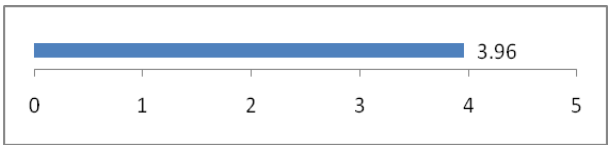
Additionally, speaker slides, as available, can be found at http://www.lightingafricaconference.org/

Exhibit 1. Lighting Africa 2010 Conference Questionnaire Results

1. Mark your primary work area(s). (202 respondents of 614 attendees, 32.8% response rate)

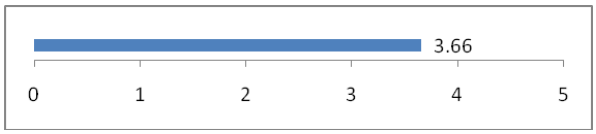


2. Value of Lighting Africa Conference 2010?

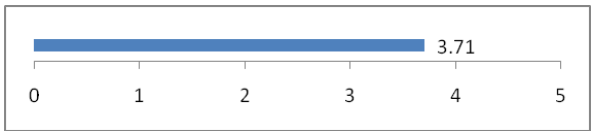


3. To what extent did the Conference presentations/sessions meet your expectations in:

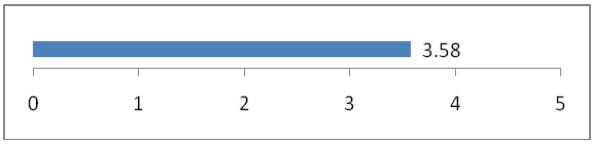
a. Product quality assurance



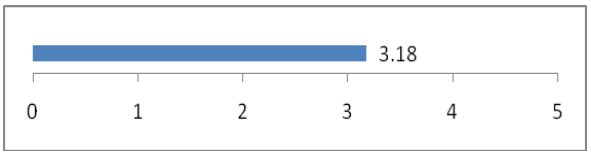
b. Market intelligence and research



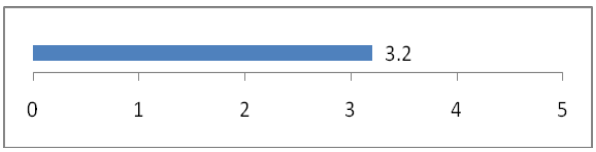
c. Business development support



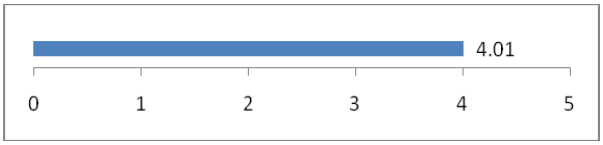
d. Financing access across the value chain



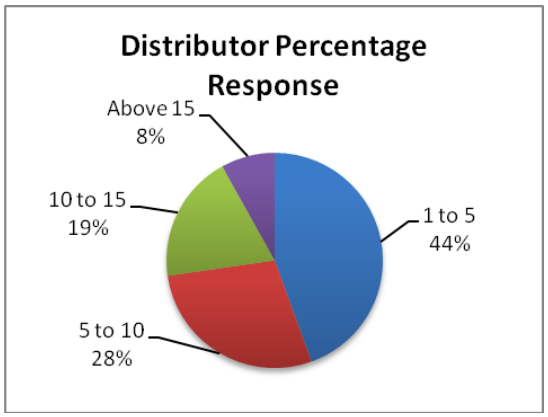
e. Policy and regulation

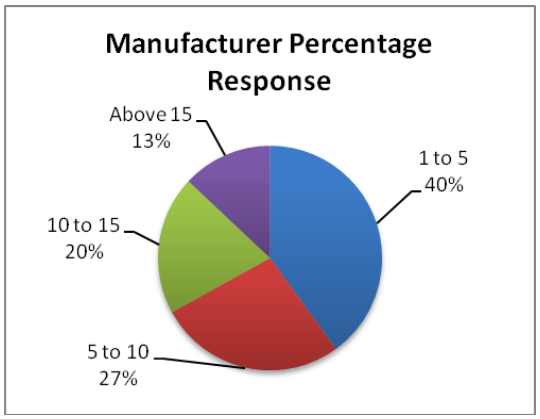


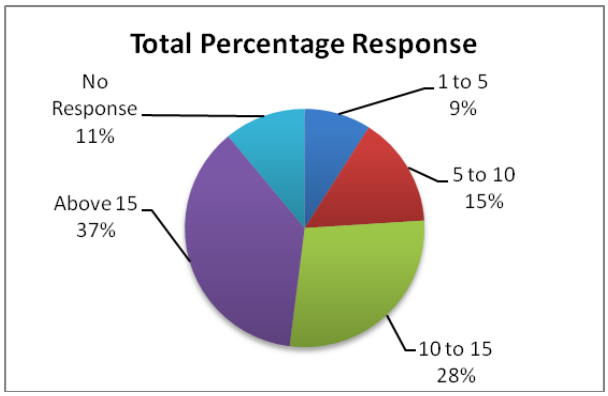
f. Networking and forging partnerships?



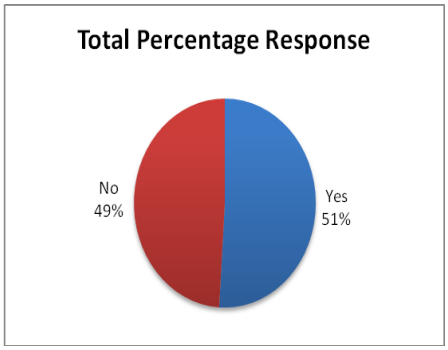
4. Manufacturers, Importers, Distributors—Did you forge partnerships? Range of serious leads?

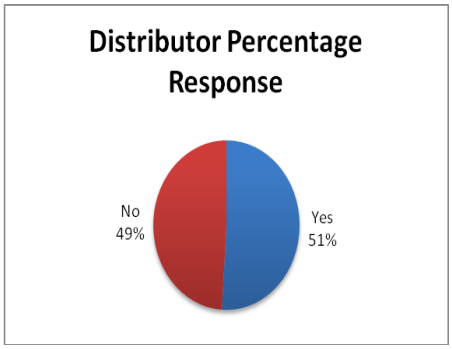


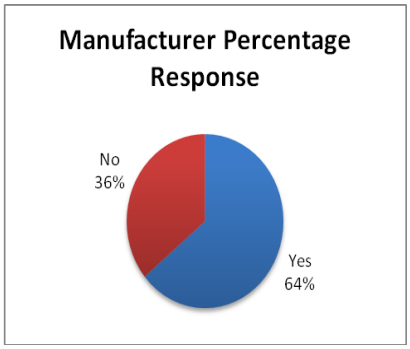




5. Have you used Lighting Africa Marketing Information or reports?







Business Conference, May 18-19, 2010

Day 1: May 18, 2010

Session I: Opening Ceremony

Session Chair/Master of Ceremony – Michael Oyier, Kenya Television Network

Session Name	*Speaker*
World Bank's Perspective on Low-Cost Off-Grid Lighting for the Base of the Pyramid	*Johannes Zutt, Country Director, World Bank Kenya*
Kenyan Perspectives on Off-Grid Lighting	*(a) Zachary Ayieko, Chief Executive Officer, Rural Electrification Authority, Kenya* *(b) Patrick M. Nyoike, Permanent Secretary, Ministry of Energy, Kenya*
Lighting Africa: Building a Sustainable Platform for an Emerging Industry	*Russell Sturm - Sustainable Energy Team Leader IFC*
Keynote Address- Renewable Energy Source – Opportunities	*Sichiri Mukunzi – Head of Department – Technical Operations, Support and Logistics, Safaricom Limited*

The World Bank's Perspective on Low Cost Off-Grid Lighting for the Base of the Pyramid—Johannes Zutt, Country Director, World Bank Kenya

Mr. Zutt welcomed with participants to the 2nd Lighting Africa Global Business Conference and Trade Fair 2010. The purpose of the initiative, launched in September 2007, is to mobilize the private sector to provide clean, affordable, and quality lighting to people without access to electricity in Sub Saharan Africa, with an immediate target of 500,000 high-quality lanterns distributed by 2012. By so doing, Lighting Africa aims at developing a commercially sustainable market for modern lighting for the Base of the Pyramid (BoP) consumers in Sub Saharan Africa, who currently are using costly, inefficient, and hazardous lighting fuels. Access to better quality and affordable lighting will promote social and economic development. Households and small businesses can realize significant cost savings, increases in productivity, and reduced health risks by transitioning away from kerosene to modern electric lighting.

Governments and donors are beginning to recognize this potential, with electricity access in Sub Saharan Africa extremely low—29% as compared to 72% for developing countries as a whole. Many governments are engaging in ambitious electrification programs to change this situation; Lighting Africa offers a complementary solution for Base of the Pyramid households and businesses who will not receive modern energy access in the near to long term.

Johannes Zutt

Mr. Johannes Zutt has been active in development since 1990. His early experience involved program planning, monitoring and evaluation, mostly for UNICEF and UNDP, in various countries in eastern and southern Africa. In 1999, Mr. Zutt joined the World Bank where he worked as the Country Program Coordinator for a number of countries, including Angola, China, Malawi, Mongolia, Mozambique, and Zambia, and team leader for numerous country strategies and projects. In 2006, he was appointed Adviser to one of the Bank's two Managing Directors, and in January 2008 was asked to serve as acting head of the Department of Institutional Integrity. In January 2009, he was appointed the World Bank Country Director for Kenya, Comoros, Eritrea, Rwanda, Seychelles and Somalia.

In 2008, there were only a handful of products that were specifically developed for the African market; today we count 79 such products from 49 manufacturers. In 2008, there were also only a handful of quality products under US$50, today there is a wide variety of products between US$25 and US$50, and a growing number of good products under US$25. The quality of products also increased dramatically.

Kenyan Perspectives on Off-Grid Lighting

(a) Mr. Zachary O. Ayieko, Chief Executive Officer, Rural Electrification Authority

Mr. Ayieko thanked the organizers for inviting him to address this important forum. He noted that for the Kenya Rural Electrification Authority (REA), the conference comes at a particularly significant time, soon after successfully hosting of the 7th Annual Meeting of the Clubs for Rural Electrification Agencies in Africa where Kenya was elected Chair of the Club whose objective is to "Light up Africa." Mr Ayieko told participants about the history of the REA and outlined its mandate.

He concluded by saying that Kenya has a high potential for development of renewable energy. This is especially so for solar, wind, and biomass whose exploitation has been limited to date. Development of these forms of energy is essential for the achievement of Kenya's development goals.

Zachary O Ayieko

Mr. Ayieko is the Chief Executive Officer of the Kenyan Rural Electrification Authority. Previously he served as Managing Director of Kenya Power & Lighting Company, Ltd.

REA was created under the Energy Act no. 12 of 2006. The overall goal of the REA is to increase connectivity from the current 12% to 100% by 2030 through a series of 5 year development phases. The first of the phases as envisioned in the country's blueprint for economic development – Vision 2030, is to connect all public facilities covering mainly trading areas. To date a total of 12,000 of these facilities have been connected. This has been achieved through a combination of grid extension, stand alone diesel generators, solar and wind energy. To demonstrate its commitment to extend electricity to all parts of the country, the government has continued to increase the amount of funds allocated for rural electrification – up to KES 35 billion between 2004 and 2010. This compares favourably to KES 7 billion spent between 1973 and 2004.

(b) Mr. Patrick M Nyoike, Permanent Secretary Ministry of Energy, Kenya

Patrick Nyoike

Mr. Nyoike serves as the Permanent Secretary, Ministry of Energy in Kenya. He also held senior positions including Chief Economist and Coordinator of Multi Donor Energy Sector and Power Development Projects at the Ministry of Energy; Chief Economist and Head of Economic Policy Analysis Unit, Ministry of Finance; and several key economist and planning positions with the Ministry of Energy, Ministry of Power and Communications; Ministry of Planning and Development; and Ministry of Finance and Planning. He holds a B. Sc. in Mathematics from the University of Ghana and a Bachelor's degree in Economics from the University of Nairobi.

Mr. Patrick Nyoike began by welcoming the international guests to Kenya. In Kenya, the focus has been on measures to promote accelerated provision of energy services. This includes aggressively increasing power generation capacities as well as the transmission and distribution network. A policy framework has been put in place which led to enactment of a new energy law (Energy Act no 12 of 2006) through which the REA was created to fast track provision of electricity in rural Kenya. Since its establishment in the year 2007, the pace of rural electrification has continued to be hastened.

The Ministry of Energy, together with other stakeholders, is actively working on measures to accelerate development of adequate power generation capacity with an emphasis on green energy sources. To encourage faster development by the private sector, the Ministry of Energy has established several instruments, including the feed-in tariffs policy. This policy aims at attracting private sector investments

in electricity generation from renewable energy sources. It seeks to facilitate resource mobilization by providing investment security and market stability for investors.

The Ministry of Energy is just completing a pilot project to install solar street lights in two busy streets in Nairobi. The solar street lights already fitted are so far working well. The Ministry of Energy will continue to investigate other promising renewable energy technologies for provision of clean energy services to rural communities.

The Ministry of Energy through the Kenya Power and Lighting Company is implementing an efficient lighting project targeting domestic households. This involves free replacement of at least 1 million incandescent with compact fluorescent lamps (CFLs) in low income residential housing estates and selected market centers. Once all the CFLs have been issued, the project will have two immediate benefits. First, it will reduce demand for electricity as the CFLs use less power, with the resultant reduction in power bills for customers. Secondly, it is expected to reduce peak demand by at least 50MW which is met by firing oil based thermal power plants; and by extension, reducing the amount of carbon dioxide emissions.

Lighting Africa: Building a Sustainable Platform for an Emerging Industry – Russell Sturm, IFC

"This is a nucleus of an industry that will transform lives in most profound way in next decade."

Mr. Sturm apologized on behalf of President Clinton who was unable to attend, and read from a letter giving his regrets.

Although one in three people obtain light with kerosene and other fuels, representing about 15% of global lighting costs, they receive only 0.2% of resulting energy services. The arrival and development of new lighting technologies, including LEDs, promise the next lighting revolution as these are more efficient, cleaner, safer, and provide higher output and quality than the alternatives. Fuel based lighting, led by kerosene is already a huge market, estimated at US$10-18 billion per year in Africa. Lighting Africa seeks to develop a large-scale commercial solution to increase modern energy access by bridging the gap between industry and consumers.

Mr. Sturm also noted that the World Bank Group's role in Lighting Africa is one as a facilitator to jumpstart the off-grid lighting sector and help mitigate market barriers across the supply chain. He noted that progress is being made in terms of lower LED product costs and increased efficiencies. "The proposition for off-grid lighting was strong when we started the program, and it is undeniable today. Thus it is essential that we exit now and ownership is taken by industry." This transition has been initiated during the Conference, with the announced partnership of industry leaders to launch an Off-Grid Lighting Stakeholders Association.

Russell Sturm

Mr. Russell Sturm leads IFC's global advisory business in the areas of climate change, sustainable energy, and sustainable water. Mr. Sturm has worked on the development of innovative sustainable energy market development products for more than 25 years and was one of the founders of Lighting Africa. Prior to joining IFC, Mr. Sturm was President of the International Institute for Energy Conservation. Mr. Sturm worked with Oak Ridge National Laboratory while completing his studies in energy and natural resource policy and finance at the University of North Carolina and Harvard University/Kennedy School of Government.

Renewable Energy Opportunities – Mr. Sichiri Mukunzi, Head of Department, Technical Operations, Support and Logistics – Safaricom Ltd. (Keynote Address)

Safaricom is a leading telecommunication company established in Kenya as a joint venture between Telkom Kenya and Vodafone UK. Safaricom has invested in interesting ways to ensure electricity is made available in rural areas through community power projects. Community members living near a Safaricom site are provided with a mobile charging unit where mobile phones can be regularly charged. Safaricom:

> **"Phones are everywhere but how are they charged? How about a solar lantern that incorporates a phone charger?"** *Sichiri Mukunzi*

- Has 1,800 sites on grid power supply, 317 sites on 24/7 diesel generator power, and 68 sites on Remote Power Solutions (RPS) that include a mix of Solar-Wind-Diesel, and battery hybrids.
- Contributes to community power indirectly by extending the grid infrastructure with its own resources at sites within a 5 km radius from existing grid infrastructure.
- Provides community power applications with excess power from the base stations (at time deliberate power system over-specification) meeting 100% of cost.

Safaricom is providing these services for a number of reasons: the slow pace of electricity infrastructure expansion in rural areas; availability of excess power from their base station; possibility for network access expansion in off-grid rural areas; rapid expansion of Mobile Money MPESA services to rural areas (see Textbox); improvement of site security; and increased average revenue per user (ARPU) due to the availability of power for mobile phone charging and the resultant economic stimulation from small businesses. Community power applications include mobile phone charging, local community computer laboratories, water pumping, street lighting, hospital facilities, school lighting, and local community security surveillance radios. Lighting is not provided in the homes or businesses.

Mr. Mukunzi highlighted the potential for solar lanterns to reach locations where Safaricom has sites but no grid access or at location with grid electricity but customers cannot afford the fees to get connected. He indicated that the social and economic benefits of having lights in schools, hospitals, small and medium enterprises (SMEs), and homes would be substantial. The challenges are product reliability and meeting the expectation of numerous communities.

The M-PESA Story

Many years back, we had to transfer money using human beings from one place to the other. This was mostly through relatives travelling from one place to another. Sometimes the money reached, but was not always reliable. Sometimes the money would not get there at all. Later on, the Post Office helped improve this. It would take almost a week. Then there was the courier system – but couriers do not carry hard cash. The idea of transferring money from one location to another has been with us for some time, but there had been no sufficient solution. M-PESA was invented in 2007. In a short time you could transfer money from your pocket to someone very far away. This is a very personalised service. In April 2007 – only 52,000 people were registered users and there were only 355 outlets. In 2010, there are now 9.5 million users and 17,600 registered outlets. Many services can now also be paid for using M-PESA (e.g., water bills, electricity bills) and others are currently being tested. M-PESA is a true success story and one that could be applied to Lighting Africa.

Safaricom Limited

Session II: Off-Grid Lighting Market: Status and Trends

Session Chair: Anil Cabraal, Lighting Africa Consultant and Technical Advisor

Session Name	*Speaker*
Off-Grid Lighting Market: Status and Trends—Commissioned Paper	*Gaurav Gupta, Associate Partner, Dahlberg Associates*
Panel Discussants: Status and Trends	*Frank Altena, Sustainability Officer, Philips Lighting* *Ranganayakulu Bodavala, President, Thrive* *Sameer Hajee, Executive Director, Lights for Life* *Gilles Vermot Desroches, Sustainable Development Senior Vice-President, Schneider Electric*

'By 2015 expect much higher performance quality for solar lanterns at lower costs'
Gaurav Gupta, Associate Partner, Dahlberg Associates

'Simply enhancing life with light'
Frank Altena, Philips Lighting

'If you have a product under 10 dollars you can revolutionize the market'
Ranganayakulu Bodavala, President, Thrive

Session Highlights:

Keynote presentation was provided by Gaurav Gupta of Dahlberg Associates.

- Africa will be the main global market for off-grid lighting with up to 700 million people unelectrified by 2015 and 100+ million under electrified.
- A number of drivers will propel market growth including: population increases, continued rise/volatility of kerosene prices, growing mobile phone charging market without grid access, rapidly declining manufacturing costs for solar lighting systems, technology evolution, and product design features to meet needs of African BoP consumer.
- The off-grid lighting market, in particular solar portable lighting (SPL), is ready for a substantial inflow of private sector investment and exponential growth. Today, however, market penetration of SPL products is low.
- Conservative assumptions suggest the African market for off-grid renewable lighting will experience exceptional growth. Under a business as usual (BAU) scenario the market is projected to easily experience 40-50% annual sales growth, with 5-6 million African household owning solar portable lights by 2015. (This contrasts with the 600,000 SPLs sold in African over the last five years.) These numbers exclude poor quality battery-powered light emitting diode (LED) torches, many in the range of US$1-10, the sales of which are in the millions.
- Nonetheless, BAU is not expected to be the likely scenario. With new quality players entering the market and substantial investments being made, the market could see annual sales growth rates closer to those of the mobile phone market in Africa of over 65%, or 12 million SPLs owned by African households and SMEs in 2015.

Anil Cabraal, Session Chair

Until April 2010, Dr. Cabraal was Lead Energy Specialist in the Energy, Transport and Water Department at the World Bank. In the past 15 years at the Bank, he guided implementation of off-grid PV projects in Asia and Africa and served as the joint Lighting Africa Program Manager. He is a contributing author of Quality Processes for PV; Designing Sustainable Off-grid Rural Electrification Projects; and Guidance Note on PV for Community Services Projects. He also served on the Advisory Board of the PV Global Approval Program. Dr. Cabraal received the Prof. Robert Hill award for PV for Development at the 20th PVSEC Conference and earned a PhD from the University of Maryland.

- Yet significant challenges remain in the African marketplace to realize the full potential.

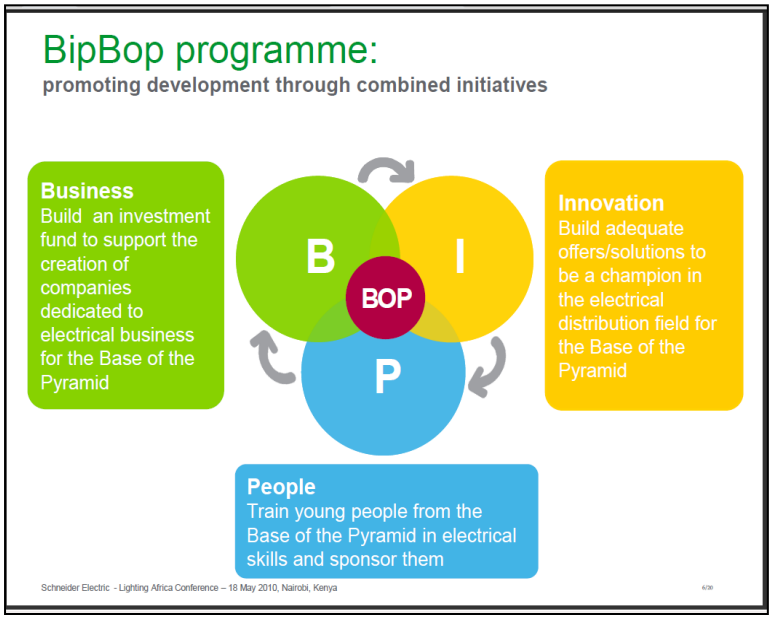
Barriers Hindering Market Growth

- Access to finance bottlenecks across the value chain
- Distribution and servicing of SPL products
- High taxes/tariffs on SPL products
- Growing problem of market spoilage
- Lack of consumer education

- Solutions are on the horizon but will require concerted investment and coordination. These include:
  - Innovative financing for consumers and other efforts to reduce product costs.
  - Distribution evolution.
  - Relaxation of taxes and tariffs on solar technology through regulatory reform.
  - Improved quality testing and certification programs to address market spoilage.
  - Consumer education on the benefits of solar lighting, improved quality of products and devices, and the harms of traditional fuels.
- Lighting Africa is serving as a regional platform for market facilitation to address the gaps and bring light to the millions of Africans in need.

Panelist responses to the Keynote presentation are provided below:

- *Philips* is focusing on a variety of applications for off-grid lighting products including education so that students and adults can study in the evenings. Applications include home lighting end uses; shop and small business lighting; road lighting; and community solutions. Philips launched the biggest floodlighting solution in the world; it is completely off-grid and can be used anywhere to impact society in a positive way. An example of a community playing soccer under the Philips off-grid floodlights was provided. Throughout its activities, Philips works in close partnership with a number of organizations to enhance life with light solar solutions. These include the Dutch government, the UN Environmental Partnership (UNEP), and World Vision. Trends show that there will be a multiple range of solutions to meet needs.
- *Schneider Electric's BipBop Program* is promoting electricity access and development through combined initiatives targeting businesses, innovation, and people. For the off-grid market, Schneider is linking into existing rural retail networks; building partnerships with MFIs, NGOs, and kerosene dealer networks; and collaborating with trained electricians.



- *Thrive* works for the benefit of rural and tribal communities in home lighting; information, communications, technology (ICT), education; and health—using advanced and innovative technologies.
- *Lights for Life* seeks to increase the space of opportunities available to children who are "lighting impoverished" by providing them with LED lighting to study after dark. It also aims to reduce total global carbon dioxide (CO_2) emissions by discouraging the use of kerosene for lighting. The *Lights For Life's One Light Per Child*™ initiative aims to provide one portable LED light to each school-aged child living in lighting poverty. Each light uses an LED to provide more than enough bright, white, environmentally friendly light for a child to study or read by.

Finally, during the panel, an informal poll was conducted by one of the speakers—Gaurav Gupta. He asked the audience two questions to obtain their views on where the off-grid market is going:

1. On growth of the industry, will it grow by 40% or more per year, or 5% or more per year?
   - *The majority responded 40% per year.*

2. Will prices for solar based off-grid lighting fall by 50 percent or more?
   - *The response was evenly split. About half said yes and the remainder no.*

Conclusions

Within Africa there is a demand for quality, cheaper lighting alternatives for the rural poor. It was noted that with products under US$10—the market will be revolutionized. Moreover, governments, businesses, consumers, and other key stakeholders must support the transition from traditional kerosene use to more cost effective, safe lighting products. Enhancing quality of life through lighting should be a goal of African countries. This can be achieved through technology innovation and collaboration with groups like the telephone industry and other stakeholders across the value chain. Lighting Africa has played an important role in stimulating these partnerships and mitigating barriers to market development and expansion.

Session III: Consumer and Trade Perspectives in Off-Grid Lighting

Session Chair: Mr. Chris Harrison Managing Director, Young & Rubicam

Session Name	*Speaker*
Consumer Preference Patterns	*Melissa Baker, Director, Head, Social Research Division, TNS Research International*
Preliminary Results of Solar Lantern Field Tests in Five Countries	*Lucius Mayer-Tasch, promotion of renewable energy efficiency programme (PTREEEP), German Technical Corporation (GTZ)*
Critical Success Factors and Lessons Learned-The Distributor Perspective	*Sam Goldman, Co-Founder and CEO, D-Light*
Humanitarian Relief and Off-Grid Lighting	*Mark Bent, CEO and President, SunNight Solar*

'From lights to livelihoods."
Sam Goldman, D-Light

'You need to be innovative to reach the BoP market—in goods and services, routes to market, and processes and supply.'
Melissa Baker, TNS Research International

'Make a difference. Help light the world.'
Mark Bent, SunNight Solar

'One size fits all lamp does not exist, these are rated differently by users in different countries.'
Lucius Mayer-Tasch, GTZ

'We need to know and understand our consumers as human beings, not just mere statistical figures.'
Chris Harrison, Young and Rubicam Brands

Chris Harrison, Session Chair

Young & Rubicam Brands. Mr. Chris Harrison is the Africa and Indian Ocean Chairman of Young & Rubicam Brands, a collaborative network of marketing communications companies under the WPP umbrella (WPP plc is a communications services group). Mr. Harrison has 27 years of experience in brands marketing and communications. Fifteen of those years have been spent in Africa, where he now leads a network that offers three agency brands in 37 countries.

Session Highlights

- *BoP Characterization.* East Africa has a population of 130 million people, of which 80 percent live on less than US$2 per day. These BoP individuals lack water, lighting, and packaged products.
- *The Needs.* BoP have significant unmet needs across the spectrum of human life from basic to higher level need.
- *Spending Patterns.* Spending priorities of the BoP are different. They may lack sanitation and running water, but will spend on things traditionally considered luxuries such as television, mobile phones, and beer. They can readily adapt to new technology as they lack a base of comparison.
- *Lighting Characteristics.* Regarding lighting, BoP lack sufficient brightness; 56% said lighting in the household was not enough to comfortably perform activities.
- *Lighting Impacts.* Poor quality lighting also yields negative social and economic impacts: hinders food preparation, reading, and children studying; shortens business hours, increases insecurity; and makes it hazardous to use the lavatory at night.

- *Lighting Penalty.* The poor suffer a "lighting penalty," paying more for poor quality lighting services from sources such as candles and paraffin lamps with no cover.
- *BoP Aspirations.* The BoP aspire to a better life and future, this was particularly noted in hopes for their children. They want to be treated with dignity and respect.
- *Attitudes Toward Brands.* Where accessible, BoP choose brands over commodities. They value, even love, the certainty associated with branded consumption. For example, they love the heritage brands in the Kenya market of Kimbo and Ono and need to have total trust in what they spend their money on and reward brands with unshakable loyalty. Branding has to be anchored both functionally and emotionally to needs.
- *Positioning Themes for BoP:*
    - **Protection and fortification** are important things both physically and emotionally.
    - **Family orientation and family care** resonate, giving the homemaker permission to spend a little more.
    - **Inclusiveness and accessibility** are essential.
    - A key enabling theme is that **lighting helps children advance and excel and facilitates maternal pride**.
    - **Empowerment** is important.
    - **Communicating expertise and quality** are critical.
    - **Do not seek rebellious innovation—**rather, visibility and well established presence in the community are important.
- *Not Always About Bare Necessities.* Despite many pressing concerns, brands that promise a little **fun and cheer are welcome,** including sensorial pleasing experience or making self/family feel special; this is especially important for non-essential consumption.
- *Pricing for the BoP.* Although subject to budget constraints, BoP do not always buy the cheapest alternative. Seek value propositions that offer more, though cost is an important factor.
- *Product Quality.* There is a clear concern over product quality. Users can often recognize quality products at first site. In some cases they have asked for warranty certificates. Protection of switches against water and dust is appreciated. Heavy weight of product is an indicator of good quality. Parts that failed most: cables, connections, switches, batteries, and handles.
- *Product Availability.* Products should not be marketed if they are not accessible in the market. Small stores are an important venue for product access; the retailer is an important gatekeeper and advocate. Successful brands understand shopkeeper needs and continuously engage through sales visits. There is also a need for materials designed to help the retailer in sales and consumer awareness.
- *Product Characterization.* Products must have functional fit within the home environment and be robust; have strong light intensity; be multi-purpose (e.g., moveable, extra features such as phone charging or radio powering, and have choice of ways to charge); be theft proof; and resemble traditional lighting devices.
- *Off-Grid Household and Retail Business Lighting Needs.* Product research conducted by Lighting Africa for four product types (torches, task lights, lanterns, and area lights) in five countries (Ethiopia, Ghana, Kenya, Tanzania, and Zambia) yielded the following findings:
    - **Households:** Kerosene is currently the most popular means of lighting in households. Modern lighting would improve quality and increase the amount of light. Improved lighting is needed both indoors to do homework and postpone tasks to the evening and outdoors to enhance security when going outside. "One in three off-grid households would improve their homes by investing in better lighting."

    - **Retail businesses:** Retail businesses need electricity to run equipment, for lighting and to increase productivity; current power sources (primarily kerosene) are not sufficient to meet lighting needs. Although most retailers do not need light in the day they indicated they would significantly increase their turnover (i.e., sales) with lights to operate at night. Lighting is needed indoors to enable the business to attract more customers, offer them added convenience by extending evening hours, postpone activities into the evening, and minimize activities the following day. Outdoor lighting increases security, alerts customers when the business is open, and makes it easier to interact with customers. "One in three retail businesses indicated they would improve their facilities by investing in better lighting and noted that solar lanterns were their product of choice."
- *Solar Powered Lighting.* This is flexible and easy to use, light intensity is good and can be regulated, does not adversely affect eyesight, is easily recognized as a lamp, is stable on a flat surface, and generates no fumes.
- *Other Applications.* Solar powered lights can be used for a range of other applications including safaris, trekking, camping, street lighting, and pathway lighting.
- *Willingness to Pay.* After trying various products, BoP were willing to pay for task lighting, area lighting, and torch lighting, seeing the benefits as important.
- *Microfinance.* Microfinance has been effective in financing solar lighting for residential and small business applications.
- *Socio-Economic Benefits.* Increased light consumption in evenings; replacement of kerosene lamps as main source of lighting (though households may continue to use kerosene lamps, candles, and torches); reduction in household expenses for kerosene and batteries for lighting; increased children studies and reading in evenings; prolonged evening activities; increased socializing in evening; productive work; safety and security outdoors; and positive qualitative results for HIV/AIDs patients.
- *Cultural Impacts.* Culture-related reservations against preferences for visual design (e.g., color, shape) will influence successful marketing.

Conclusions

Industry (manufacturers and distributors) players are seeking greater understanding of consumer preferences in the emergent off-grid lighting market. While anecdotal evidence points to a substantial opportunity and entrepreneurial interest in the off grid lighting market in Africa, many potential players lack the market intelligence needed to develop and disseminate appropriate products to meet the needs of African customers. Largely, this is the result of the infancy of this market; one that expects to deliver strong returns on investment but, at present, remains largely undefined, untapped, and unrealized. This session provided information on defining the African consumers, their design preferences, priority attributes of different types of lighting products, consumer demographics, etc.

Session IV: Policy Drivers

Session Chair: Dana Rysankova, World Bank Lighting Africa Program Manager

Session Name	*Speaker*
Policy Barriers Hindering Off-Grid Lighting—Commissioned Paper	*Mark Hankins, Energy Specialist, Marge Consulting*
Panel Discussants: Mitigating the Barriers	*Lutengano U.A. Mwakahesya, Director-General, Tanzania Rural Energy Agency* *Augustus Goanue, Interim Head, Liberia Rural and Renewable Energy Agency* *Ogunlade Davidson, Minister of Energy and Water Resources, Sierra Leone* *Omane Frimpong, Managing Director, Wilkins Engineering, Ghana*

'Quality standards are absolutely required as Africa has a history of being a dumping grounds for poor quality products.'
Ogunlade Davidson, Sierra Leone

'The most important role of Government is to make a level playing field for private sector players.'
Omane Frimpong, Ghana

'Political will drives policy commitments. The private sector is important to ensure that good policy is developed and results in more than empty words.'
Augustus Goanus, Liberia

'Commercial companies are challenged to build skills of distributors in rural areas, including sponsorship of retailer education.'
Lutengano U.S. Mwakahesya, Tanzania

Dana Rysankova, Session Chair

Ms. Dana Rysankova is the World Bank Program Manager for Lighting Africa. She is a Senior Energy Specialist in the Africa Energy Unit of the World Bank. Ms. Rysankova leads and contributes to a number of electrification and renewable energy initiatives financed by the World Bank in East and West Africa. She is also managing the Africa Electrification Initiative (AEI), which aims to promote experience exchanges among Africa electrification practitioners. Ms. Rysankova has over 10 years of experience on energy access issues. She joined4the World Bank in February 1999 and has held various positions in the private sector development and energy units in the Latin America and Africa regions.

Session Highlights

Mr. Hankins presented preliminary findings of the Lighting Africa policy study which focused on eight countries: Cameroun, Democratic Republic of the Congo (DRC), Ghana, Kenya, Rwanda, Senegal, Rwanda, and Tanzania. The purpose of the study was to provide policy guidance on low cost lighting development. Preliminary findings are outlined below.

Key Policy Challenges

- Lack of significant progress in modern low cost lighting access, particularly for BoP.
- Official policy (and funding) is primarily on grid extension as primary electricity access option.
- Kerosene use continues and often represents a huge outflow of cash among BoP and overall Government expenditure (e.g., subsidies).
- Grid electrification projects are not going to reach substantial population with modern light for the next 30 years.
- Government knowledge of low cost lighting solutions lags behind technology.

- Tariffs are still a major barrier.
- Effective policy solutions to achieve mass access to low cost lighting access have yet to be implemented.
- Meanwhile, the private sector is delivering lighting options (e.g., LEDs) and consumers are buying what the market provides—even if it is poor quality.

Proposed Solutions

- Lighting access is a solvable problem; however, encouragement is needed for private sector to engage in this market.
- Areas for policy intervention include:
- Development of policy and regulatory frameworks for private sector involvement.
- Provision of quality assurance and standards.
- Support for affordable solutions aimed at low income groups.
- Streamlining and simplification of import procedures and consistent application of same.
- Removal and enforcement of tariffs, taxes, and duties.
- Elimination of incentives for kerosene.
- Provision of incentives for private sector and consumers to catalyze the market.
- Support to suppliers to obtain scale economies and reduce high import costs for low cost lighting equipment (e.g., bulk purchases).
- Market development assistance for new, unfamiliar products including technical assistance, matching grants, and financing for awareness campaigns.
- Incentives for the private sector to move capital into rural areas.
- Impact measurement of lighting access programs is important—if we cannot measure policy impacts on modern lighting access, how do we know when we are making progress?
- One size does not fit all. The eight countries studied each had different policy barriers, needs, and proposed policy solutions to accommodate their specific circumstances.

Mark Hankins – Keynote Speaker

Renewable Energy Consultant Mr. Hankins is a Nairobi-based consultant who specializes in rural electrification and renewable energy, having worked in East and Southern Africa for over 20 years. Mr. Hankins has been involved in rural energy projects in Tanzania, Ethiopia and Zambia, and has conducted rural electrification market surveys in a number of countries. A leader in development and execution of PV projects in Africa, he has worked with renewable projects for the private sector, UN, the World Bank, USAID, the GEF, Sida and Shell Foundation. Mr. Hankins is author of "Solar Electric Systems for Africa" and recently released a new book on off-grid solar PV installation.

Panelist Responses

- *The Role of the Government in Provision of Modern Lighting.* The government plays a multi-faceted role in stimulating market development and scale up, including policy commitment, removal of fiscal barriers, procurement/incentives, and access to finance.
- *Linking Lighting and Energy Policy.* Energy policy must be comprehensive because it is only written once in a long time. In many countries there is no policy, or the policy is outdated. Lighting is only a small component of a broader energy policy but needs to be included. There also needs to be a good regulatory framework to support these policies.
- *Fiscal Policy.* The private sector has requested reductions/exemptions from lighting component and product duties and taxes. However, some of these taxes and duties are necessary for government functioning and cannot easily be removed.

Senegal has removed tax protection for kerosene with a corresponding reduction in consumption.

- *Subsidies.* Subsidies, where they are applied for off-grid lighting, must be targeted so that they benefit poor people.
- *Collaboration with the Private Sector.* It is important to work in cooperation with the private sector—manufacturers, distributors, financiers, etc.—in the design of effective policy. Governments can also encourage competition; facilitate partnerships between manufacturers and distributors; promote local assembly and economies of scale; and support market studies and business plan support. Consumer awareness campaigns are also important.
- *State and Local Engagement.* Policies at the national level need to involve state, local, and regional bodies.
- *Quality Assurance.* Standards are required as Africa has a history of being a dumping ground for poor quality products and this should be avoided in the case of off-grid lighting. Lighting products are getting more complicated which makes it difficult for local bodies to differentiate the good from the bad, and increases the priority for quality assurance. International best practices and "seals" will be useful. Regional standards also have a role to play, including participation by the East Africa Commission (EAC), Common Market for Eastern and Southern Africa (COMESA), and Economic Community of Western African States (ECOWAS).
- *Movement of Goods.* Many countries experience slow movement of goods through ports and customs; there is a need to improve processing procedures.

Conclusions

The lighting policy problem has many dimensions including recognition, cost issues (taxes, duties), private sector involvement, quality issues, and scale up. Currently, Lighting Africa is sponsoring a study to examine low cost lighting policy in eight countries to identify issues and opportunities for policy support to accelerate the uptake of off-grid, low cost lighting in Sub Saharan Africa. For this session, Mark Hankins presented the results of the policy study to date, and government officials from four participating countries provided their perspectives on the topic.

Governments have an important role to play in supporting technology, finance, and business innovation. Off-grid lighting should be part of broader energy policy and include fiscal incentives to benefit modern lighting while reducing/eliminating kerosene subsidies. Policies need to address local needs and conditions, and governments should engage the private sector and other key stakeholders in formulation and implementation. Regulatory enforcement is important and monitoring policy impacts is critical as the sector evolves and grows.

Session V: Wrap Up—Day 1

- Access to electricity is very limited in Sub Saharan Africa, estimated at only 29% of the population.

- *Lighting Africa* aims at providing up to 250 million people in Sub Saharan Africa with access to non-fossil fuel based, low cost, safe, and reliable lighting products with associated basic energy services by the year 2030. The near-term target is 2.5 million people by 2012. Lighting Africa addresses the lighting needs of rural, urban, and peri-urban customers without electricity access—predominantly low income households and businesses. It complements government grid and off-grid (solar) expansion efforts by focusing on modern energy services to the BoP will not receive electricity access in the near- to mid-term.

- New advancements in lighting technology, including LEDs and CFLs promise clean, portable, durable, lower cost, and higher quality lighting. The challenge is to make these products accessible to the people in Africa. With expenditures on fuel based lighting estimated at US$38 billion annually, the potential exists to engage the international lighting industry in this new market area, while serving consumers. Lighting Africa builds the bridge between technology providers and consumers.

- Regarding market trends, the solar portable lamp market penetration is currently very low, below 0.5%. However, there are significant opportunities for growth: unreliable electricity service provided by grid extension, population growth, increasing price and price volatility of kerosene, growing industries such as cell phone industry, and decreasing price of SPL and other improved lighting products. The lighting market is segmented, thus requiring a multi range of solutions. If barriers are addressed—lower-cost, reliable products, access to financing, local skills, consumer training, taxes and duties, transaction cost for CDM – the market could significantly grow by 40% and the prices could decrease by 50% over the next 5 years.

- With respect to consumers, the private sector should make sure that it understands the customers and their values. The communication strategy should consider both functional and emotional needs. Building the brands and additional features are important for customers both at the bottom and top of the pyramid. Retailers should play a key role in the marketing strategy since they are in direct communication with the final customers. Availability and quality of the products is critical, as is pricing (most of the people live with less than US$2 per day). Also, multi-purpose products have an advantage.

- In the policy arena, governments have an important role to play in encouraging the private sector to deliver modern lighting services. There are a number of policy and fiscal instruments that can be used to complement grid and off-grid extension. However, there is no silver bullet—policy solutions will differ from country to country.

Day 2: May 19, 2010

Concurrent Sessions

Session VI (a): Market Perspectives on Quality Assurance

Session Chair: Akanksha Chaurey, Director, The Energy & Resources Institute (TERI)

Session Name	*Speaker*
QA Strategy for the Off-Grid Lighting Industry—Commissioned Paper	*Rodd Eddy, Industry Consultant*
Panel Discussants:	• *Sam Andrews, China Operations Manager, Barefoot Power* • *David Otieno, Deutsche Regional Energy Advisory, Gesellschaft für Technische Zusammenarbeit (GTZ)* • *Norbert Pfanner, Dipl.-Ing, Fraunhofer Institute for Solar Energy* • *Eric Chesire, Kenya Bureau of Standards**

Session Highlights

On behalf of Lighting Africa, Rodd Eddy proposed a Quality Assurance Framework consisting of:

- *Voluntary International Quality Seal Program.* This is based on truth-in-advertising standards for off-grid lighting and energy products. For a product to receive the seal it must meet pre-determined requirements such as a specification sheet with minimum operating standards, additional claims on packaging or marketing materials must be accurate, specifications and claims must be verified by an independent test laboratory using standardized test methods, and the manufacturer must sign a pledge annually that their product continues to meet/exceed specifications.

Akanksha Chaurey, Session Chair

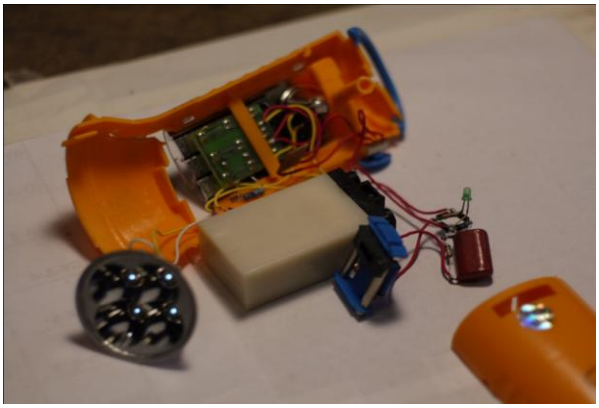
Ms. Chaurey's experience in the field of renewable energy for sustainable development is spread over 22 years. Expertise is distributed generation and rural electrification. In July 1999, she rejoined TERI and is now working as Director, Decentralized Energy Solutions Division. She has a Masters of Science degree in Physics and a Masters of Technology in Metallurgical Engineering from the Indian Institute of Technology, Kanpur. Ms. Chaurey recently submitted her PhD thesis on "Assessment and Evaluation of Photovoltaic Systems for Rural Lighting in India" to the Indian Institute of Technology, Delhi, and is awaiting final award of the degree. She has over 25 technical publications in journals and conference proceedings, and several research reports to her credit.

Rodd Eddy, Keynote Speaker

Mr. Eddy is a Program Consultant for Lighting Africa and is on the board of several companies within the health and construction fields. His experience is international, with active engagements in Asia, Europe, and Africa. For 10 years, Mr. Eddy worked for OSRAM, in capacities from President and CEO to Senior Director of Sustainability. He has worked for more than 17 years in the lighting industry and six years in the communications industry. Mr. Eddy holds a diploma in illumination engineering and an advanced diploma in telecommunications.

Reducing Low Quality

Ensuring quality equipment should create a level playing field that protects the consumer, reduces counterfeit and substandard products, and encourages investment.



After the drop test

Fake LED Product

- *Use of Standardized Test Methods to Assess Product Performance.* A testing methodology has been developed and tested in coordination with Lighting Africa, Fraunhofer Institute, and the National Lighting Test Centre in China. It is comprised of two steps: a quick screening process to eliminate simple issues (soldering, switches, durability, packaging), and a detailed full testing that assesses lumen depreciation, battery longevity, etc.
- *A Network of Approved Laboratories to Test Products Using the Standardized Methods*. The initial standard implemented will be based on a price performance compromise enabling affordability coupled with a first level of quality. The University of Nairobi has committed to establishment of a product testing facility; this will be the first laboratory set up in Africa.
- *Communication and Awareness.* Build a campaign around the benefits of clean, sustainable off-grid lighting, the detrimental effects of fuel based systems, and how consumers can tell quality from substandard products.
- *Global Off-Grid Lighting Association.* The quality assurance standards, communication, implementation and monitoring will be overseen by a newly developed Global Off-Grid Lighting Association.

During the Conference, over 20 organizations signed onto a Letter of Intent (LOI) to establish an association of off-grid lighting market stakeholders who will collectively pursue common interests in support of the sustainable development of the market. The initial focus of the association will be on product quality assurance and:

- Supporting the sustainable development of off-grid lighting solutions in developing nations.
- Facilitating economic, ecological, and social benefits for all stakeholders.
- Reducing fuel based lighting systems globally to address climate change by mitigating GHG emissions.

A copy of the signed Letter of Intent is provided in Appendix III. Panelists confirmed the need for a quality assurance program on off-grid lighting and supported the formation of an independent Stakeholder Association to take on this responsibility.

Conclusions

Fuel based lighting is expensive, unhealthy, and inefficient but, it is affordable to the common person and therefore offers a short term solution to lighting needs. Off-grid lighting products are being sold into the African market as an alternative/complement to kerosene; however, the majority are substandard. Market spoilage and low product quality is already biasing customers against solar lanterns. This is further complicated by the lack of government and/or national quality standards.

To address these issues, Lighting Africa has developed a quality assurance framework that will be promoted in collaboration with the newly formed off-grid industry stakeholder association. In particular, a number of next steps will be conducted in the development and implementation of the Industry Association:

- Develop a seal/quality mark.
- Continue industry capacity building.
- Develop a market monitoring program.
- Create an on-line portal for consumer verification.
- Develop and implement a communication campaign.
- Obtain consumer feedback on off-grid lighting products.
- Select and roll out a quality assurance program in pilot countries.

Session VI (b): Emerging Business Models in Reaching the Bottom of the Pyramid

Session Chair: Professor Pikay Richardson, Manchester Business School

Session Name	*Speaker*
Marketing to the Base of the Pyramid—Commissioned Paper.	*Professor Pikay Richardson*
Panel Discussants:	• Harald Schuetzeichel, Director Solar Energy Foundation in Ethiopia/Founder Sun Transfer in Kenya, Sun Transfer in Ethiopia • Ueli Scheuemeier, Consultant, Sunlabob in Uganda • Mohamedrafik Parpia, Managing Director, Zara Solar in Tanzania • David Taverner, Senior Program Manager, GSMA Development Fund • Hua Shuming, Director, National Lighting Test Center

Session Highlights

BoP Market Misconceptions. The BoP market (poor) are not worthwhile customers, have no need for products sold in developed countries, cannot appreciate or pay for innovations, are not critical for Multi National Enterprises' (MNE's) long-term growth and survival, and do not excite good and competent managers (i.e., will not operate there).

The Reality of BoP Markets in General. There is enough purchasing power in these countries however high interest rates prevail for credit (in some cases as high as 600-100%, whereas banks average 25%). BoP markets appreciate brands and quality. BoP markets are getting increasingly connected and networked and readily embrace technology. Distribution networks exist.

Reality of Rural BoP Markets:

- **Intra-community Influences** are relatively more important than inter-community ones. Communities are scattered and more closely knit; hence intra-community communications are more important and critical. The views of opinion leaders are vital to success.
- **Scarcity of Media Bandwidth but Abundance of Attention.** In rural markets REACH is more important than ATTENTION. The challenge is media attention. Approaches to address this include: a micro marketing program in India tapped into Women's Self Help Groups to reach consumers in inaccessible markets; use of publicity vans; and Colgate's Oral Health program which lured potential consumers with the promise of a "free oral check."
- **Slow to Adopt Brands, Slow to Give Up.** Rural markets are more closed and hence are slow to adopt new brands, but equally slow to give them up. Thus the need to front-load investment and plan for longer lead times.
- **Expenses are Year Long, Income is often Seasonal.** Rural markets exhibit seasonality of incomes and demand; requires firms to plan supply to suit.

Pikay Richardson, Session Chair and Keynote Speaker

Dr. Pikay Richardson is a seasoned economic and management educator and consultant. He holds a BSc in Electrical Engineering, an MSc in Management Sciences, and a PhD in Business Economics and Strategy from the University of Manchester (England). From 1989 until 2006, Dr. Richardson was a full-time member of faculty at Manchester Business School, University of Manchester, and at the School of Management, New Jersey Institute of Technology. Dr. Richardson is currently a senior visiting fellow at the Manchester Business School. He has consulted for companies in the United Kingdom, Ghana, Nigeria, and India.

- **Information Hungry, Entertainment Starved**. Limited entertainment options make it easier for marketing communications to generate high levels of participation if communications are entertaining. (Nokia has successfully used an engaging radio drama to communicate its "one year warranty" in South Africa.)
- **Higher Receptivity to Advertising, with Lower Persuasion.** Rural consumers are readily persuaded by marketing that touches them directly (personal experience, seeing others using it, demonstrations). For example, Unilever's "germ glo box" was used to highlight the importance of washing hands with anti-bacterial soap.
- **Commercially Profitable and Socially Acceptable.** Commercial enterprises (more so MNEs) should be careful not to be seen as too aggressive or mercantilist when dealing with rural markets. Building a rural marketing thrust around a social platform makes it more acceptable to governments, Non Government Organizations (NGOs), etc. Unilever's micro marketing program in India links corporate interests (getting rural women to sell products to their communities) to a larger social agenda (giving rural women an income generating opportunity).
- **Route-to-Market Strategies for MNEs**. Textbox solutions for BoP markets do not exist; companies, consultants, academics and development agencies need to better understand the success factors for operating environments characterised by deep poverty. Partnerships with organizations that already serve the poor in the target market are useful. Building relationships with a number of organizations as early as possible is important. Understand the strategic objectives, culture, and organizational structures of BoP models; do they fit with your own? Once relationships are built, begin to identify important bottlenecks that may hinder the achievement of your goals and modify your model to overcome the constraints. Start by thinking about replicating existing competencies to support the building of markets in the BoP. Ensure that business supports an increase in the real income of people (social objectives side by side with commercial objectives) and monitor the dynamics of your partner's overall model with strategic objectives.

Case Studies

- **Unilever in India.** Needed to find low cost ways to distribute products. Created a network of millions of micro-entrepreneurs, Shakti Amma (empowered mothers) to sell its products in the villages. Start up loans enabled the women to buy stocks of goods to sell in local villages. Supported efforts of partners to achieve additional capacities, such as training. Not afraid to experiment with new types of distribution, such as selling through village street performers. Thirty percent of revenues were achieved this way.
- **Telenor in Bangladesh**. Telenor's Norway market was facing saturation in 1990s. The company entered Bangladesh via a joint venture with Grameen Bank: Grameen Phone (commercial) and Grameen Telecom (social). Grameen Phone was profitable in 2000; had a 60% market share in 2006. Grameen Telecom created 250,000 micro-entrepreneurs (village phone ladies) by 2006. This benefited Telenor via joint venture access to important capabilities and resources. They expanded their existing fibre optic network, and secured funding from various donor agencies due to the social objectives (NORAD, ADB, IFC, etc) that absorbed some of the risks lowering the cost of capital. For intangibles, obtained the goodwill, public trust, and brand name of Grameen. This brand equity was critical to obtaining a license. Local partner knowledge also reduced uncertain and search costs; provided access to people with special skills in working with the rural poor; and yielded deep knowledge of microfinance system, ensuring selection of appropriate micro-entrepreneurs.
- **Motorola and Mobile Phones.** The Motorola case of selling mobile phones for the BoP involved four times redesign of mobile phones; a low cost, no frill phone for US$40; reliable and simple, standby

time of two weeks; lots of battery power (500 hours); extra loud volume; and conformance to local languages. Expect huge sales in China, India, and Turkey.

Serving BoP Markets Successfully—Lessons from Cases and Panelist Experience.

- Recognize that Western-style patterns of economic emancipation, participation, and development do not exist in BoP market environments.
- Change mindsets (unlearn and relearn).
- Collaborate with not-traditional partners who understand the social context.
- Co-invent custom solutions, building from the bottom up.
- Develop local capacity, sharing resources across boundaries.
- Focus on unique product, service and technology requirements of the BoP.
- Localize value creation.
- Enable access to goods and services, including financing.
- Consider unconventional partnering, with governments, NGOs, or groups of multiple stakeholders to bring necessary capabilities to the table.

Conclusions

The BoP is not integrated into the global market economy and do not benefit from it. The BoP community suffers from significant unmet needs including lack of bank accounts and access to financial services, no formal title to property, and limited access to electricity, water, and sanitation services, etc. This market segment is dependent on informal or subsistence livelihood; they are uniquely vulnerable to the destruction of natural resources they are powerless to protect. Informality and subsistence are poverty traps, with most BoP paying higher prices for basic goods and services, with likely poorer quality.

The BoP represents a market for low cost, modern lighting to help improve their lives and livelihoods. Models exist for delivery of these services, including lessons learned and best practices. Myths associated with the BoP market need to be dispelled and opportunities leveraged. New models require advanced technology, creative financing, affordable packaging, local partnerships with relevant experience, and attention to societal performance.

Session VII (a): Product Advances in Off-Grid Lighting

Session Chair: Anton Zimmermann, CTO, Phocos AG

Session Name	*Speaker*
LEDs	*Ling Wu, General Secretary, China Solid State Lighting Alliance*
Batteries	*Omair Dawood, Assistant Marketing Manager, SANYO*
Photovoltaics	*Therese Jordan, Technologies Vice President for Business Development, USA, Konarka Technologies*

'My people are using kerosene lamps and but are keen on purchasing better offerings'
President Yoweri Museveni, to Sanyo Company in the year 2006—This statement led Sanyo to innovate the solar lantern for the people of Uganda

'Statistics show there is a lot of sunlight reaching the world that should be turned into energy instead of burning kerosene and petrol fuel which pollute the earth—we only need to tap the sunlight'
Therese Jordan, Konarka

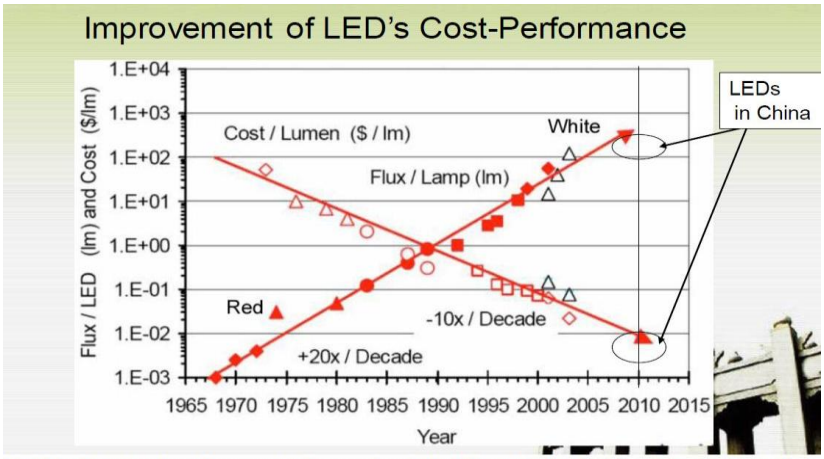
Session Highlights

Anton Zimmermann, Session Chair

Mr. Anton Zimmermann is a graduate of Ulm's University of Applied Science in Germany, where he received a degree in Industrial Electronic Engineering. He has 20 years of experience in engineering of renewable energy systems and design of electronic equipment for photovoltaic applications. As cofounder and Chief Technology Officer of Phocos AG, he is in charge of technology programs and manages the intercultural design and production teams.

LEDs. LEDs have experienced tremendous cost and performance improvements over the last 40 years. Today, LEDs are becoming the most important component of the off-grid lighting unit in China. Given the significant solar resource available worldwide, photovoltaics (PV) is the preferred solution for powering these systems in rural areas. The benefits of rural PV lighting service include affordable costs, long life span, easy maintenance, high performance and efficiency, and modular design. The typical off-grid solar lighting system is comprised of a solar panel, controller, rechargeable battery and LED lighting unit. The Chinese government supports off-grid lighting technology. In 2003, the Ministry of Science and Technology initiated a National Semiconductor Lighting Project. Today, over 100 Chinese companies produce 80% of photovoltaic lighting lamps in the world.

It was noted that most of Chinese products imported into Africa are cheap and of low quality. This is not because China does not have better quality products to offer, but because the Chinese lack channels of distribution to export good quality, expensive products. Most of the distributors that deal with Chinese companies prefer to import cheap products which they can move quickly into the marketplace. It was further indicated that continued emphasis will be placed on ensuring the LED lighting unit in the PV LED lighting system meets technical requirements and standards, tested at certified institutions.



LED is becoming the most important lighting unit of off-grid photovoltaic lighting system in China !

Batteries. The rechargeable battery market forecast is projected to grow from about US$3 billion in 2010 to over US$55 billion in 2014. Three types of batteries are typical for solar standalone systems, these include lead acid, lithium ion, and nickel metal hydride. The advantages and disadvantages of each are outlined below:

- **Lead Acid Battery.** The advantages are low price, long history and easy to use. Disadvantages are high discharging ration, low cycle at low state of charge, lower charge/discharge efficiency, large installation areas and heavy weight, and not environmentally friendly.
- **Lithium Ion Battery**. Advantages are high output power density, many cycles at 100% depth of discharge, high power per energy density, and small and lightweight. Disadvantages are high prices and sensitive to overcharging.
- **Nickel Metal Hydride Battery.** Advantage is many cycles, not affected by over charge or over discharge, and low self discharging ration. Disadvantages are memory effect and higher price.

Sanyo is the only manufacturer that provides both photovoltaic and rechargeable batteries. It continues to develop new products for Africa including solar LED lanterns and solar power boosters. The latest Sanyo technology is the "Eneloop" battery which is easy to use, portable, rechargeable for up to 1000-2000 times and lasts longer, and is also usable in very low temperatures. This technology should be able to change the lives of many through eventual cost reduction, convenience, and efficiency.

Applications vs. Battery Type

	Lead Acid	Li-Ion Lithium Ion	Ni-MH Nickel Metal Hydride	NAS sodium-sulfur battery
Large Commercial (more than 1MWh)				●
Commercial (10kWh~1MWh)	●	●		
Residential (1~10kWh)	●	●		
Solar Home System (~1kWh)	●	●	●	Solar Standalone system
Car Battery (~1kWh)	●	●	●	
Lantern (~30Wh)	●	●	●	
Mobile phone (~5Wh)		●		

Solar Technologies

KONARKA

Module and Cell Efficiency							
Technology	Thin Film					Crystalline Silicon	
	(a-Si)	(CdTe)	CI(G)S	a-Si/ µSi	OPV	Mono	Multi
							
Cell efficiency	5-7%	8-11%	7-11%	8%	3-5%	16-22%	14-17%
Module efficiency						13-21%	12-16%
Area Needed per KW (for modules)	~ 15 m²	~ 11m²	~ 11m²	~12m²	~30 m²	~7m²	~8m²

Source: (Adapted from) Daniel Fraile, EPIA

Photovoltaics

- **Solar Technologies.** Solar technologies include thin film and crystalline silicon (mono and multi). The emerging technologies have come with a wide range of new products that are of higher quality and are more efficient.
- **Price Trends in Solar Modules**. A 440 solar module prices at less than US$4.00/Wp. The lowest price for multi-crystalline silicon is US$1.74/Wp, for monocrystalline silicon US$2.07/Wp, and the lowest thin film price is US$1.50/Wp. However, not all models are equal—brand, attributes, and certifications matter.
- **Next Generation PV**. To focus on silicon PV systems and organic PV systems (OPV). Bulk, heterojunction solar cells will be molecularly designed and nano-engineered. Fully automated production processes will be used for module construction. Konarka is recognized throughout the world as a leader in OPV—a 3rd generation solar technology that is rapidly emerging to compete with silicon based 1st and 2nd generation solar technologies. At the heart of Konarka's technology is a photo-reactive polymer material that can be printed or coated inexpensively onto flexible substrates using roll-to-roll manufacturing, similar to the way newspaper is printed on large rolls of paper. The resulting Power Plastic can then be manufactured into a wide range of end-use products for portable applications, remote stand alone systems, and large scale installations.
- **Attributes of Organic PV**. Design features include flexibility, thin, light weight, impact resistant, low light sensitivity (indoor/outdoor) multiple colors, transparent option, and customized voltage. Further, it is truly green in terms of recyclability and environmental impact (on a per watt peak basis is 80-95% lower than silicon).
- **Trickle Charging over a Range of Conditions.** At full sun, silicon can provide 50-200% more power than thin films, including OPV. At low light, OPV can produce 170% more power than traditional power.

Conclusions

Tremendous advances are occurring in all the key components of off-grid lighting systems, including LED lights, batteries, and solar modules. Improvements are taking place in both the cost and performance of these elements, as well as the overall systems. These advances offer promise for the "lighting poor" in Sub Saharan Africa to be able to obtain quality products at low cost that are environmentally beneficial.

Session VII (b): Financing Across the Supply Chain: Investor Roundtable

Session Chair: Arthur Itotia Njagi, Lighting Africa Project Manager, IFC

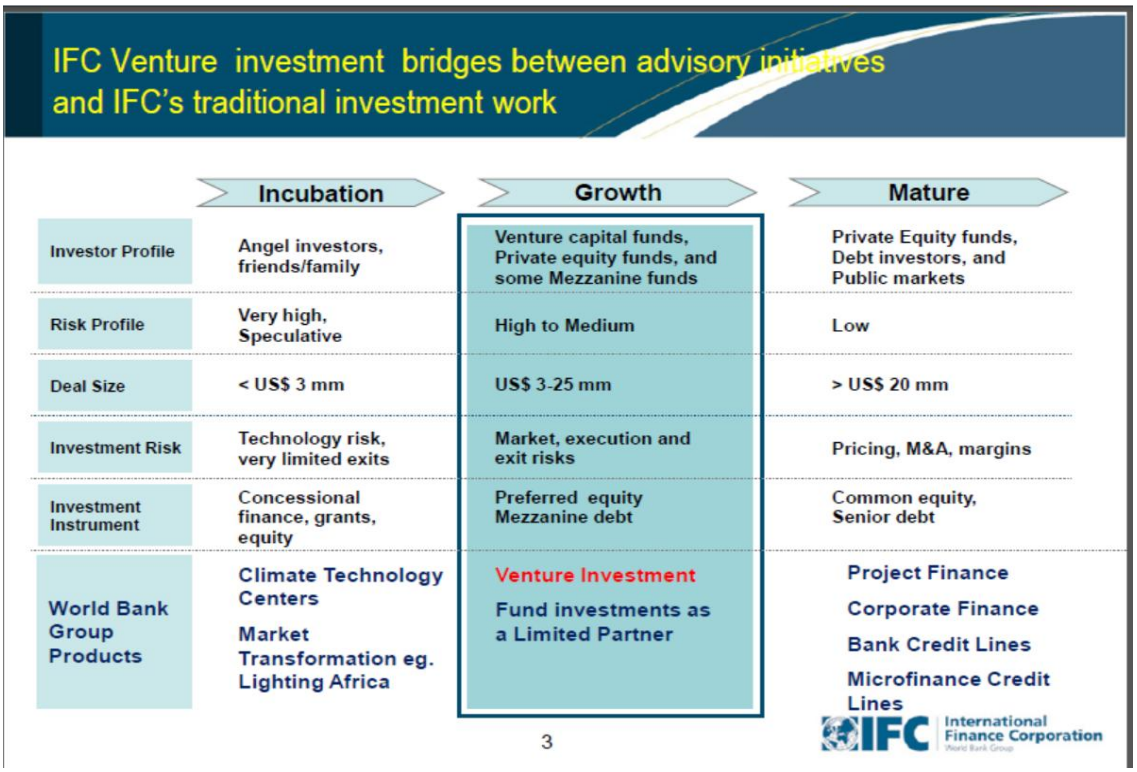
Session Name	*Speaker*
IFC	*Corinne Figueredo, Senior Investment Officer, Cleantech Venture Investment Team*
Ecobank	*Vitalis Muthoka*
Acumen	*Raj Kundra, Director, Capital Markets and Energy Portfolio*
E+Co Africa	*Kofi Nketsia-Tabiri, Regional Manager*
Tujijenge Africa	*Felistas Coutinho, Director*

Session Highlights

- *Growth Capital*. IFC's Cleantech Venture Investment program offers innovative products and services that improve the productive and responsible use of natural resources, reduce/eliminate negative ecological impact, and represent sustainable and profitable business opportunities. This program bridges between advisory initiatives and IFC's traditional investment work, offering venture capital funds, private equity funds, and some mezzanine funds. Deal size ranges from US$3-25 million, providing preferred equity and mezzanine debt. IFC serves as a minority investor with a maximum 20% equity stake. Co-investors can be local venture capital funds, cleantech funds, and strategic investors. Investment criteria include: strong management team with a proven track record and technical/market knowledge; revenue generation or customer traction; post research and development (R&D), proven technology; sustainable competitive advantage (e.g., patents, know how, licensed technology, cost base; clear path to scale up and investor exit; and existing investors ready to co-invest). IFC can be an important partner for cleantech companies from or moving into developing countries as it offers climate change expertise; the IFC brand; local market knowledge and presence (100 offices in over 70 countries); a global network of 1400 clients and partner institutions; early stage investment and technology/sector expertise; and a range of financial products to follow company growth (preferred, common, mezzanine, senior debt, and guarantees).

Arthur Itotia Njagi, Session Chair

Currently, Mr. Njagi is serving as the Lighting Africa Project Manager based in Nairobi, Kenya. Prior to joining IFC, Mr. Njagi was the Marketing Manager for Vestergaard Frandsen EA limited covering the East, Central, and Southern Africa regions. He also served as the Business Development Manager for Kodak Kenya limited in East, South, and West Africa. Mr. Njagi brings 15 years experience in managing the launch of new products, business models, and market development activities across multiple brands within Africa.



- *Financing Across the Value Chain.* Ecobank is the leading pan African banking group with a presence in more African countries than any other bank. Ecobank currently operates in 30 African countries, and provides a full range of wholesale, retail, commercial, investment, and transaction banking services and products. Customers include governments and government agencies, multinational, regional, multilateral and financial institutions, local companies and medium, small and microenterprises, and consumers. Ecobank structures financing solutions customized to the needs of value chain stakeholders—retailers, distributors, importers, and manufacturers with services including letters of credit, post shipment financing, stock financing, trade guarantees, etc. It also works with end users through microfinance institutions via risk mitigation arrangements.
- *Patient Capital*. Acumen Fund is a non profit organization that invests patient capital for enterprises that sustainably serve the poor. Patient capital funding blends social and financial returns for long term social impact, targeting the BoP. The Acumen model is to identify qualified enterprises, invest loans and equity, provide managerial assistance, and re-invest any returns. In the energy area, Acumen Fund invests in proven technologies at low cost for off-grid communities, including solar powered lights to replace kerosene. Launched in summer 2007, the Acumen fund has active/approved investments totalling US$5.6 million and has strong experienced teams in East Africa.
- *Small and Medium Enterprise (SME) Support.* E+Co provides investment of services and capital in small and growing clean energy enterprises. E+Co finds great entrepreneurs, helps them establish clean energy businesses, and then invests in them. Also, through carbon monetization, E+Co has developed a new and innovative way to provide financing to clean energy businesses. E+Co's business development support and investment capital serves to create energy businesses that mitigate climate change and reduce poverty while generating financial returns. E+Co makes debt and equity clean energy investments in developing countries; the investments range from approximately US$25,000 to US$1,000,000. To date, E+Co has made investments in over 200

enterprises in 21 developing countries, with six regional offices including in South Africa, Tanzania, and Ghana. Thirty-one PV lighting enterprises have been supported by E+Co in 12 countries, across the supply chain.

- *Microfinance*. Tujijenge Afrika creates MFIs that are transparent, efficient, competitive, and profitable in their work to serve Africa's most needy. Tujijenge Afrika wants the poor to benefit from a formalized system with more investment and opportunity. Tujijenge Afrika provides the start-up capital for new MFIs as well as support in training, fundraising, mentoring, and provision of infrastructure for development. Efforts are expected to be sustainable within three years of operation. Tujijenge Afrika is the majority shareholder of their MFIs but individual local investors and corporate investors both local and international hold a stake.

Conclusions

Providing better access to finance will become a priority as the market for quality lighting products grows and more companies enter the sector. Financial institutions often lack market comprehension and/or are not convinced of the viability of the market. Therefore they are hesitant to lend to distributors. High interest rates negate the fundamental purpose of alternative financing plans, providing little to no incentive for their utilization. Moreover, available financing is often security based, though most suppliers do not hold collateral. Finally, low income consumers often do not have the initial investment needed to purchase new lighting products.

Lighting Africa works to provide working capital and trade finance to manufacturers and distributors by providing commercial financing institutions with information, training, wholesale capital, and risk mitigation instruments to help them improves access to finance for stakeholders along the supply chain. In addition, outreach to specialized funds in the energy sector is also underway. Lighting Africa also explored the potential for financing and risk sharing arrangements to help consumer goods companies and service organizations offer off-grid lighting products through their retail channels. By investing in a first-loss partnership to facilitate the acquisition of low-cost, off-grid lighting products through micro-finance institutions or commercial banks, these companies stand to gain from the increased access to lighting product by people at the base of the pyramid.

Session VIII (a): Sustainability Issues in Off-Grid Programs

Session Chair: Udo Gattenlöhner, Executive Director, Global Nature Fund

Session Name	*Speaker*
Off-Grid Lighting Sustainability Issues	*Gerhard Mair, Consultant*
Particulate Emissions from Kerosene Lanterns	*Dustin Poppendieck Assistant Professor in the Environmental Resources, Engineering Department at Humboldt State University*
Recycling and Disposal of Lead Acid Batteries	*Sophie van den Berg, Partners in Development*

'Sustainable development is defined as meeting the needs of the present without compromising the ability of future generations to meet their own needs.'
World Commission on Environment and Development, 1987

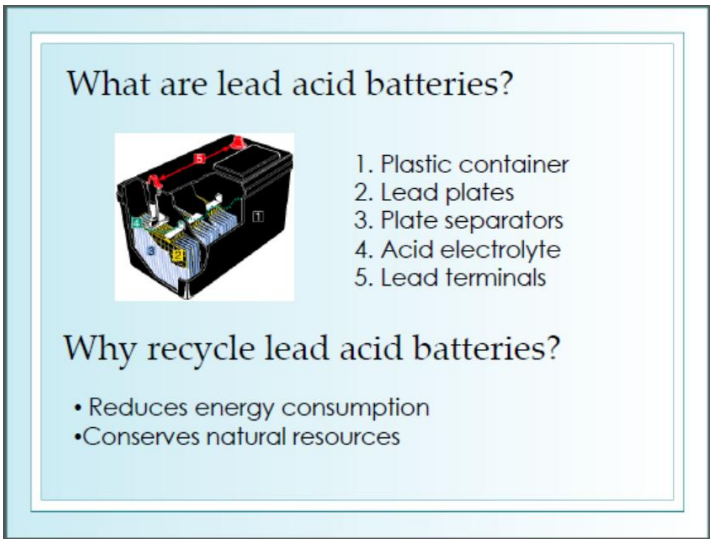
Udo Gattenlöhner , Session Chair

Udo Gattenlöhner graduated in Agricultural Sciences at the University of Hohenheim (Germany). From 1991 to 1996 he worked as project director for the German Environmental Aid Association and the Lake Constance Foundation in Germany. From 1996 to 1998 he was appointed director of the "Model Project Constance", an EU supported "LIFE-project." In 1999 Mr. Gattenlöhner joined Global Nature Fund and was appointed Executive Director in 2002. He has broad experiences in developing and managing various projects, i.e., in the agricultural sector, water management, wetland restoration and renewable energy on national and international levels.

Session Highlights

- *Sustainability and Social Impacts of Off-Grid Lighting.* Social impact assessment involves the process of analyzing, monitoring, and managing the intended and unintended social consequences, both positive and negative, of planned interventions. OSRAM conducted a social impact assessment of its off-grid lighting project in Suba District in Kenya (2008/9) which involved three steps: system analysis (project and scenario design), monitoring of project implementation, and evaluation of social impacts. OSRAM operated three energy hubs in the Suba District with a goal of displacing kerosene with solar lanterns. The results demonstrated that 91% of off-grid service users perceived a favorable impact on their daily life. This includes higher incomes and savings due to cost reductions for lighting in households, fisheries, and communication; higher quality of lighting; replacement of a non renewable energy source (e.g., kerosene); elimination of fumes from household lighting; reduction in direct CO_2 emissions from lighting; investments and jobs; children studying in the evening; women working in the evening, thereby enhancing their social position; and men advancing their position in the community as a result of higher income levels.
  Particulate Emissions from Kerosene Lamps. A variety of health issues are associated with kerosene lamps. These include burns, child poisoning due to inadvertent consumption, exposure to unburned fuel, comprised visual health due to sub-standard luminance, and indoor air pollution. In particular, indoor air particulate matter impacts in the developing world result in: 2-2.8 million deaths/year; 4% of global mortality; 1 million childhood deaths/year; and women being diagnosed with lung cancer, two-thirds of which are non-smokers. Particulate matter health impacts include increased respiratory infections (e.g., tuberculosis), bronchitis, asthma, allergic reactions, and chronic heart disease and lung cancer. A study was conducted to examine the impacts of kerosene lamps as compared to alternatives (e.g., simple wick lamp, small hurricane lamp, and LED lights). The results confirmed that indoor air pollution is adversely impacting health, and LED lamps will yield fewer respiratory health issues for consumers than will kerosene lamps.

- *Disposal and Recycling of Used Lead Acid Batteries.* Lead acid batteries are often used to power solar lanterns. These batteries can yield detrimental health and environmental impacts as the *acid is extremely corrosive, is a good ca*rrier for dissolved and suspended lead, and can contaminate soil and water sources. Also the lead can cause reduced IQ levels, anemia, nerve disorders, kidney damage, muscle and joint pain, loss of memory, seizures, birth defects, and even death. Thus recycling of batteries is important. This entails battery collection, drainage of the electrolyte, crushing and separation, recycling of plastic, smelting and refining, effective control of fumes and gases, proper treatment of effluents, and occupational health. A six step process to environmentally sound management was proposed: (1) inventory of used lead acid batteries and recyclers; (2) public education/awareness regarding the need to recycle these batteries; (3) policy development (e.g., regulation and instruments); (4) engagement of the informal sector on the importance of battery disposal and recycling; (5) battery collection and storage, transport, and shipping; and (6) creation of recycling facilities. Currently battery recycling plants exist in a number of countries throughout Africa.



Conclusions

Modern off-grid lighting devices that use LEDs or fluorescent tubes and bulbs are promising, low cost alternatives to fuel-based lighting. These systems have the potential to provide sustainable, reliable modern off-grid lighting at an affordable price, in turn delivering socio-economic, environmental, and public health benefits to users in Sub Saharan Africa and beyond. However, as all technological innovations bear an environmental cost, it is important to minimize the environmental impact associated with the influx of modern lighting products that will accompany the emergence of the lighting market in Africa. This will require understanding sustainability issues associated with off-grid lighting and devising an environmental sustainability program that works to ensure safeguards are in place to protect the environment from ecological harm associated with the entire lifecycle of products, from "cradle to grave." This includes component manufacturing to disposal practices once their useful life has ended.

Session VIII (b): Carbon Finance

Session Chair: Nana Asamoah Manu, Lighting Africa Kenya Country Manager

Session Name	*Speaker*
Methodologies for Carbon Finance Monitoring and Evaluation	*Evan Mills, Staff Scientist, Lawrence Berkeley Laboratory*
Selling Carbon Credits for Kerosene Replacement with Solar Lamps	*John Keane, Head of Programs, Solar Aid*
Business and Finance Innovation for Cleaner Rural Lighting Solutions	*Mayank Sekhsaria, Co-Founder, Greenlight Planet Inc.*
Industry Perspective on Carbon Finance	*Tom Morton, Executive Director, Environmental Markets, J.P. Morgan-Climate Care*

'Imagine a world where everyone has access to affordable clean, renewable power.' *John Keane, Director, Solar Aid*E+Co*

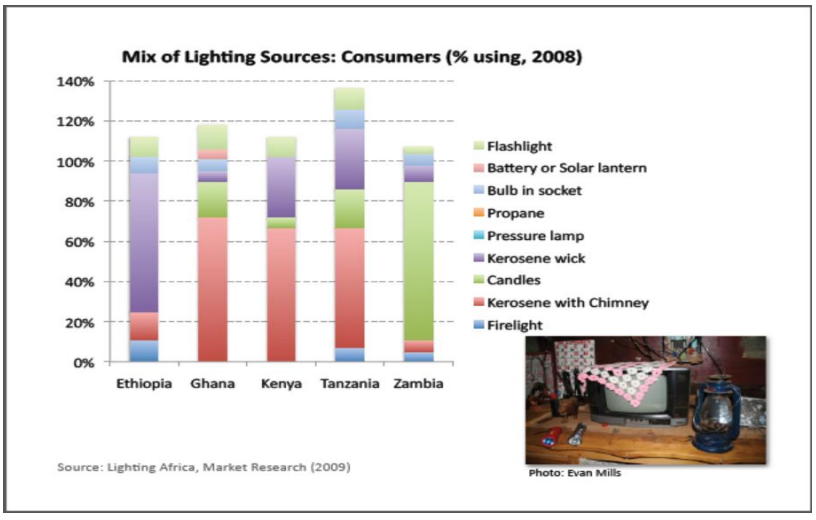
Nana Asamoah Manu, Session Chair

Mr. Manu serves as the Lighting Africa Country Manager for Kenya where a key part of his position entails business development services, finance facilitation, and consumer education and outreach.

Session Highlights

Methodologies for Carbon Finance Monitoring and Evaluation. There is considerable, yet often wishful anticipation for reducing GHG emissions through replacement of fuel based lighting in the developing world with off-grid lighting. Most estimates underestimate the practical realities that stand to erode a truly significant potential. The CDM is the leading system for quantifying the benefits of these projects and embodying them in a market-based platform for trading carbon credits. However, compliance with methodologies for highly decentralized, small scale energy saving projects currently used by the CDM is viewed by project developers as onerous, time consuming, and costly.

In recognition of these issues, the CDM has recently placed priority on improving methodologies for estimating CO_2 reductions from displacement of fuel-based lighting with energy efficient alternatives. In this panel, a new framework was proposed that shifts the analytical focus from costly, yet narrow and uncertain baseline estimates to simplified methods based primarily on "deemed" values focusing on replacement lighting system quality and performance characteristics. The result is a more structured and rigorous methodology that is simpler to implement and involves fewer transaction costs. Through this new framework it has been demonstrated that well designed off-grid lighting products with proven high quality and durability can generate significant reductions. Including quality



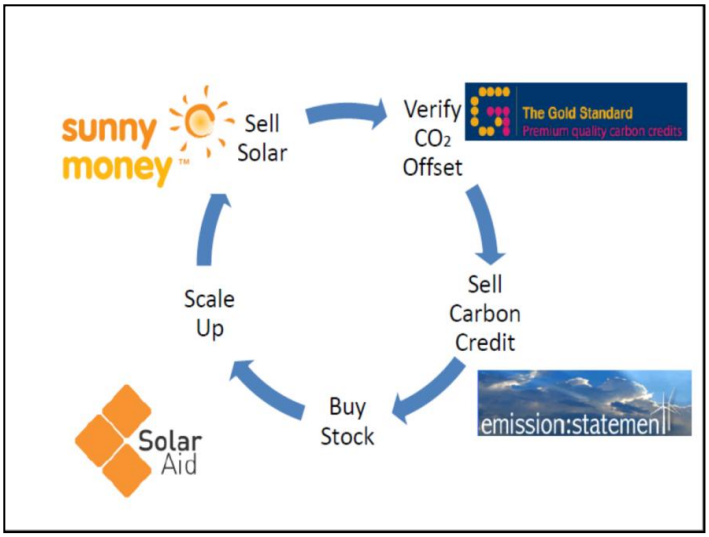
assurance in the methodology will help to reduce market spoilage that currently exists in the African marketplace, thereby ensuring carbon reduction additionality (e.g., emission reductions that would not have occurred without the CDM program). Further, the methodology creates greater transparency for policy makers, removes barriers for project developers through a standardized CDM approach, and contributes to greater end-user satisfaction with improved lighting systems.

A New CDM Methodology for LED Off-Grid Lighting: Epilogue

Since the Lighting Africa 2010 Conference, and based on the proposed methodology discussed above, a new and improved methodology for quantifying the carbon reductions of LED systems in off-grid lighting contexts has been approved for CDM (AMS-III-AR, UNFCC 2010). The goal is to provide a methodology more conducive to LED projects and reduce the time and cost of qualifying a project and documenting carbon savings while requiring performance disclosure and embedding new criterion for minimum product quality while rewarding those products that exceed the minimum. In most cases, independent testing is required to demonstrate performance. Lighting Africa assisted in development of the methodology and LA quality approved products are excluded from the independent testing requirement.

Selling Carbon Credits for Kerosene Replacement with Solar Lamps. SolarAid seeks to address two of the biggest threats facing humanity today—climate change and poverty. Working in rural areas across East and Southern Africa, SolarAid helps to combat both by bringing clean, renewable power to remote and disadvantaged communities, helping them tap into an abundant source of free, clean energy - the sun!

SolarAid Carbon Finance Model



Using a pioneering and innovative technique called microsolar, SolarAid trains local entrepreneurs in sales and marketing techniques to manage their own businesses and generate independent income by selling the organization's solar-powered SunnyMoney products. SolarAid's solar lamp replacement project in Malawi, which displaced kerosene lamps, generated the first ever Gold Standard credits for Sub Saharan Africa. Although there was bureaucracy and significant costs encountered in achieving certification, they have successfully sold emission credits in the marketplace and expect to scale up these activities in the future, with the revenue plowed back into the project. By fully involving the local community, and ensuring the project's financial and technical sustainability, SolarAid and Gold Standard are helping the rural poor in Africa benefit from the carbon market.

Business and Finance Innovation for Cleaner Rural Lighting Solutions. Greenlight Planet combines cutting-edge technology with innovative distribution networks to commercialize low-power LED lanterns. Greenlight requirements for solar lantern carbon projects are threefold:

1) **Long lasting product:** To meet this requirement, Greenlight uses the Sun King which features 16 hours of light on a single day's charge; improved cloudy day charging; an unbreakable, water sealed polycarbonate shell; three year battery lifetime; 1 year limited warranty; and is designed for rural use.
2) **Ability to visit ANY user:** This is necessary to verify exactly how many lamps are in operation. Making the lanterns is easy but selling them is hard. Keys problems are product distribution and tracking the number of lamps that have been sold.
3) **Provision of lots of lanterns***:* Traditional projects are only feasible if you sell over 100,000 lanterns. In Africa, which has huge potential, the top markets Greenlight has identified are Nigeria, Ethiopia, and Democratic Republic of Congo.

Game changers for Greenlight regarding the carbon market are the need for changes in the UNFCCC methodology which is cumbersome; reduced costs for project development; and higher value for carbon offsets.

Industry Perspective on Carbon Finance. ClimateCare is one of the longest established and leading environment-focused organizations in the carbon market. ClimateCare originates and sources carbon credits on behalf of businesses, NGOs, and sovereign states and runs many corporate carbon offset programs. ClimateCare experts develop and consult on innovative emission reduction projects throughout the world—with a focus on Sub Saharan Africa and other least developed countries. The team specializes in socially focused projects with tangible development impacts: renewable energy, energy efficiency, efficient lighting, improved cookstoves, and clean water provision. ClimateCare uses carbon finance not only to reduce GHG emissions but to accelerate sustainable, low carbon development. ClimateCare provides certified emission reductions (CERs) under the Kyoto Protocol and Verified Emission Reductions (VERs) from its own managed projects and through its market network. There are opportunities for emission reduction projects on off-grid lighting in Africa, though the current process through CDM is time consuming for large and small projects. It is important to develop the market without compromising standards and values. ClimateCare has a pipeline of millions of tons under contract, assessment, and negotiation; and it also offers a range of on-line calculators to assist in calculating emissions.

Conclusions

Carbon finance for off grid lighting remains a nascent opportunity, with companies to date confronting complex, time consuming, and costly requirements for meeting CDM requirements for CERs. The new methodology adopted by UNFCCC (AMS-III-AR) should help to address these barriers, streamline the process, and enhance access to carbon finance as a new revenue stream for the market. Additionally, VERs offer opportunities as well. Carbon finance, as it becomes more prevalent, will assist in stimulating off-grid lighting markets, improving project revenues, enhancing consumer adoption and usage, and engaging a broader range of manufacturers and distributors. It will also help in facilitating more robust monitoring of the marketplace given the rigorous requirements for monitoring, reporting, and verification.

Session VIII (c): Implementation Issues in Off-Grid Lighting Programs

Session Chair: Joel Kolker, Regional Program Leader, Public-Private Infrastructure Advisory Facility

Session Name	*Speaker*
United Nations Industrial Development Organization (UNIDO)	*Alex Varghese, UNIDO Representative to Kenya and Eritrea*
Agence Sénégalaise d'Electrification Rurale (ASER)	*Ousmane Fall Sarr, Directeur des Etudes et du Système d'Information*
German Technical Cooperation (GTZ)	*Dr. Carsten Hellpap, Manager, Energizing Development*
United Nations Environment Program (UNEP)	*Gustavo Mañez Gomis, Energy Branch, Division of Technology, Industry and Economics*

"It is time for Africa to take the responsibility to say that we in Africa are also able to assemble these products to bring lighting to our households and communities."
Alex Varfhese, UNIDO Representative to Kenya and Eritrea

United Nations Industrial Development Organization (UNIDO). UNIDO presented its experience in decentralized power generation for productive activities as a model for replication and scale-up. In particular, the focus was on developing a scalable model using *energy kiosks* for East Africa; piloting the program in Kenya; implementing 100/200 functional model energy kiosks for productive activities in the next 24 months in Kenya; and working with donors, the Government of Kenya, and others to replicate the kiosk model in additional African countries.

Joel Kolker, Session Chair

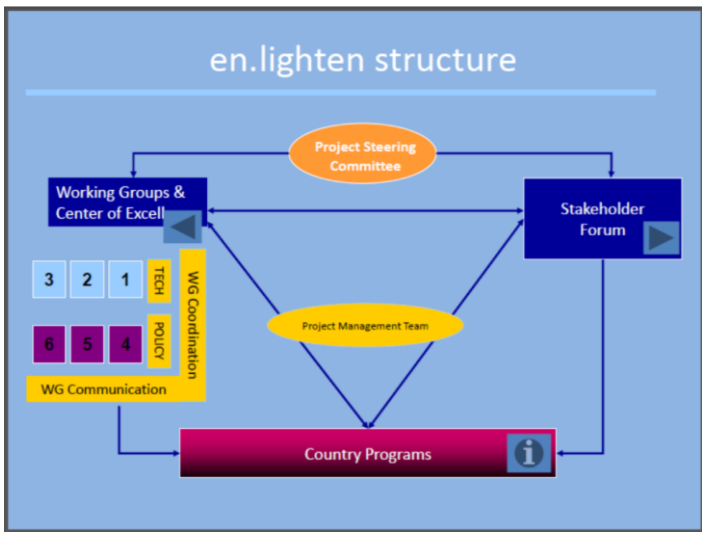
Mr. Joel Kolker is the Regional Africa Coordinator for PPIAF based in Nairobi. PPIAF is a multi-donor Trust Fund managed by the World Bank to support the enabling environment for private sector participation in infrastructure—particularly power, water, transport and the ICT sectors. Mr. Kolker has lived and worked on the sub-continent for over 20 years and previously worked on infrastructure transactions for a bi-lateral donor. He has degrees from the University of Pennsylvania.

The rural energy kiosk (REK) is a community cooperative, decentralized renewable energy based electrical energy service center that can utilize single or multiple (hybrid) sources of renewable energy systems to produce electricity based on what is locally available (e.g., micro hydro, solar, wind, waste products, etc). Electricity is used to add value to promote business in rural areas, improve quality of life, and enhance productivity and productive use activities, thereby boosting economic activities in the village. The following applications could be considered based on the needs of the villagers and available power supply: a LED lamp recharging and assembly facility (youth employment) to recharge LED lamps, mobile phones, and car batteries; an ICT center with ICT training facilities for youth, an internet facility, computer printing and copying; power to community services for schools, health centers, and community development centers; and an industrial/trading or business center with light industrial activities such as flour milling, metal welding, carpentry, juice making, cold storage, etc. A typical kiosk involves 10-30 kW of hybrid renewable energy based power and can serve 1,000-3,000 households or various productive applications as listed above. For households, three kerosene lamps/per household (common) would be replaced with high efficient, rechargeable LED lamps. UNIDO provides 12-18 months working support for maintenance of renewable energy equipment, training on productive uses, and financial management and administration of the kiosk. UNIDO is working with Lighting Africa to incubate 200 microenterprises in Kenya to assemble LED lamps.

Agence Sénégalaise d'Electrification Rurale (ASER). ASER is an autonomous body attached to the Ministry of Energy responsible for accelerating the development of rural electrification in Senegal as a means of reducing poverty and improving living standards in the country. Over the last few years ASER has been undertaking major, highly visible rural electrification programs that have been based on dividing the country into rural electrification concessions to be allotted to private operators through a process of competitive bidding. However, ASER also views off-grid lighting as an important means for addressing the energy needs of those who will not be reached by these programs in the foreseeable future. In response, ASER has signed an agreement with Lighting Africa to introduce quality lighting in rural and peri-urban locations in the country.

German Technical Co-operation (GTZ). GTZ presented lessons learned from its Energizing Development Program (EnDEV) which is a global, performance based German-Dutch energy partnership aimed at providing access to modern energy technologies and services to the poor, focusing on Africa. Global EnDev provides funding for promising basic country activities and scale up of successful projects based on very competitive benchmarking where countries compete with each other within regions. Results are strong local commitment of partner organizations, private sector, and customers; high implementation speed; stimulation of innovative solutions; and implementation of a rigorous monitoring system. To date, EnDev has supported 22 projects in 21 countries, reaching over five million people in a sustainable way (about 820,000 people with lighting household applications). Key activities include facilitating business-to-business contacts; technical and business training of importers, distributors, retailers, and customers; quality testing; market studies and surveys; awareness raising and consumer protection information; and financing schemes to include direct/indirect subsidies, guarantee funds, and loan schemes. GTZ/EnDev is coordinating activities with Lighting Africa.

United Nations Environment Program (UNEP). UNEP presented the en.lighten program which is a global initiative to accelerate market transformation for efficient lighting technologies in residential, public lighting, commercial, and industrial applications, and to achieve CO_2 reductions. En.lighten is led by UNEP in coordination with partners such as Philips and OSRAM. The total budget is about US$20 million; the program was launched in February 2010 and is planned for a four-year duration. The en.lighten management structure involves a Project Steering Committee, Working Groups and Center of Excellence, a Project Management Team, and country programs.



En.lighten's three core components are:

- **Global Stakeholder Platform.** Involves an international multi-stakeholder forum of government decision makers, industry, agencies (including the World Bank and donors), civil society, academia and others representing all world regions, sectors, and concerns. The dialogue will result in a **roadmap** for global lighting market transformation with goals, actions, and timelines, as well as steps for a coordinated **phase out of inefficient lighting**.
- **Center of Excellence for Efficient Lighting.** The Center is comprised of technical staff hosted by UNEP. The Center coordinates policy and technical activities and develops a set of guidelines for harmonization of quality, performance standards, and labels. It is supported by a wide range of technical institutions and an experts' network (**Working Groups**).
- **Technical Support** to countries and programs to include: a **policy toolkit** with best practices and recommendations for all relevant lighting sectors in support of countries; guidance materials (e.g., quality control, assurance, finance, communications, etc.); technical assistance to new countries to develop market transformation programs; development of a model **recycling strategy** and system; and development of country lighting assessments (**health checks.**)

Lighting Africa is collaborating with en.lighten and is chairing the Working Group on Off-Grid Lighting.

Conclusions

A variety implementation models are being employed to advance off-grid lighting. These include:

- UNIDO's rural energy kiosk approach which is utilizing locally available renewable energy resources to energize East Africa for productive and social uses.
- ASER is incorporating off-grid lighting products into its rural electrification programs to expand its reach to those unserved.
- GTZ, through the EnDev program, is using competitive benchmarking to bring promising pilot projects to scale in Sub Saharan Africa.
- UNEP, leading the en.lighten program, is working with a range of donors and other stakeholders to accelerate efficient lighting across a number of sectors.

Lighting Africa is collaborating with each of these activities.

Session IX: Lighting Africa—The Way Forward

Session Chair: Russell Sturm, Sustainable Energy Team Leader, IFC

Session Name	*Speaker*
Panelists	*Vijay Iyer, World Bank Africa Energy Sector Manager*
	Khetsiwe Dlamini, Regional Manager, Africa Sustainability, IFC
Group Discussants/ Moderators	*Patrick Avato, IFC Lighting Africa Global Program Manager*
	Dana Rysankova, World Bank Lighting Africa Program Manager
	Arthur Itotia Njagi, IFC LA Program Manager for Kenya and Ghana

In this session, panelists Vijay Iyer and Khetsiwe Dlamini, led by Session Chair Russell Sturm, provided their views on where Lighting Africa has come and where it should be going. Discussants provided their perspectives, and an open discussion ensued with conference participants.

Session Highlights

- Less than 30% of the population in Africa has access to electricity, perpetuating a cycle of poverty.
- Conventional power sources are not moving quickly enough to meet today's demand, and projected population growth will increase the energy gap.
- Off-grid lighting provides a complement to government electrification programs. The World Bank and IFC reaffirmed their commitment to Lighting Africa and the need to accelerate development of commercial off-grid lighting markets in Sub Saharan Africa as a means of improving access to energy for the unserved or under served.
- Off-grid lighting is a dynamic and growing market with a variety of products and business models. Opportunities include:
    - Technological improvement in off-grid lighting products.
    - Rapidly declining costs for LEDs, solar components, and batteries.
    - Ongoing increases in base kerosene prices which hinders competitiveness.
    - A variety of distribution ownership models: multinational subsidiaries, local/international joint ventures, and local franchises.
    - A range of marketing strategies to reach end users: leveraging existing channels, direct marketing, and bundling with other products.

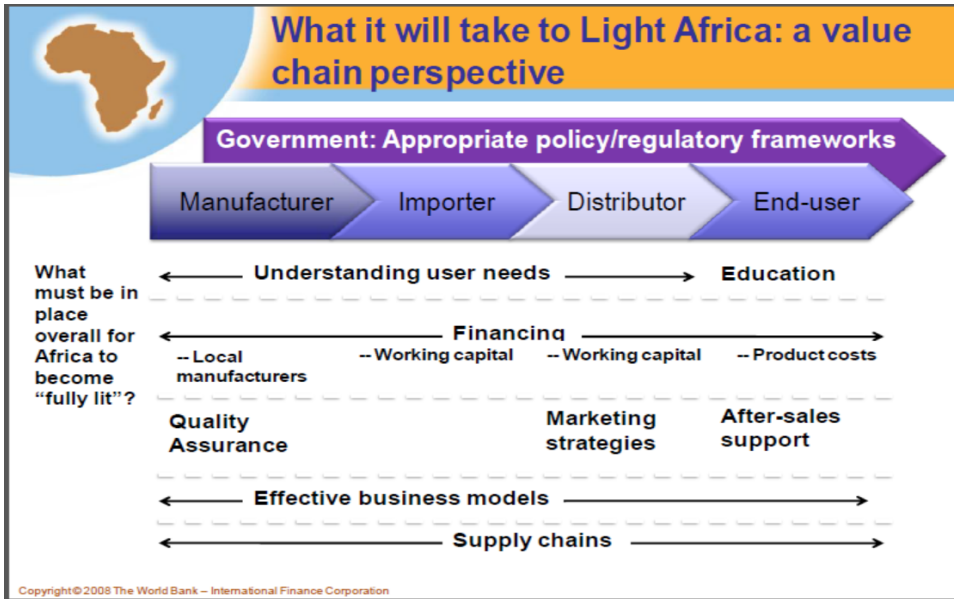
Khetsiwe Dlamini, Panelist

Dr. Dlamini brings over 18 years private sector development experience, spanning several industries, social sectors, and emerging economies. With IFC, she manages Africa's sustainability business line. Prior positions with IFC include Strategy Officer, IFC PEP Africa; Program Manager, Women's Entrepreneurship (Middle East & North Africa); Acting Regional Manager, Africa Project Development Facility (APDF); and Business Development Officer, APDF. She holds a Doctorate in Business Leadership, University of South Africa; an MBA, Entrepreneurship, University of Wales; and a BSc (honors), University of Natal.

S. Vijay Iyer, Panelist

Mr. S. Vijay Iyer leads the World Bank's Energy Group for sub Saharan Africa. Mr. Iyer and his team, comprising over 50 professionals, manage an energy portfolio of 50 projects in 36 sub Saharan countries with a value of over US$8 billion, spanning the spectrum of the energy supply chain. He brings a diverse and broad range of development experience from South Asian countries, and from the public policy and private sector arenas in India. An MBA from the Yale School of Management, Mr. Iyer also holds prior Masters in Chemistry from India.

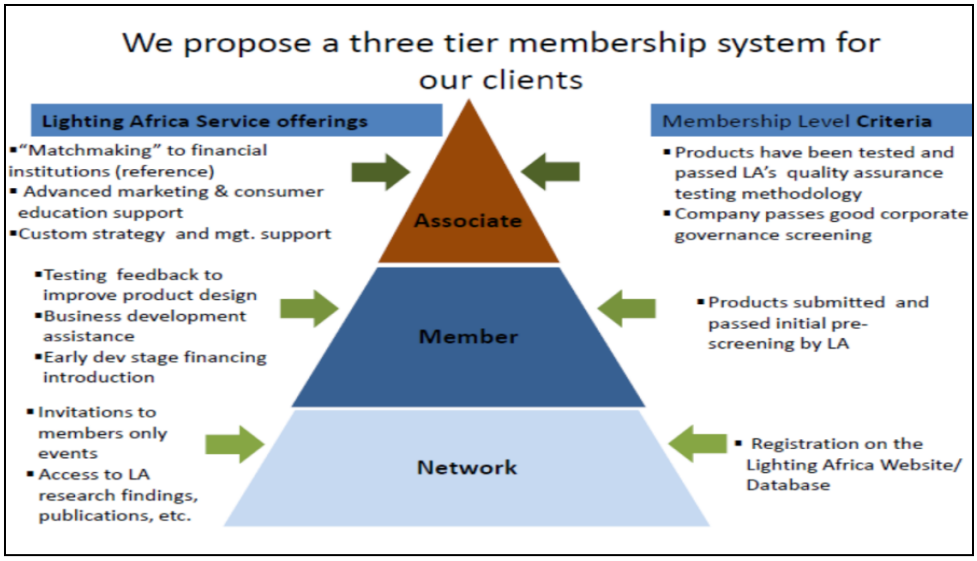
    - Increased consumer demand for better off-grid lighting, often combined with other applications (e.g., phone charger, fans, radios, etc.)
- Off-grid lighting could have the same transformative effect that the mobile phone technology had in Africa. Besides being cheaper than electricity, modern off-grid lighting is environmentally friendly and lacks the health risks associated with inhaling soot and fumes from kerosene lamps.
- Although off-grid lighting is poised for take off, barriers hamper widespread advancement:
    - Poor product quality/performance can lead to market spoilage.
    - Not competitive to manufacture in Africa.
    - Policy frameworks require continued adjustment.
    - Access to finance, including carbon credits, has been too complex to capture/apply pricing off-sets.
    - Product costs prohibitive for the poorest—we still need a quality lamp for US$10.
    - Lack of consumer awareness of the benefits of improved lighting products.



- The role of Lighting Africa is to mitigate the barriers and facilitate market development. Lighting Africa activities focus on: market intelligence; product quality assurance; business support services and access to finance; consumer education; and policy and public sector operations. The Lighting Africa 2010 Conference, which brought together over 600 participants and 50 exhibitors, validated the critical importance of each of these core components in filling market gaps.
- The sector also received a boost from the signing of a letter of intent by over 20 organizations to form an industry association dedicated to off-grid lighting solutions. The mission of the Association is to become a respected global leader in the implementation of a harmonized set of best practices; enabling the sustainable development of clean off-grid lighting solutions for developing countries. Activities include: setting and/or developing harmonized international standards; international lobbying and awareness creation; provision of regional support; international stakeholder networking; publication of technical information; addressing environmental issues on recycling and effects; tracking global trends and synergies; and serving as a vehicle for project funding at the global and regional levels.

Proposed Lighting Africa Next Steps

- Establish a three-tier *business support system* to provide companies with additional advisory services as they deepen their commitment to the market, improve product quality, and meet other market development criteria.
    - *Tier 1* (bottom) is open to the entire Lighting Africa network and includes access to program research findings, publications, conferences, etc.
    - *Tier 2* (middle) is open to manufacturers, distributors, and other industry stakeholders with products that have met Lighting Africa preliminary quality testing; services including testing/feedback to improve product design, business development assistance, and early development stage financing introduction.
    - *Tier 3* (top) is for companies with products that have been tested and passed Lighting Africa's quality assurance testing methodology and good governance corporate screening. Support includes matchmaking to financial institutions; advanced marketing and consumer educations support; and custom strategy and management support.



- *Market Intelligence:* publish condensed synthesis report on results of 10,000 consumer interviews; publish market trends report; and for associate members conduct monthly retail audits to track changes.
- *Quality Assurance:* finalize standardized test methods; test new manufacturer products; establish testing laboratories in Africa and conduct local product pre-screening; develop technical notes; conduct second product awards ceremony; and establish Quality Assurance Advisory Committee.
- *Access to Finance:* address financing gaps. For manufacturers, growth and working capital requirements; for distributors/importers, working capital and trade finance; and for consumers, financing of product purchases.
    - *Policy and Enabling Environment Support:* work with eight initial countries to mitigate policy barriers for off-grid lighting.
    - *Consumer Education:* Pilot consumer outreach campaigns, including road shows and mass media outreach in Kenya and Ghana.

Open Discussion—Audience Comments on Proposed Lighting Africa Activities

- The Lighting Africa 2010 Conference and Trade Fair has provided an important forum for sharing information and best practices on off-grid lighting and seeing firsthand the latest products available in the marketplace.
- Lighting Africa focused on the importance of bringing light, and its benefits of better security, more productivity, and more sustained educational opportunities to the millions of African homes and small businesses that will not have electricity access in the foreseeable future.
- Lighting Africa needs to continue to focus on financing access for distributors, retailers, and consumers. Trade finance, microfinance, and other financing mechanisms are important to make modern lighting more attractive to distributors and consumers alike.
- Engaging policy makers in the dialogue is critical to eliminate fossil fuel subsidies as well as tariffs/duties for off-grid lighting systems and components. Effective policy measures will serve to attract private sector investment in this area.
- Market research information has been very useful in understanding consumer needs/preferences and helping design the right products for the marketplace. It helps in formulating market entry strategies and validating our assumptions.
- The Lighting Africa product awards are important in helping consumers, financiers, bulk buyers, and others to identify quality lighting products more easily. The awards recognized off-grid lighting systems that achieve high performance, while remaining affordable for low- income earners in Sub Saharan Africa.
- The networking opportunities at the event have been extremely useful in bringing together manufacturers, distributors, policy makers, and investors all in one place.

Appendices

I. Conference Program
II. Product Award Ceremony
III. Letter of Intent to Create an International Off-Grid Lighting Stakeholder Association.
IV. Lighting Africa Conference Registration List.
V. Lighting Africa Trade Fair— Exhibitors and Contact Information.
VI. Lighting Africa Survey Results

Appendix I. Conference Program

Monday, May 17			
09:00-17:00	Set up of Trade Fair booths: Trade Booths will be open during lunches and breaks on May 18-19 and during the evening receptions		
17:00	Conference Registration Open		
Tuesday, May 18			
8:00	Conference Registration Open		
09:00-10:30 *Plenary Session*	I. Opening Ceremony		
10:30-11:00	Coffee Break in Trade Fair Areas		
10:30	Press Conference		
11:00-12:30 *Plenary Session*	II. Off-Grid Lighting Market: Status and Trends		
12:30-14:00	Lunch		
14:00--16:00 *Plenary Session*	III. Consumer and Trade Perspectives in Off-Grid Lighting		
16:00-16:30	Coffee Break in Trade Fair Areas		
16:30-18:00 *Plenary Session*	IV. Policy Drivers		
18:00	V. Wrap Up		
18:30	Trade Fair Exhibition and Reception		
20:00	First Lighting Africa Product Award Ceremony		
20:30	Gala Dinner		
Wednesday, May 19			
09:00-10:30 *Breakout Sessions*	VI. (A) Market Perspectives on Quality Assurance	VI. (B) Emerging Business Models in Reaching the Base of the Pyramid	
10:30-11:00	Coffee Break in Trade Fair Areas		
11:00-12:30 *Breakout Sessions*	VII. (A) Product Advances in Off-Grid Lighting	VII. (B) Financing Across the Supply Chain: Investor Roundtable	
12:30-14:00	Lunch		
14:00-15:30 *Breakout Sessions*	VIII. (A) Sustainability Issues in Off Grid Lighting	VIII. (B) Carbon Finance	VIII. (C) Implementation Issues in Off-grid Lighting
15:30:16:00	Coffee Break in Trade Fair Areas		
16:00-18:00 *Plenary Session*	IX. Lighting Africa—The Way Forward		
18:00-18:30 *Plenary Session*	X. Wrap Up		
18:30	Trade Fair Exhibition and Reception		
Thursday, May 20			
08:30- 17:00	Lighting Africa 2010 – Business Conference and Trade Fair - Side Events		

Conference Agenda: May 17-20, 2010

	Monday May 17
09:00-17:00	Set up of Trade Fair Booths: **Trade Booths are open from 09:00-20:00 on May 18 and 19. The key focus will be during lunches, breaks, and evening receptions on these days**
17:00	Conference Registration Open: Jambo Conference Center
	Tuesday May 18
08:00	**Conference Registration Open—Jambo Conference Center**
09:00	**I. Opening Ceremony** **Master of Ceremony**: Michael Oyier, **Kenya Television Network (KTN)** • **The World Bank's Perspective on Low-Cost Off-Grid Lighting for the Base of the Pyramid (BOP)** Johannes C.M. Zutt, World Bank Country Director for Kenya • **Kenya Perspectives on Off-Grid Lighting** Honorable Patrick M. Nyoike, Permanent Secretary, **Ministry of Energy of Kenya** • Mr. Zachary Ayieko, Chief Executive Officer, **Rural Electrification Authority, Kenya** • **Lighting Africa: Building a Sustainable Platform for An Emerging Industry** Russell Sturm, Sustainable Energy Team Leader, **IFC** *Keynote Address— Sichiri Mukunzi, Head of Department - Technical Operations, Support & Logistics –* ***Safaricom Ltd***
10:30	**Coffee Break in Trade Fair Areas**
11:00	**II. Off-Grid Lighting Market: Status and Trends** **Session Chair**: Anil Cabraal**, Rural and Renewable Energy Consultant** • **Off-Grid Lighting Market Trends-Gaurav Gupta, Associate Partner, Dahlberg Associates** *(20 minutes)* • **Industry Discussion Led by Session Chair** *(10 minutes each)* ○ Frank Altena, Sustainability Officer, **Philips Lighting** ○ Ranganayakulu Bodavala, President, **Thrive** ○ Sameer Hajee, Executive Director, **Lights for Life** ○ Gilles Vermot Desroches, Sustainable Development Senior Vice-President, **Schneider Electric** **Question and Answer**
12:30	**Luncheon—Nyama Choma Ranch adjacent to Jambo Ballroom**
14:00	**III. Consumer and Trade Perspectives in Off-Grid Lighting** **Session Chair**: Mr. Chris Harrison Managing Director, **Young & Rubicamm** *(Speakers, 15 minutes each)* • **Consumer Preference Patterns** Melissa Baker, Director, Head, Social Research Division, **TNS Research International** • **Preliminary Results of Solar Lantern Field Tests in Five Countries** Lucius Mayer-Tasch, Promotion of Renewable Energy and Energy Efficiency Programme (PREEEP), **German Technical Cooperation (GTZ)** • **Critical Success Factors and Lessons Learned-The Distributor Perspective** Sam Goldman, Co-Founder and CEO, **D-Light**

	• **Humanitarian Relief and Off-Grid Lighting** Mark Bent, CEO and President, **SunNight Solar** **Question and Answer**
16:00	**Coffee Break in Trade Fair Areas**
16:30	**IV. Policy Drivers** **Session Chair:** Dana Rysankova, Senior Energy Specialist, **The World Bank** • **Policy Barriers Hindering Off-Grid Lighting**—Mark Hankins, Energy Specialist, **Marge Consulting** *(30 minutes)* • **Panel Discussants: Mitigating the Barriers** *(7 minutes each)* ○ Lutengano U.A. Mwakahesya, Director-General, **Tanzania Rural Energy Agency** ○ Augustus Goanue, Interim Head, **Liberia Rural and Renewable Energy Agency** ○ Ogunlade Davidson, Minister of Energy and Water Resources, **Sierra Leone** ○ Omane Frimpong, Managing Director, **Wilkins Engineering**, **Ghana** **Question and Answer**
18:00	**V. Wrap Up** ○ Ogunlade Davidson, Minister of Energy and Water Resources, **Sierra Leone** ○ Vijay Iyer**,** , **World Bank Africa Energy Sector Manager**
18:30	**Reception in Trade Fair Areas**
20:00	**First Lighting Africa Product Award Ceremony** **Hosts: Jean Philippe Prosper, IFC Director for Eastern and Southern Africa**
20:30	**Gala Dinner: Nyama Choma Ranch**

	Wednesday May 19
09:00	**Concurrent Breakout Sessions**
A.	**VI. Market Perspectives on Quality Assurance** **Session Chair**: Akanksha Chaurey, Director, **The Energy & Resources Institute (TERI)** • **Quality Assurance Strategy for the Off-Grid Lighting Industry**—Rodd Eddy, Lighting Africa Consultant *(30 minutes)* • **Panel Discussants** *(7 minutes each)* ○ Sam Andrews, China Operations Manager, **Barefoot Power** ○ Norbert Pfanner, Dipl.-Ing, **Fraunhofer Institute for Solar Energy** ○ Eric Chesire, **Kenya Bureau of Standards** ○ Shuming Hua, Director, **National Lighting Test Center** **Question and Answer**
B.	**VI. Emerging Business Models in Reaching the Base of the Pyramid** **Session Chair**: Professor Pikay Richardson, **Manchester Business School** • **Marketing to the Base of the Pyramid**—Professor Pikay Richardson *(30 minutes)* • **Panel Discussants** *(7 minutes each)* ○ Harald Schuetzeichel, Director Solar Energy Foundation in Ethiopia/Founder Sun Transfer in Kenya, **Sun Transfer in Ethiopia and Kenya** ○ Ueli Scheuemeier, **Rural African Ventures Investment** ○ Mohamedrafik Parpia, Managing Director, **Zara Solar in Tanzania** ○ Sagar Gubbi, Consultant, **GSMA Development Fund** **Question and Answer**
10:30	**Coffee Break in Trade Fair Areas**
11:00	**Concurrent Breakout Sessions**
A.	**VII. Product Advances in Off-Grid Lighting** **Session Chair**: Anton Zimmermann, CTO, **Phocos AG** *(Speakers, 20 minutes each)* • **LED's** Ling Wu, General Secretary, **China Solid State Lighting Alliance** • **Batteries** **Omair Dawood, Assistant Marketing Manager** • **Photovoltaics** Therese Jordan, Technologies Vice President for Business Development, USA, **Konarka Technologies** **Question and Answer**
B.	**VII. Financing Across the Supply Chain: Investor Roundtable** **Session Chair**: Arthur Itotia Njagi, Lighting Africa Project Manager, **IFC** *(Speakers, 20 minutes each)* • **IFC** Corinne Figueredo, Manager, Cleaner Technologies Program • **Acumen** Raj Kundra, Director, Capital Markets and Energy Portfolio • **E+Co Africa** Kofi Nketsia-Tabiri, Regional Manager • **Tujijenge Africa** Felistas Coutinho, Director **Question and Answer**
12:30	**Luncheon: Nyama Choma Ranch**

14:00	**Concurrent Breakout Sessions**
A.	**VIII. Sustainability Issues in Off-Grid Lighting** **Session Chair**: Udo Gattenlöhner, Executive Director, **Global Nature Fund** *(Speakers, 20 minutes each)* • **Off-Grid Lighting Sustainability Issues** Gerhard Mair, **Consultant** • **Particulate Emissions from Kerosene Lanterns** Dustin Poppendieck, Assistant Professor in the Environmental Resources, **Engineering Department at Humboldt State University** • **Recycling and Disposal of Lead Acid Batteries** Sophie van den Berg, **Partners in Development** **Question and Answer**
B.	**VIII. Carbon Finance** **Session Chair**: Nana Asamoah Manu, Lighting Africa Kenya Country Officer, **IFC** *(Speakers, 15 minutes each)* • **Methodologies for Carbon Finance Monitoring and Evaluation** Evan Mills, Staff Scientist, **Lawrence Berkeley Laboratory** • **Selling Carbon Credits for Kerosene Replacement with Solar Lamps** John Keane, Head of Programs, **Solar Aid** • **Business and Finance Innovation for Cleaner Rural Lighting Solutions** Mayank Sekhsaria, Co-Founder, **Greenlight Planet Inc.** • **Industry Perspective on Carbon Finance** Tom Morton, Executive Director, Environmental Markets, **J.P. Morgan-Climate Care** **Question and Answer**
C.	**VIII. Implementation Issues in Donor-Financed Programs** **Session Chair**: Joel Kolker, Regional Program Leader, **Public-Private Infrastructure Advisory Facility** *(Speakers, 15 minutes each)* • **United Nations Industrial Development Organization (UNIDO)** Alex Varghese, UNIDO Representative to Kenya and Eritrea • **Agence Sénégalaise d'Electrification Rurale (ASER)** Cheik Wade • **German Technical Cooperation (GTZ)** Dr. Carsten Hellpap, Manager, Energizing Development • **Global Market Transformation for Efficient Lighting** Gustavo Mañez Gomis, Energy Branch, Division of Technology, Industry and Economics, **United Nations Environment Programme*** **Question and Answer**
15:30	**Break**
16:00	**IX. Lighting Africa—The Way Forward** **Session Chair**: **Russell Sturm, Sustainable Energy Team Leader, IFC** **Panelists:** • Dana Rysankova, **World Bank Lighting Africa Program Manager** • Arthur Itotia Njagi**, IFC Lighting Africa Program Manager** **Group Discussion**
18:00	**X. Wrap Up** • Vijay Iyer, **World Bank Africa Energy Sector Manager** • Khetsiwe Dlamini, **IFC Regional Manager (Africa) Sustainability**
18:30	**Reception in Trade Fair**

Side Events, May 20, 2010

A number of side events were held to delve into specific topical areas addressing off-grid lighting issues in more detail. These meetings were open to all conference attendees. A summary of these events is provided below.

Business Development Side Event
8:30 am to 10:30 am

Overview: One of the main challenges confronting Small and Medium Scale Enterprises (SMEs) is the ability to effectively manage and channel resources to maximize potential. This side event provided guidance to business owners, corporate leaders, and senior staff enabling them to improve business delivery, ensure growth and monitor performance. It offered an introduction to the IFC *Business Edge Model* which seeks to build the capacity of distributors and importers in managing distribution, staff, and finance. The session employed Business Edge's real-life examples for illustration thereby demonstrating the value of the tool for business development.
Attendees: Distributors, Importers, SMEs and others interested in enhancing business development skills in off-grid lighting.
Speaker: Grace Ngungi, CEO, FutureForce Consultancy
The panel was moderated by Nana Asamoah Manu, Lighting Africa Kenya Country Officer

End-User Finance for Off-Grid Lighting
8:30 am to 10:30 am

Overview: There is vast market potential for affordable and reliable lighting products, however the high up-front capital outlays leave the majority of low-income people unable to access modern, more efficient options. The best opportunity to overcome this challenge, and promote the uptake of clean energy, is through the expansion of end-user financing. In developing long-term strategic partnerships, and promoting innovation, financial institutions and energy enterprises can leverage respective specialties to appropriately design and implement energy lending models and educate, support and assure clientele in upgrading to modern lighting. This session explored the productive intersection between clean energy and financing models in developing countries. It highlighted the work that is being done by prominent microfinance institutions and energy enterprises in East Africa. Cross-cutting themes addressed included expanded opportunities for income generation; improved health due to access to cleaner energy options; greater empowerment of women for education and enterprise development; and mitigated environmental impact.

Attendees: Financial institutions that serve the poor, investors in local energy enterprises, energy entrepreneurs interested in extending credit, development practitioners working on expanding access to clean energy, manufacturers and distributors, and policymakers working to create incentives for linking finance with energy.
Speakers:

- Secou Sarr, Coordinator, Enda-TM, Senegal
- Morris Newa, Faulu Advisory Services, Kenya
- Felistas Coutinho, Executive Director, Tujijenge, Tanzania
- John Keane, Head of Programs, Solar Aid

The panel was moderated by Ellen Morris, co-founder of Arc Finance

Financing Access for Off-Grid Lighting
11:00 am to 1:00 pm

Overview: Growth capital for manufacturers, trader finance for distributors, and micro-finance for consumers are essential ingredients in the development of the low cost off-grid market. This session created a platform for interaction between financial institutions and funds seeking to invest in the renewable energy market and manufactures/distributors looking for funding. The session evaluated and discussed the various financial sources and offerings available in the marketplace today and in planning. It also explored their practical application in helping to tap and exploit the potential demand in the off-grid lighting industry. Topics included:

- Latest IFC developments to structure and provide financing for lighting companies serving and end-users in the off-grid markets. Potential financing sources included existing and planned IFC funds, specialized international energy enterprise funds, and partnerships with domestic commercial banks and micro-finance institutions.
- Structures that blend concessional funding to leverage commercial finance and complementary advisory services.

Attendees: Manufacturers, distributors, consumer groups, SMEs, and others interested in financing off-grid lighting projects, programs and products.

Speakers:

- Itotia Njagi, Lighting Africa IFC Program Manager (also served as session moderator)
- Edwin Macharia, Partner, Dalberg Global Development Advisors, Nairobi
- John C. MacLean, President, Energy Efficiency Finance Corporation

Emerging Models in Reaching the Base of the Pyramid
2:00 pm to 5:00 pm

Overview: This session took participants on an insightful journey in the development and implementation of transformational marketing and route-to-market strategies aimed at rural and low-income markets. Focusing on "out of the box" approaches and relevant case studies, it explored successful and innovative business models that offer lessons for players in the off-grid lighting industry as they develop strategies in reaching the bottom of the pyramid. The session addressed the following specific topics:

- Setting marketing objectives with relevance to base-of-pyramid consumers and businesses (particularly micro-scale)
- Recognition of the BOP population not as charity-dependent but potentially profitable market that deserves to be considered and served by business
- Models for setting business objectives that are relevant to BOP consumers and businesses (particularly micro-scale)
- Translating these objectives into actionable strategies relevant to off-grid industry
- Development of strategic marketing plans and route-to-route strategies
- Critical success factors
- Implementation of the strategies for business success and the gradual achievement of drawing BOP consumers into mainstream business

Attendees: Manufacturers of off-grid lighting products seeking entry into African markets; importers/distributors of off-grid lighting products; marketing and brand managers; managers involved in trade marketing investments and trade marketing implementation; and business development managers and consultants interested in the African market.

Speaker: Professor Pikay Richardson, Visiting Fellow and Independent Economic and Management Consultant, Manchester Business School, University of Manchester, the UK
The session was moderated by Kwaw Eliason, Lighting Africa Ghana Country Officer

Appendix II. Product Award Ceremony, Evening May 19, 2010

Winners picked as best off-grid lighting products in Sub Saharan Africa

The Lighting Africa Program selected five innovative products as the best able to deliver safe, reliable and cost-effective lighting to millions of people in Africa who currently rely on fuel-based lamps or other low-quality products. The winners were judged by a panel of industry experts.

Twenty-four entrants were rigorously tested and judged in five categories: room lighting, task lighting, portable torch lighting, best value and top performance. No award was made in the portable torch lighting category. The winning manufacturer's and products in the other categories were:

- Barefoot Power's 'PowaPack,' which won in the room lighting category and also won for top performance.
- Greenlight Planet's 'Sun King,' which won in the task lighting category and took second in the best value category.
- Barefoot Power's 'Firefly 12 Mobile,' which won in the best value category for products that cost under US$40 and came second in the task lighting category.
- SunTransfer's 'SunTransfer2,' which took second place in the top performance category.
- D. Light Design's 'Nova S200,' which took second place in the room lighting category.

The awards mark the beginning of a process that will help consumers identify quality lighting products more easily. The awards were designed to recognize off-grid lighting systems that achieve high performance, while remaining affordable for low- income earners in Sub Saharan Africa.

Following the ceremony, members of the Lighting Africa Quality Assurance team provided feedback to the five winners and all of the 24 finalists, to include detailed laboratory test results and user comments. This was offered to help them refine their products and ready them for the African market. Additionally, the five winners will receive Lighting Africa branding rights and business, marketing, and outreach support services.

Appendix III. Letter of Intent to Form an Off-Grid Lighting Stakeholder's Association

On the evening of May 17 an Industry Association Meeting was held involving approximately 40 participants representing manufacturers, distributors, NGO's, development institutions. The purpose of the meeting was to engage interested stakeholders in the formation of an industry body to take responsibility for the sustainable development of the off-grid lighting market. This session involved a roundtable discussion laying the ground work for the creation of a stakeholders association. It addressed the following issues:

- Creating a value proposition for industry.
- Developing sustainable off-grid lighting solutions for developing nations.
- Improving market conditions to improve profitability for import/distribution organisations.
- Continuing the development, and associated ownership of, the Lighting Africa quality assurance program and other key program activities—market intelligence, consumer outreach, policy support, B2B website, and conferences and workshops).
- Enabling unique access to market data and information pertinent to industry market development activities.

The association meeting was an important step in transitioning Lighting Africa from the World Bank Group which served in a facilitator role to demonstrate the market potential for off-grid lighting, mobilize key players, and mitigate barriers to market development and operation. As a result of the meeting, a Letter of Intent (LOI) was signed by 24 stakeholders expressing their support for and commitment to creation of an international off-grid lighting stakeholder association. A copy of the signed LOI is provided on the following page.

LETTER OF INTENT TO CREATE AN INTERNATIONAL OFF-GRID LIGHTING STAKEHOLDER ASSOCIATION

Date: May 18, 2010
Location: 2nd Lighting Africa Conference, Nairobi, Kenya
Topic: Intent to establish an International Off-Grid Lighting Stakeholder Association

Whereas,

- Supporting the sustainable development of off-grid lighting solutions in developing nations,
- Enabling economic, ecological and social benefits for all stakeholders,
- The reduction of fuel based lighting systems globally plays an important role in addressing climate change by mitigating emissions of greenhouse gases,
- The undersigned organizations within the global off-grid lighting market agree on the intent to establish an association of off-grid lighting market stakeholders to collectively pursue common interests in support of the sustainable development of the market. The initial focus of the association will be on product quality assurance and policy advocacy.

In the future, the association will consider adding additional areas of focus dependant on market requirements and needs.

This agreement is non-binding; however, it serves as a foundation to collectively form a cooperation between the undersigned.

This Green Paper has been agreed by the signatories and is supported by Lighting Africa, which envisions providing resources for initial coordination and support for the activities described under this LOI.

Lighting Africa will in parallel continue to support the development of the off-grid lighting market by governmental lobbying, policy advocacy, capacity building and direct financing in the support of development.

We the undersigned agree with the intent to cooperate to take concrete steps to develop an international off-grid lighting stakeholder association through the development of a global body in order to address the above mentioned points.

- BAREFOOT POWER
- CB ENERGIE
- CHINA SSL ALLIANCE
- DECORE SCIENCE & TECHNOLOGIES
- D.LIGHT
- ENERGY FOR OPPORTUNITY
- EPINAV LTD
- FRAUNHOFER ISE
- GLOBAL NATURE FUND

- GREENLIGHT PLANET
- MICRO ENERGY INTERNATIONAL
- NATIONAL LIGHTING TEST CENTER
- OSRAM GROUP
- PHILIPS LIGHTING
- PZDA, TAIWAN
- SOLUX, E.V.
- SUNLABOB RENWABLE ENERGY
- TATA BP SOLAR
- TERI, INDIA
- THRIVE ENERGY TECHNOLOGY
- TOTAL SA
- VILLAGE BOOM
- WILKINS ENGINEERING
- SOLAR ENERGY FOUNDATION

Appendix IV. Conference Registration List

First Name	Last Name	Company	Work Country	Registration Type	Email Address
Mohammed	Abdoub			Delegate	
Worku	Abebe	solar Energy Foundation	Ethiopia	Delegate	worku@solar-energy-foundation.org
Meron	Abebe	Solar energy foundation	Ethiopia	Delegate	samsolareth@yahoo.com
ZAUHREEN	ADATIA	Mitha Electricals		Delegate	zauhreen@gmail.com
Young Johnson	Adedeji	Wire and Cable	Nigeria	Delegate	johnsonbravo1980@yahoo.com
Dr. Joseph	Adelegan	Global Network for Environment and Economic Development Research / Green Powe	Nigeria	Delegate	dr_joseph_adelegan@yahoo.com
Stephen	Ageru	Solar Power Agencies (U)Ltd	Uganda	Delegate	amiito2000@yahoo.com
Tamir	Agmon	EPINAV	USA	Delegate	agmont@012.net.il
Gerald	Aigner		Switzerland	Delegate	gerald.aigner@gmail.com
Huang	Aiguo	Beijing Jiegao Guangdian Seienge Project Co.,Ltd		Delegate	jgkj_01@163.com
Henry	Aine	GEM Engineering Company Ltd	Uganda	Delegate	henry_aine@yahoo.co.uk
Dr. Tayo	Akintoba	Metrosolarmatics, Inc.	USA	Delegate	takintoba@metrosolarmatics.com
Fred	Akuffo	Kwame Nkrumah University of Science and Technology	Ghana	Delegate	foakuffo@gmail.com
AGALASSOU	Alassane	AMADER	Mali	Delegate	agalassou@amadermali.net
Robinson	Alazraki	Total SA	France	Delegate	robinson.alazraki@total.com
Michael	Alger	Gehrlicher Solar AG	Germany	Delegate	katrin.haertel@gehrlicher.com
Taha	Ali	A.L.I	Ethiopia	Delegate	ali.tahaahmed@yahoo.com
Sultan	Ali Javid	Head of Energy for Rural Development for Afghanistan		Delegate	sultan.javid@mrrd.gov.af
Peter	Alstone	Humboldt State University - Schatz Energy Research Center	USA	Delegate	pmj2@humboldt.edu
Thiresan	Alwar	SolarWorld Africa	South Africa	Delegate	thiresan@gmail.com
Andrew	Amadi	Renewable Energy Ventures(K) Ltd	Kenya	Delegate	aamadi@africarenewables.com
NIANG	Amadou Tidiane	CERER	Senegal	Delegate	tidjane91@yahoo.fr
Kweku Darteh	Anane-Appiah	Energy Innovations Co. Ltd	Ghana	Delegate	ananeappiahkd@gmail.com
Maureen	Anayo	Smart Solar (K) Limited	Kenya	Delegate	maureen.anayo@smartsolar.co.ke
Harry	Andrews	Smart Solar (K) Limited	Kenya	Delegate	harry.andrews@smartsolar.co.ke
EMMANUEL	ANSAH	YOUTH IN SUSTINABLE AGRICULTURAL AND ENVIRONMETAL CONSERVATION	Ghana	Delegate	emansah@yahoo.com
Francis	Anyonah	Bumalaonline Technologies Ltd	Kenya	Delegate	francisanyona@yahoo.com
Chabanne	Arnaud	CB ENERGIE	Burkina Faso	Delegate	archabanne@yahoo.fr
Bernard S.	Asamoah	Association of Ghana Solar Industries(AGSI)	Ghana	Delegate	asknelectricltd@gmail.com
Elijah	Asare - Bediako	Jesberphid co. Ltd	Ghana	Delegate	easareb@yahoo.co.uk
Gifty Baaba	Asmah	Daasgift Quality Foundation/AGSI	Ghana	Delegate	baabagift@yahoo.com
David Perono	Balleza	Winrock International	Philippines	Delegate	dballeza@amore.org.ph
Oluwasegun	Balogun	Naijatomo Nig Limited	Nigeria	Delegate	obalogun@naijatomo.com
Jonathan	Bamber	ToughStuff	United Kingdom	Delegate	jonathan.bamber@toughstuffonline.org
Livingstone	Bangi	Energy Plus Ltd	Uganda	Delegate	cdk-eng@utlonline.co.ug
Pareen	Bathia	EGG-energy	Tanzania	Delegate	pareen.bathia@gmail.com
Mario	Batsana	FUNAE - Fundo de Energia	Mozambique	Delegate	mariobatsana@funae.co.mz
johan	beckmann	Powerfy	Sweden	Delegate	johan.beckmann@powerfy.se
Benon	Bena	Rural Electrification Agency	Uganda	Delegate	bena@rea.or.ug
Gary	Bernhardt	Adaptive Lighting Solutions llc	USA	Delegate	garybernhardt@mac.com
Maelle	BISSONNET	TOTAL	France	Delegate	maelle.bissonnet@total.com
BUYINZA J	BOAZ	FOUNDATION FOR AIDS ORPHANED CHILDREN [FAOC]	Uganda	Delegate	faoc2002@yahoo.com
Isacc	Bondet	Ministry of Energy Kenya		Delegate	
EDITH	BOSIRE	ECOTOURISM KENYA	Kenya	Delegate	ceo@ecotourismkenya.org
Lauren	Bottcher			Delegate	
Nana Antwi Boasiako	Brempong	Child Research for Action and Development Agency (CRADA Group)	Ghana	Delegate	cdcghana@yahoo.com
Malcolm	Brew	Nimbus	Uganda	Delegate	Malcolmbrew@gmail.com
James	BUDD	SOLEIL ENERGIE	Togo	Delegate	james.budd@budd-pni.com

Albert	Butare	Mininfra	Rwanda	Delegate	albertbrw@gmail.com
Boaz	Buyinza			Delegate	
Emma	Caddy	Environmental Resources Management	South Africa	Delegate	emma.caddy@erm.com
TANDONG	CALISTUS JONG	AMYOFACIG (NGO)	Cameroon	Delegate	tandongcalistus@yahoo.com
Eddah	Calysta	University of Nairobi	Kenya	Delegate	eddah.kangela@uonbi.ac.ke
Thomas	Carton	Tulane University	USA	Delegate	tcarton@tulane.edu
Darren	Casy	Aurora Lighting	USA	Delegate	dariren@aurora.eu.com
Zdenek	Chalus	ZTC Group	Czech Republic	Delegate	zdenek.chalus@ztc-consulting.com
Kavuma	Charles	CK Electricals	Uganda	Delegate	mc@yahoo.co.uk
Omar	Cheema	Solar Press	United Kingdom	Delegate	omar.cheema@solar-press.com
Zhang	Chengbo	Shanghai Baiyi Lighting Elecotronic Co.,Ltd	China	Delegate	info@baiyiled.com
Giovanni	CHERSOLA	Fondation Manzoni asbl	DRC	Delegate	presidenza@fondazione-madre-agnese-manzoni.org
John	Cheruiyot	Solar Power& Lighting Credit	Kenya	Delegate	jcheruiyot@gmail.com
John	Cheruiyot			Delegate	
Hsieh Ming	Chia	Mega Force Co Ltd	China	Delegate	jack@megasolartec.com
SIRIMA	CHRISTOPHE	MINISTERE DES MINES ET DE L'ENERGIE, DIRECTION GENERALE DE L'ELECTRICITE	Cote d'Ivoire	Delegate	siimchrist@yahoo.fr
Wang	Chunlong	Beijing Landsky Lighting Engineering Co.,Ltd	China	Delegate	chunlong@landsky.cn
Klara	CLAESSENS	MININFRA	Rwanda	Delegate	klara.claessens@btcctb.org
OPARAH	CLEOPHAS	SCC-VI AGROFORESTRY PROJECT		Delegate	oparahcleophas@yahoo.com
Oparas	Cleophas			Delegate	
Simon	Collings	GVEP International		Delegate	simon.collings@gvepinternational.org
Geordie	Colville	UNEP	Kenya	Delegate	Geordie.Colville@unep.org
Bernd	Dallmann	Freiburg Management & Marketing International GmbH FMMI	Germany	Delegate	bernd.dallmann@fwtm.freiburg.de
Sam	Dargan	Great Lakes Energy	Rwanda	Delegate	sam@energyforafrica.com
Peerke	De Bakker	UNEP	Kenya	Delegate	Peerke.Bakker@unep.org
HUGO	DE MEYER	Total AFRICA MIDDLE EAST	France	Delegate	hugo.de-meyer@total.com
Olamedi	Dele	Ibusi Olu Nigeria Limited	Nigeria	Delegate	Ibusiolung@yahoo.com
Joyce	DeMucci	BASE Technologies	Uganda	Delegate	joycedm@barefootpower.com
Kyle	Denning	Viability Africa Ltd	Kenya	Delegate	kyle@viabilityonline.com
Dereje	Dereje	Lydetco Plc		Delegate	
Nikhil	Desai	World Bank	USA	Delegate	ndesai@alum.mit.edu
Kantilal	Dhanji			Delegate	
Mital	Dhrona	Uni-Supplies & Marketing (K) Ltd	Kenya	Delegate	mital@skypex.co.ke
Ramatoulaye	Diallo	Horecasenegal	Senegal	Delegate	issarama@yahoo.fr
Mahamadou Karamoko	DIARRA	ACCESS SARL	Mali	Delegate	karamkd7@hotmail.com
Miguel	Diogo	FUNAE	Mozambique	Delegate	migueldiogo@funae.co.mz
PRINCE COLLINS	DOGBEY	Power Energy Limited	Ghana	Delegate	prncdogbey@yahoo.com
Bakary	Doucoure	Horonya Touba-sarl		Delegate	horonya@yahoo.fr
Harm	Duiker	SNV-Netherlands Development Organization	Kenya	Delegate	hduiker@snvworld.org
Bright	Echefu	Bricke Institute for Health	Nigeria	Delegate	brickecenter@gmail.com
N'GUESSAN	Egny Pierre	Minister des Mines et de l'Energie,Direction General de l'Energie	Cote d'Ivoire	Delegate	egny2002@yahoo.fr
KIMBOWA	EMMY S.	ENERGY SYSTEMS Limited	Uganda	Delegate	emmy@energysystemsug.com
Myra	Englemann	NAWECCE	Kenya	Delegate	myrarfs@yahoo.com
BOTO	Eugene	SOPIE	Cote d'Ivoire	Delegate	eboto@sopie.ci
frank	evans	battery&solar power service centre	Tanzania	Delegate	frankevans2003@yahoo.com
Andre	Faye	Aser	Senegal	Delegate	afaye@aser.sn
Jeff Michael	Felten	Camco Advisory Services Tanzania Limited		Delegate	Jeff.Felten@camcoglobal.com
Luke	Filose	Fenix International		Delegate	lfilose@fenixintl.com
Michael	Franz	GTZ	Kenya	Delegate	michael.franz@gtz.de
Laurens	Friso	Rural Energy Foundation	Ethiopia	Delegate	laurensfriso@gmail.com

Nicholas	Gachie	Integrated Energy Solutions (IES) Ltd	Kenya	Delegate	nicholas.gachie@escoafrica.com
Ann Wambui	Gaithu			Delegate	anniwambu@yahoo.com
Gaoussou	Gakou	HORONYA ELECTRONIC		Delegate	monoluxdb@yahoo.fr
Wang	Gang	Foshan Research Institute of Sun Yat-Sen University	China	Delegate	stswangg@mail.sysu.edu.cn
Joachim	Gaube	German Technical Cooperation	Ethiopia	Delegate	joachim.gaube@gtz.de
kevin	gauna	sunbrothers	USA	Delegate	kwgauna@yahoo.com
Joyce	Gema	React Africa	Kenya	Delegate	jgema@reactafrica.com
MWESIGWA	GEOFREY BESIGWA	Vision for GreenLight Uganda	Uganda	Delegate	besigm@gmail.com
Rajesh	Ghai	Electroworks Ltd	Kenya	Delegate	rajeghai@yahoo.comg
John	Gikonyo	Jopat Trading Ltd	Kenya	Delegate	jgikonyo@jopattrading.com
Reuben	Gisore	KEBS	Kenya	Delegate	reubengo@kebs.org
Martha	Gitau	RINCOD	Kenya	Delegate	marthgitau@yahoo.com
George	Gitau	ToughStuff	Kenya	Delegate	george.gitau@toughstuffonline.com
Deepali	Gohil	SolaTaa Ltd.	Kenya	Delegate	deepali.gohil@gmail.com
Philip	Goodwin	Lifeline Technologies Trading Ltd.	South Africa	Delegate	pgoodwin@lifelinetrading.net
Kunal	Grover	Simba Group	Nigeria	Delegate	kunalgrover@simbaonline.net
Laurent	Guarin	EGG Energy	Tanzania	Delegate	sakune2@gmail.com
Sagar	Gubbi	GSMA Development Fund	India	Delegate	sgubbi@gsm.org
Olivier	Guillaumin	FAST FORWARD	France	Delegate	olivier.guillaumin@fastforward.cc
Michael	Guo	Mega Force Co Ltd	China	Delegate	jane2005_mega@126.com
Jianqun	Hao	China Solid State Lighting Alliance		Delegate	
Hon.Fungaroo Kaps	Hassan	Parliament of Uganda	Uganda	Delegate	kapshassan@yahoo.co.uk
roger	hattam	ToughStuff	Kenya	Delegate	roger.hattam@toughstuffonline.org
Frank	Haugwitz	Solar Promotion International GmbH	Germany	Delegate	armbruster@solarpromotion.com
Mark	Henderson	Arizona State University	USA	Delegate	mark.henderson@asu.edu
Gerard	Hendriksen	GTZ	Rwanda	Delegate	gerard.hendriksen@gtz.de
Maggie	Hobbs	Tambuzi Ltd	Kenya	Delegate	maggie.hobbs@tambuzi.co.ke
Eliza	Hogan	Smart Solar (K) Limited	Kenya	Delegate	eliza.hogan@smartsolar.co.ke
Lyndsay	Holley	Ubu Power	Kenya	Delegate	lholley@gmail.com
Mohameden	Horma	ONG AJAD	Mauritania	Delegate	ajad_97@yahoo.com
Bob	Houter	Ubbink East Africa		Delegate	bob.houter@centrotec.com
Anne Sophie	HUBAUX	MININFRA	Rwanda	Delegate	anne-sophie.hubaux@btcctb.org
Patrik	Huber	responsibility Social Investments AG	Switzerland	Delegate	patrik.huber@responsability.com
Mason	Huffine	SolarAid	Tanzania	Delegate	Mason@solar-aid.org
Wali	Ibrahimi	World Bank Group		Delegate	aibrahimi@worldbank.org
Anwana	Ima Oobong	International Foundation For African Children (IFAC)	Nigeria	Delegate	ifac@live.co.uk
Aminu Haruna	Isa	P. Energy Commission of Nigeria	Nigeria	Delegate	jaminh117@yahoo.com
Vinithia	Jayalal	IFC		Delegate	vjayalal@ifc.org
Yu	Jianping	Huaye Group	China	Delegate	wdyzn222@126.com
Hao	Jianqun	China Solid State Lighting Alliance	China	Delegate	haojq@china-led.net
Shi	Jie	Jiangsu SFT Optoelectronic Science & Technology Co., Ltd.	China	Delegate	sj@sft.com.cn
Pan	Jingyu	Beijing Landsky Lighting Engineering Co.,Ltd	China	Delegate	jingyu@landsky.cn
Li	Jinmin	Institute of Semiconductors of Chinese Academy of Science	China	Delegate	jmli@red.semi.ac.cn
Armand	John	Southern Corridor Co Ltd	Tanzania	Delegate	armand.mselle@sc.co.tz
Goodwill	Johnson	Kenny K Electrical Company Ltd	Nigeria	Delegate	kennyelectrical@yahoo.com
Marilyn	Johnson	The Aurora Light Foundation	USA	Delegate	marilyn@aurora.us.com
Miquelina	Julien	FUNAE - Energy Fund	Mozambique	Delegate	miquelinamenezes@tvcabo.co.mz
AMEGNIDO	K. Gato Prosper	SOLEIL ENERGIE	Togo	Delegate	gato@groupegato.com
Kimani	Kabogo			Delegate	
Joy	Kagombero	POT Communications Limited		Delegate	

Daniel	Kahn	Carbon X Ltd	Tanzania	Delegate	dan.j.kahn@gmail.com
Gladys	Kairu	Fewa	Kenya	Delegate	kairu@gmail.com
Gabriel	Kajero	InEnegy Limited	Nigeria	Delegate	gabriel.kajero@inenegy.com
Rose	Kajuju	HHEWA	Kenya	Delegate	rose@gmail.com
jorrit	kalff	BASE Technologies	Uganda	Delegate	jkalff@hotmail.com
Antoine	Kalonji	DR Congo Ministry of Energy		Delegate	antokalonji@yahoo.fr
Mary	Kamanda	Kigalia Limited	Kenya	Delegate	mkamanda@kigelialimited.com
Patrick	Kamau	University of Nairobi	Kenya	Delegate	mwendiamai@yahoo.com
Henry	Kamau	VBD Automotive Technologies	Kenya	Delegate	henry.kamau@vbdautotech.com
Emmanuel	Kanabe	iGeneration Consulting	United Kingdom	Delegate	manny@igenerationconsulting.com
Muslim	Karimjee	Uni-Supplies & Marketing (K) Ltd	Kenya	Delegate	mkarimjee@usm.co.ke
Susan	Kariuki	Better Living Resources	Kenya	Delegate	wangechisk@yahoo.com
Susan	Kariuki			Delegate	
Karin	Kauw	ETC Energy	Netherlands	Delegate	k.kauw@etcnl.nl
Manoj K	Khadka	Micro Hydro Expert		Delegate	manoj.khadka@mrrd.gov.af
Vishal	Khagram	Riftcot Ltd	Kenya	Delegate	vishal@riftcot.com
Cecilia	Kibe	RINCOD	Kenya	Delegate	cicamy@yahoo.com
Julia	Kibore		Kenya	Delegate	juliakibore@quanzzaclothing.com
George	Kidenda			Delegate	
Franz	Kies	Solux e.V.	Germany	Delegate	Kies@Solux.org
Salome	Kilonzo	Pee Makuweni CBO	Kenya	Delegate	kilonzo2000@yahoo.com
Allen	Kimani	HHEWA	Kenya	Delegate	allen@gmail.com
Jesse	Kimani	Kenya Women Finance Trust-DTM	Kenya	Delegate	jkimani@kwftdtm.com
Chris	Kimani	Renewable Solar Energy ltd	Kenya	Delegate	rsolarenergy@gmail.com
Victor	Kimanthi	Beulah Limited	Kenya	Delegate	victormwanzia7@hotmail.com
Vitalis	Kimario	Trans Regional Environment Technology Association (TRETA)	Tanzania	Delegate	treta88tz@yahoo.com
Patrick	Kimathi	UNIDO	Kenya	Delegate	patrick.kimathi@business360outlook.com
Caroline	Kimathi	-		Delegate	
Anne	Kinyanjui	AWAN	Kenya	Delegate	extrade2006@yahoo.com
Silas	Kinyua	AHEAD Energy	Kenya	Delegate	kinyua.silas@yahoo.com
Simon	Kiruri	Faulu Advisory Services	Kenya	Delegate	simonk@faulu-advisory.com
Isaac	Kiva	Ministry Of Energy	Kenya	Delegate	isaac_kiva@yahoo.com
Senyo Komla	KONOU	Compagnie Energie Electrique du Togo	Togo	Delegate	senyo.konou@ceet.tg
Gilbert	Korir Maritim	Pro-Alpha Technical Services Ltd	Kenya	Delegate	gilbertkorir@yahoo.com
Kurt	Kornbluth	UC Davis	USA	Delegate	kkorn@ucdavis.edu
Harshil	Kotecha	Uni-Supplies & Marketing (K) Ltd	Kenya	Delegate	harshil13@hotmail.com
Amar	Kothari	Uni-Supplies & Marketing (K) Ltd	Kenya	Delegate	amar@sunlite-solar.com
Peter	Kotut		Kenya	Delegate	pkotut@gmail.com
Komenan	Kouadio Anderson	OPER AFRICA		Delegate	ongoperafrica@yahoo.fr
Vipul	Kumar	Irrisun Ltd	Kenya	Delegate	vipafrica@gmail.com
Raina	Kumra	Light Up Malawi	USA	Delegate	hello@rainakumra.net
Patrick	Kyoyetera			Delegate	
Alkarim	Ladha	Carbon X Ltd	Tanzania	Delegate	ksladha@yahoo.com
Patricia	Lai	Humboldt State University/ Schatz Lab	USA	Delegate	pel3@humboldt.edu
Daan	Lamaris	DOEN Foundation	Netherlands	Delegate	daan@doen.nl
Anthony	Lambkin	World Bank	USA	Delegate	alambkin@worldbank.org
Juliet	Langat	Unilever Team Kenka Ltd.		Delegate	
Chad	Larson	Mecene Investment	South Africa	Delegate	chadglarson@gmail.com
Bjarne	Laustsen			Delegate	bjarne@laustsen.org
Francois	Lepicard	Hystra	France	Delegate	flepicard@hystra.com

OMBOGO	LEWIS JOHN	Fourteen Hundred ComputersLtd	Kenya	Delegate	lewis@fourteenhundred.co.ke
Jinmin	Li	China Solid State Lighting Alliance		Delegate	jmli@red.semi.ac.cn
Yaping	Li	China Solid State Lighting Alliance		Delegate	yaping@sina.com
Wei	Lian	China Solid State Lighting Alliance		Delegate	
Chen	Liang	Jiangsu SFT Optoelectronic Science & Technology Co., Ltd.	China	Delegate	lighting8007@sft.com.cn
xiaohui	liu	shanghai roy solar co.,ltd.	China	Delegate	roysolarliu@yahoo.com.cn
Stanley	Lyalabi	Rural Electrification Authority	Zambia	Delegate	stanleylyalabi@yahoo.com
Jonathan	Lyimo	Glenergy Inc.	Tanzania	Delegate	colyimo@yahoo.com
Gerard	Madon	Marge		Delegate	gmadon@marge.eu
Prosper	Magali	Ensol (T) Ltd	Tanzania	Delegate	ensolut@yahoo.com
Sitato	Magero	NAWECCE	Kenya	Delegate	sitato@yahoo.com
Coretta	Magongoa	Eskom	South Africa	Delegate	coretta.magongoa@eskom.co.za
saad	mahamed jibril	somaliland energy for sustainable development org	Somalia	Delegate	somalilandsusenergy@yahoo.com
Mathias	Mailu	University of Nairobi	Kenya	Delegate	mailu4@yahoo.com
DOUGLAS	MAINA	BRAZAFRIC ENTERPRISES	Kenya	Delegate	industries@brazafric.com
David	Maina	University of Nairobi	Kenya	Delegate	muchori27@yahoo.com
Meena	Malde	Altec		Delegate	meena@altec.me
Anzelmus	Matini	University of Nairobi	Kenya	Delegate	amatini@yahoo.co.uk
Gilbert	Mato			Delegate	ggmato@yahoo.com
Mwikali	Matu		Kenya	Delegate	mwikali@envisiontarizi.com
Naeem	Mawji	Carbon X Ltd.		Delegate	naeem.mawji@gmail.com
Yisufu	Maxwell	Ghana Broadcasting Corporation	Ghana	Delegate	fawee2001@yahoo.co.uk
Paul	Mbuthi	Ministry of Energy	Kenya	Delegate	pmbuthi@gmail.com
Bridget	McGraw	KNOWLEDGE NOW	Kenya	Delegate	bridgetmcgraw@yahoo.com
Shashank	Mehta	Uni-Supplies & Marketing (K) Ltd	Kenya	Delegate	shashank@sunlite-solar.com
MEMEL	Meless Roger	Anare	Cote d'Ivoire	Delegate	rogermelesse@yahoo.fr
George	Michieka	Smart Solar (K) Limited	Kenya	Delegate	george.michieka@smartsolar.co.ke
Esther	Migu			Delegate	esthermigu@yahoo.com
Lasten	Mika	Practical Action	Zimbabwe	Delegate	lastenm@practicalactionzw.org
Hamisi	Mikate	ENSOL (T) LTD	Tanzania	Delegate	solartz@yahoo.com
Alex	Mitha	Mitha Electricals		Delegate	mithaelectricals@gmail.com
Simon	Miyare	Solar Works East Africa Ltd	Kenya	Delegate	smiyare@solarworksea.co.ke
Frederick	Mkocha	UMEME JUA LTD	Tanzania	Delegate	office@umemejua.com
Violet	Mmari	Marcon Electronics and Solar Power Co. Ltd	Tanzania	Delegate	marconsolar@gmail.com
Andrew	Mnzava	ESEC LTD	Tanzania	Delegate	andrewmnzava@gmail.com
Nassir	Mohammed	ECO ENERGY SOLUTIONS	Kenya	Delegate	nasmoha17@yahoo.com
Ruth	Moko	None	Kenya	Delegate	ruthmoko2005@yahoo.com
Kagiso	Mokwena	Living Power Unlimited	South Africa	Delegate	bakwenasolutions@gmail.com
Adriaan	Mol	ToughStuff	Kenya	Delegate	adriaan.mol@toughstuffonline.org
Jesse	Moore	Signal Point Partners	Kenya	Delegate	jmoore@signalpointpartners.com
Golda	Moore	Solar Nexus International	USA	Delegate	goldamoore@gmail.com
Ellen	Morris	Arc Finance, Ltd.	USA	Delegate	ellen@arcfinance.org
Thomas	Morton	ClimateCare	Kenya	Delegate	josephine.wanguku@jpmorgan.com
NDIAYE	MOUSTAPHA	PROXIMS INTERNATIONAL	Senegal	Delegate	proxint@orange.sn
Prosper	Msellem	REA		Delegate	pmsellem@rea.go.tz
Eli	Mtango	Kaya Amani Ltd	Tanzania	Delegate	elimtango@hotmail.com
Dr. Peter	Mtui	Space Engineering Company		Delegate	plmtui@yahoo.com
Anthony	Muchoki	Alan Engineering Ltd	Kenya	Delegate	amuchoki@alanengineering.co.ke
Charles	Muchunku	Energy for Sustainable Development	Kenya	Delegate	charles.muchunku@esda.co.ke
Christine	Muia	Semi Arid Women Group AthiRiver	Kenya	Delegate	chrismuia@yahoo.com

David	Mukaru	Equity Bank	Kenya	Delegate	david.mukaru@equitybank.co.ke
Myra	Mukulu	GTZ	Kenya	Delegate	myra.mukulu@gtz.de
Leon	Muli	Randon Group (Photographers)	Kenya	Delegate	info@leonmuli.com
Mustafa	Mulla	Abdulrasul Mulla $ Sons Malindi	Kenya	Delegate	izzipoint@swiftmalindi.com
Naomi	Mulusi	Siham Ministry Kangundo	Kenya	Delegate	pmulusya@yahoo.com
Maina	Mumbi			Delegate	elecsolar@yahoo.com
Esther	Munduru Drilliga	Glenergy Inc.	Uganda	Delegate	emundril@yahoo.fr
Sr. Bernadette	Munyao	Ukambani Diocess	Kenya	Delegate	bernadettemunyao2002@yahoo.com
Paul	Mureithi	Uni-Supplies & Marketing (K) Ltd	Kenya	Delegate	p_mureithi1@yahoo.com
Anne	Murray	E+Co	USA	Delegate	anne.murray@eandco.net
Gitonga	Murungi	Deutrex 818 Ltd.	Kenya	Delegate	deutrex818@gmail.com
sule	musa	vendors concepts international	Nigeria	Delegate	vendorsconcepts@gmail.com
Marie Claire	MUSABWAMANA	MININFRA	Rwanda	Delegate	musclaida@yahoo.fr
Robert	Musoke	Solar Power Agencies [u] Ltd	Uganda	Delegate	musokerobert001@yahoo.com
Robert	Musoke			Delegate	
Brian	Musomba			Delegate	
Vitalis	Muthoka	Ecobank Kenya Limited	Kenya	Delegate	VMuthoka@ecobank.com
Jane	Mutiso	AWAN	Kenya	Delegate	jmutiso@swiftkenya.com
Robert	Mutsaers	Gpower NGO	Kenya	Delegate	r.mutsaers@gpower-africa.org
Sherina	Mutungi	Kacowopee Kathiani	Kenya	Delegate	kacowopee@yahoo.com
Rhema N.	MWAMBA	TaiCom Congo Ltd	Zaire	Delegate	taicom.congo@gmail.com
Samuel	Mwangi	AgriBiz Consult	Kenya	Delegate	finedeli@yahoo.co.uk
Joyce	Mwangi	Smart Solar (K) Limited	Kenya	Delegate	joyce.mwangi@smartsolar.co.ke
Robert	Mwaniki	Rad Enterprises Ltd	Kenya	Delegate	info@radent.co.ke
JOSEPH	MWERU	BRAZAFRIC INDUSTRIES	Kenya	Delegate	solar@brazafric.com
Sabina	Mwikali Munguti	KATHIANI	Kenya	Delegate	sabinamunguti@gmail.com
Beth	Mwikia	FEWA	Kenya	Delegate	mwikia@gmail.com
Justus Lavi	Mwololo	Global Exim Ltdhairman	Kenya	Delegate	jlmwololo@yahoo.com
Manuela	Naessl	World Bank Group		Delegate	mnaessl@worldbank.org
abda	nahi	Energies-Services	Mauritania	Delegate	energiesservices@yahoo.fr
Shigeo	NAKAGAWA	Japan International Cooperation Agency (JICA)	Kenya	Delegate	Nakagawa.Shigeo@jica.go.jp
SAMPSON	NARTEY	western men's agency	Ghana	Delegate	westernemage@yahoo.com
George	Nchwali	REA		Delegate	gnchwali@rea.go.tz
specioza	ndagire	Uganda Energy Credit Capitalisation Company	Uganda	Delegate	sndagire@energy.go.ug
John	Nderitu			Delegate	
Josephine	Ndirangu	AWAN	Kenya	Delegate	josephinewn@yahoo.com
John	Ndiritu	Enegsave		Delegate	gichanend@yahoo.com
Peter	Ndwigah			Delegate	p_ndwigah@yahoo.com
David	Nestory Balyagait	INTRA PROFESSION EAST AFRICA LTD		Delegate	dav_ne_ba@yahoo.com
Andrew	Ngachu	Interchange Kenya Ltd	Kenya	Delegate	andrew@interchangeafrica.com
Andrew	Ngachu			Delegate	
REGINALD	NGAILO	NJOMBE ELECTRONICS CENTRE	Tanzania	Delegate	ngailoregy@yahoo.com
Joseph	Nganga	infoDev @ the World Bank	Kenya	Delegate	ngangaj@gmail.com
Ashington	Ngigi	Integral Advisory Services	Kenya	Delegate	ashington@integral-advisory.com
PAPA MOMAR	NGOM	ASER	Senegal	Delegate	pmngom@aser.sn
Mgbra	Nguessan	Marge		Delegate	mnguessan@econoler.com
Grace	Ngungi	Future Force Consultancy	Kenya	Delegate	grace@futureforceconsultancy.com
Cecilie fardal	Nilsen	The University of Oslo		Delegate	ceciliefardal@hotmail.com
J. Ben	Nimako	CircuitVilla Services Ltd	Ghana	Delegate	kofibro@yahoo.com
Alphonse	NIYIBIZI	Kimathi University College of Technology	Kenya	Delegate	nieysal@yahoo.com

Andrew	Njoba			Delegate	
Moses	Njoroge	Meligads E-Business Strategies	Kenya	Delegate	mosesn@e-commerceafrica.com
Julian	Njoroge	Random Group (Photographers)	Kenya	Delegate	enquiries@rgl.co.ke
Hera	Nkatha	HHEWA	Kenya	Delegate	nkatha@gmail.com
Sosthene	Nkundimana	ISAE BUSOGO	Rwanda	Delegate	nkundisosi1@yahoo.fr
Modeste	Nkutchet	PAG		Delegate	nkutchet@yahoo.fr
Nkiruka	Nnaemego	Fresh & Young Brains Development Initiative	Nigeria	Delegate	fbinaija@yahoo.com
UZOCHUKWU	NWACHUKWU	U-SQUARED LIMITED	Nigeria	Delegate	uzorusquaredltd@yahoo.com
Arnold Nzuamtemi	Nzali	Solution ltd		Delegate	arngungi1@yahoo.com
Zachee	NzohNgandembou	Cameroon	Cameroon	Delegate	zachee_n@yahoo.com
Louise	Nzomo	Pipal Limited	Kenya	Delegate	reception@pipal.com
Fiona	Oates	Watu na Nuru, Diocese of Ruaha	Tanzania	Delegate	ifoates@gmail.com
rowland	obiyo	realistic functions	Nigeria	Delegate	realfunc2000@yahoo.com
Julius	Ochieng	Solar Cookers International (E.A.)	Kenya	Delegate	jotieno99@yahoo.com
Moses	Ochieng			Delegate	Moses@fsdkenya.org
Cosmas	Ochieng	Self Help Centre		Delegate	
Jacob	Odhiambo	Jacobs Solarize Limited	Kenya	Delegate	jodhiambo@jacobssolarize.co.ke
Ayorinde	Oduroye	Babcock University	Nigeria	Delegate	poduroye@yahoo.co.uk
Martin	Ogada	Unilever Team Kenka Ltd.		Delegate	
Fred	Ogana	TechnoServe	Kenya	Delegate	fogana@technoserve.or.ke
Simon	Ogutu	Solar Cookers International(EA)	Kenya	Delegate	simonogutu@yahoo.com
GEORGE	OKAI	Energy Innovations Co. Ltd	Ghana	Delegate	g.okai@hotmail.com
Anthony	OKPANACHI	Ecobank Kenya Limited	Kenya	Delegate	AOKPANACHI@ecobank.com
ufuoma	Okpugwo		Nigeria	Delegate	tinefe2002@yahoo.com
Leah	Okullo	Acumen Fund	Kenya	Delegate	lokullo@acumenfund.org
isiaka babatunde	olawore	NUTECH NIG LTD	Nigeria	Delegate	olaworeinternational@yahoo.com
Willem	Olde Kalter	Smart Solar	Kenya	Delegate	willem@smartsolar.co.ke
Robert	Olivier	National Environment Management Authority Kenya	Kenya	Delegate	rolivier@nema.go.ke
Ashley	Olson	Nuru Design	Kenya	Delegate	aolson@nurulight.com
MR AKINOLA	OLUDAYO ORIYOMI	awesome electrical and power nig limite	Nigeria	Delegate	akinoladayo@yahoo.com
Oscar	Ominde	OSRAM	Kenya	Delegate	o.ominde@osram.com
Richard	Omondi	AYICC-K	Kenya	Delegate	richardomondi54@yahoo.com
Dancan	Omondi	Kisumu Ex-Streetboys & Girls	Kenya	Delegate	kisumuexstreetboys@hotmail.com
BOAZ	ONDIEGI	electroworks and power systems	Kenya	Delegate	bondiegi@yahoo.com
Richard	Ondiek	Climate XL Africa	Kenya	Delegate	ondiek@climatexl.org
Richard	Onzima	Glenergy Inc.	Uganda	Delegate	ronzima@gmail.com
JAMES	ORERY	JOHNSON CONTROLS	Kenya	Delegate	korery2001@yahoo.com
Margaret	Osiemo		Kenya	Delegate	osiemom@gmail.com
Kyran	O'Sullivan	World Bank		Delegate	Kosullivan@worldbank.org
David	Otieno	GTZ	Uganda	Delegate	David.Otieno@gtz.de
David	Ouma Mugah Nyiendo	Big Fish Brands	Kenya	Delegate	dmugah@gmail.com
Tom	Owino	ClimateCare	Kenya	Delegate	josephine.wanguku@climatecare.org
MARGARET	OWINO	Solar Cookers International	Kenya	Delegate	maggyapondi@yahoo.com
Kaushik	Pabari	Uni-Supplies & Marketing (K) Ltd	Kenya	Delegate	kaushikpabari@hotmail.com
Shruti	Pabari	Uni-Supplies & Marketing (K) Ltd	Kenya	Delegate	shruti_pabari@hotmail.com
Raju	Pabari	Uni-Supplies & Marketing (K) Ltd	Kenya	Delegate	rpabari@kwale-group.com
Rotimi	Padonu	Ecco-Synergy Nigeria Ltd	Nigeria	Delegate	rotimipadonu@ymail.com
Jingyu	Pan	China Solid State Lighting Alliance		Delegate	
Rajen	Patel	RADBONE CLARK	Kenya	Delegate	rajen_patel@radboneclark.com
Andreas	Paul	Phocos AG	Germany	Delegate	andreas.paul@phocos.com

Kristine	Pearson	Lifeline Energy	South Africa	Delegate	kpearson@lifelineenergy.org
augustus	pela	Trans-Africa Gas and Electric, Plc	USA	Delegate	apela@transafricagaselectric.com
MAKAU	Peter	Ecobank Kenya Limited	Kenya	Delegate	PMAKAU@ecobank.com
Daniel	Phillip			Delegate	
Adre	Pio	IRSE	Angola	Delegate	apgourgel@hotmail.com
Bryan	Pon	UC Davis	USA	Delegate	bjpon@ucdavis.edu
Nachiket W	Potnis	Appropriate Rural Technology Institute â€“ Tanzania (ARTI-TZ)		Delegate	arti.tanzania@gmail.com
Jeffrey	Prins	DOEN Foundation	Netherlands	Delegate	jeffrey@doen.nl
Michael	Pugliese	Arizona State University	USA	Delegate	michael.pugliese@goodrich.com
Juliet	Pumpuni	World Bank		Delegate	jpumpuni@worldbank.org
ADIJAT KUBURA OLUWATOYIN	RAJI	XCEL PREMIER BRAND LIMITED	Nigeria	Delegate	lightoil2010@yahoo.com
CHIKURU	RAYMOND	MINISTERE DE L'ENERGIE	Zaire	Delegate	chikuru_2000@yahoo.fr
Goutham	Reddy	THRIVE	Kenya	Delegate	goutham@thrive.in
Thomas	Reid	5 Capitals Environmental and Management Consulting	UAE	Delegate	tomtdr@gmail.com
Ryan	Renner	Light Up Malawi	USA	Delegate	Ryan.Renner3@gmail.com
jeanette	richert	solpower canarias	Spain	Delegate	j.richert@solpower.es
oliver	richert	solpower.es	Spain	Delegate	jeanetterichert@spray.se
Thomas	Ricke	VillageBoom	Germany	Delegate	Ricke@mfc-agency.com
CHARLES	RIOBA	SOLAR WORLD EA LTD	Kenya	Delegate	otekirioba@yahoo.com
Paul	Rippey	Center for Financial Inclusion - ACCION	USA	Delegate	paulrippeypdx@gmail.com
Ndonye	Rita		Kenya	Delegate	rndonye@ioshem.co.ke
Theresa	Riunge	HHEWA	Kenya	Delegate	twriunge@yahoo.com
Florence oyin	Roberto	Las Juntas De Pacuar	Costa Rica	Delegate	gnosisbiz@live.com
Ken	Robertson	STAR EcoWorks	Canada	Delegate	kenirobertson@gmail.com
Brad	Rogers	Arizona State University	USA	Delegate	BRogers@asu.edu
Jacqueline	Rumiri	NAWECCE	Kenya	Delegate	rumiri@yahoo.com
Mohamed	saad	Giza Systems	Egypt	Delegate	mohamed.saad@gizasystems.com
Abhimanyu	Sahu	Schneider Electric		Delegate	abhimany-sahu@in.schneider-electric.com
Anjali	Saini	IES	Kenya	Delegate	anjali.saini@yahoo.co.uk
WASIU	SALAMI	XCEL PREMIER BRAND LIMITED	Nigeria	Delegate	wsalami@yahoo.com
Bhavik	Savani	Uni-Supplies & Marketing (K) Ltd	Kenya	Delegate	bhavik15@hotmail.com
Ronald	Schourhouizen			Delegate	
Andy	Schroeter	Sunlabob Renewable Energy Ltd	Laos	Delegate	andy.schroeter@sunlabob.com
Becca	Schwartz	BASE Technologies	Uganda	Delegate	beccas@barefootpower.com
Jamie	Seno	Random Group (Photographers)	Kenya	Delegate	jamie@rgl.co.ke
Ananias	Sentozi	World Vision-Rwanda	Rwanda	Delegate	senanias@yahoo.fr
Laurence	SEWE	African Development bank		Delegate	larry.sewe@gmail.com
Romal	Shah	Archway International Limited	Kenya	Delegate	romal@archwayinternational.biz
Kuldeep	Shah	Kulvin Enterprises	Kenya	Delegate	kuldeep.nagaria@gmail.com
Biren	Shah	Nabico Enterprises Limited	Kenya	Delegate	biren@nabico.co.ke
Bijal	Shah	ReSustEn	Kenya	Delegate	shah_bij2003@yahoo.com
Ajmal	Shams	Head, Engineering Department		Delegate	ashams@nspafghanistan.org
Melessaw	Shanko	MGP Consultants	Ethiopia	Delegate	mgp@ethionet.et
Mrs. ANIDASO	SHORMEH GYAMFI-AIDO	Energy Innovations Co. Ltd	Ghana	Delegate	enovatios.gh@gmail.com
Anidaso Shormeh	Shormeh Gyamfi-Aidoo	Energy Innovations Co. Ltd	Ghana	Delegate	enovation.gh@gmail.com
Bhola	Shrestha	East African Tea Trade Association	Kenya	Delegate	bholashrestha@gmail.com
Zhao	Shuguang	Shanghai Chenhao Lighting Technology Co.,Ltd	China	Delegate	ZSGQ8467@163.COM
Boldewijn	Sloet	BASE Technologies	Uganda	Delegate	boldewijns@barefootpower.com
adetola	SOGBESAN	Hypersand Power Systems Limited	Nigeria	Delegate	tola@hypersand.net
Chris	Soper	Sollatek East Africa	Kenya	Delegate	chris.soper@sollatek.co.ke

BOLADE	SOREMEKUN	RUBITEC NIGERIA LTD	Nigeria	Delegate	bolades@rubitecsolar.com
Heiko	Specking	Charity Services by VALUEworks	Switzerland	Delegate	heiko@valueworks.ch
geoffrey	ssebuggwawo	private sector foundation uganda	Uganda	Delegate	gssebuggwawo@yahoo.com
Derek	Steel	Kingfisher	Kenya	Delegate	dsteel@marketpower.co.ke
David	Strait	CPC Madison	USA	Delegate	dmstrait@charter.net
Kristin	Stroup	The World Bank	Liberia	Delegate	kstroup@worldbank.org
Rodney	Sultani	Ministry of Energy Kenya		Delegate	
Sekhar	Suryanarayanan	Columbia Business School	USA	Delegate	ssuryanarayanan11@gsb.columbia.edu
Charles	T.O. King			Delegate	
Kahisu	Tadesse	Ethiopia Rural Energy Development Promotion Center	Ethiopia	Delegate	kahisu@yahoo.com
Andrew	Tanswell	ToughStuff	United Kingdom	Delegate	andrew.tanswell@toughstuffonline.org
Hycinth	Tanto	Clean Energy Technologies Group	Cameroon	Delegate	cetechgroup@yahoo.com
David	Taverner	GSMA	United Kingdom	Delegate	dtaverner@gsm.org
Joseph N.	TCHIBO	TaiCom Congo	DRC	Delegate	nkinzo@gmail.com
Yuda	Tembo	Lighting The Way Zambia	Zambia	Delegate	yudatembo@yahoo.com
Chifundo	Tenthani	University of Malawi, The Malawi Polytechnic	Malawi	Delegate	ctenthani@gmail.com
Divyesh	Thakrar	Uni-Supplies & Marketing (K) Ltd	Kenya	Delegate	divyesh@deetee.biz
Elizabeth	Thande	AWAN	Kenya	Delegate	elizabeth@wetfarm.co.ke
DIEUDONNE	THANG	GLOBAL VILLAGE CAMEROON	Cameroon	Delegate	thangda@yahoo.fr
PATRICK	THIMBA	AFRICA BIO PRODUCTS LTD	Kenya	Delegate	ceo@africabio.co.ke
Patrick	Too	Unilever Team Kenka Ltd.		Delegate	
ISMAIL O	TOURE	AMADER	Mali	Delegate	itoure@amadermali.net
Jennifer	Tracy	Humbolt University		Delegate	Jennifer.Tracy@humboldt.edu
Samson	Tsegaye	Solar Energy Foundation	Ethiopia	Delegate	samson@solar-energy-foundation.org
Lilian	TU	IFC	China	Delegate	LTu@ifc.org
Godfrey	Turyahikayo	Rural Electrification Agency	Uganda	Delegate	grturyahikayo@rea.or.ug
Justina	Uisso	REA		Delegate	juisso@rea.go.tz
CHINEDUM	UKABIALA	NIGERIA ELECTRICITY REGULATORY COMMISSION	Nigeria	Delegate	COUKABIALA@GMAIL.COM
Kirsten	Ulsrud	University of Oslo	Norway	Delegate	kirsten.ulsrud@sosgeo.uio.no
NITA	VADER	irrisun ltd	Kenya	Delegate	nitavadera@nbi.ispkenya.com
BILU	VADERA	irrisun ltd	Kenya	Delegate	bcvadera@gmail.com
Maarten	van Asperen	VU University Amsterdam	Netherlands	Delegate	vanasperen@hotmail.com
Erik	VAN MALDEREN	Belgian development agency	Rwanda	Delegate	erik.vanmalderen@btcctb.org
Robert	Vanderplas	PAG Team		Delegate	rvanderplas@yahoo.com
Rainer	Veit	Das Optimum Ltd.	Germany	Delegate	Rainer.Veit@das-optimum.eu
Vivian	Vendeirinho	Electricity for Africa	Spain	Delegate	efa@incub8.me
Purity	W. Waweru	AWAN	Kenya	Delegate	pwaweru@yahoo.com
Evans	Wadongo	Sustainable Development For All-Kenya	Kenya	Delegate	e.wadongo@sustainabledevelopmentforall.org
James	Wafula	University of Nairobi	Kenya	Delegate	s_homepower@yahoo.com
Assumpter	Wairimu	NAWECCE	Kenya	Delegate	assumpter@yahoo.com
Milton	Waiswa	Department of Meteorology	Uganda	Delegate	milton.waiswa@meteo-uganda.net
Gladys	Wakesho Mwambi	Dynamic Mothers Women Group	Kenya	Delegate	wamwambi@yahoo.com
Tuta	Wamanga	Unilever Team Kenka Ltd.		Delegate	
yafei	Wang	Kangheng Green Energy Co., Ltd.	China	Delegate	w.yafei@gmail.com
Gang	Wang	China Solid State Lighting Alliance		Delegate	
Daniel	Wangalwa	University of Nairobi	Kenya	Delegate	danielwangalwa@hotmail.com
Reginah	Wangari	Irrisun Ltd	Kenya	Delegate	irrisun@gmail.com
Eunice	Wanjiru	FEWA	Kenya	Delegate	wanjiru@yahoo.com
JULIANA	WANJIRU	KENYA WOMEN FINANCE TRUST	Kenya	Delegate	jwanjiru@kwftdtm.com
Daniel	Wanjohi	GVEP International	Kenya	Delegate	daniel.macharia@gvepinternational.org

ALEX	WANYOKO	SUN TRANSFER (K) LTD	Kenya	Delegate	alexmahugu@gmail.com
Charlotte	Ward	CVS Consulting (Africa) Ltd	Kenya	Delegate	charlotteward.mail@gmail.com
Emmy	Wasirwa	Wana Solutions Ltd	Uganda	Delegate	WASIRWA@aol.co.uk
Rahab	Waweru	HHEWA	Kenya	Delegate	rwaweru@yahoo.com
Lian	Wei	Shenzhen Zhongkeminglianxing Optoelectronics Technology Co.,Ltd	China	Delegate	lianwei.66@163.com
Ilan	Weichselbaum	Epinav Ltd	Israel	Delegate	wilan@epinav.com
Zhang	Weidong	Shanghai Baiyi Lighting Elecotronic Co.,Ltd	China	Delegate	gma@baiyiled.com
Reinhard	Weitzel	OSRAM GmbH	Germany	Delegate	r.weitzel@osram.de
Yuehua	Wen	China Solid State Lighting Alliance		Delegate	
He	Wenming	Fujian Zhongke Wanbang Optoelectronics Co.,Ltd	China	Delegate	171712271@qq.com
George	Weru	Solar works E. A. Ltd	Kenya	Delegate	werugeorge@yahoo.com
Juergen	Wieland	SunTransfer GmbH, Germany	Germany	Delegate	wieland@suntransfer.com
Simon	Willans	Energy For Opportunity	Sierra Leone	Delegate	simonwillans@gmail.com
Jacob	Winiecki	Arc Finance	USA	Delegate	jacob.winiecki@gmail.com
Xu	Xiangang	Shandong University	China	Delegate	xxu@sdu.edu.cn
Xiangang	Xu	China Solid State Lighting Alliance		Delegate	
Cheng	Yan	China Solid State Lighting Alliance		Delegate	
Cheng	Yan			Delegate	
Jamie	Yang	EGG-energy	Tanzania	Delegate	jamie.yang@egg-energy.com
LI	YAO	IFC	China	Delegate	yli2@ifc.org
Li	Yaping	Hebei Daqi Lighting Co., Ltd	China	Delegate	hbdaqi@126.com
Zhou	Ye	Guangzhou Yixin Energy Management Company	China	Delegate	zhuye@gmail.com
Wen	Yuehua	Shanghai Baiyi Lighting Elecotronic Co.,Ltd	China	Delegate	yuehua@baiyiled.com
BABATUNDE	YUSUF	XCEL PREMIER BRAND LIMITED	Nigeria	Delegate	babatunde_tj@yahoo.com
Eitan	Zeira	Konarka	USA	Delegate	ezeira@konarka.com
Weidong	Zhang	China Solid State Lighting Alliance		Delegate	
Chengbo	Zhang	China Solid State Lighting Alliance		Delegate	info@baiyiled.com
Shugang	Zhao	China Solid State Lighting Alliance		Delegate	
CAO	ZHENWU	Beijing Oasis New Energy Company	China	Delegate	rocky@oasisnewenergy.com
Yin	Zhiping	Jiangsu SFT Optoelectronic Science & Technology Co., Ltd.	China	Delegate	jyin@sft.com.cn
Zac	Zhou	Smart Solar (K) Limited		Delegate	Zac@smartsolar.co.ke
Ye	Zhou	China Solid State Lighting Alliance		Delegate	
Gary	Zieff	dissigno	USA	Delegate	gary@dissigno.com
		Asachi Limited		Delegate	
		Asachi Limited		Delegate	
		African Green Energy Limited		Delegate	
		Rural Development Solutions Limited		Delegate	
		Barefoot Technologies		Delegate	
		CVS Consulting Africa Limited		Delegate	
		Kulvin Enterprises		Delegate	
Harry	Andrews	Barefoot Power	Kenya	Exhibitor	harrya@barefootpower.com
Stephen	Awange	Uni-Supplies & Marketing (K) Limited	Kenya	Exhibitor	awangestephen@gmail.com
Agyenim	Boateng	Wilkins Engineering	Ghana	Exhibitor	agyenimboat@yahoo.com
Stefania	Boglioli	CLIMACENTO GREEN TECH	Kenya	Exhibitor	info@climacento.co.ke
Arnaud	Chabanne	CB ENERGIE		Exhibitor	cbenergie@yahoo.fr
Raman	Chauhan	DeCore Nanosemiconductors	India	Exhibitor	rch@dstlworld.com
Norman	Chege	Davis & Shirtliff Ltd	Kenya	Exhibitor	norman.chege@dayliff.com
Shih	Chen	Jetpro Technology, Inc.	Taiwan	Exhibitor	shchen86@hotmail.com
Salome	Githu	Good News Broadcasting System	Kenya	Exhibitor	sallygithu@gbskenya.com
Bharat	Gohil	SolaTaa	Kenya	Exhibitor	solataa@gmail.com

Janice	Hao	China Solid State Lighting Alliance	China	Exhibitor	haojq@china-led.net
Sean	Hesketh	Mega Force Co ltd	China	Exhibitor	shesketh@rogers.com
Xinghua	Huang	Beijing Oasis New Energy Company	China	Exhibitor	un@sohu.com
Dhanumjaya	Kadiyala	Thrive Energy Technologies Pvt Ltd	India	Exhibitor	dhanu@thrive.in
Roman	Kang'ethe	Wambui Enterprises	Kenya	Exhibitor	romanyambura@yahoo.com
SolarAid	Kenya	SolarAid Kenya	Kenya	Exhibitor	mariannek@solar-aid.org
Franz	Kies	SOLUX	Germany	Exhibitor	FranzKies@t-online.de
Eston	Kimani	Entia Ltd	Kenya	Exhibitor	eston.kimani@gmail.com
Patrick	Kimathi	UNIDO	Kenya	Exhibitor	kimathi@smestoday.co.ke
Gathu	Kirubi	SunTransfer Kenya Ltd	Kenya	Exhibitor	kirubi@suntransfer.com
Haijo	Kuper	Ubbink East Africa	Kenya	Exhibitor	hkuper@ubbink.nl
Muyi	Lawal	Solar Electric Ltd	Nigeria	Exhibitor	info@solarelectricsystems.net
Wang	Lijun	Trony	China	Exhibitor	wang.lijun@trony.com
Nemwel	Machuki	TEGEMEO LIGHTING	Kenya	Exhibitor	machuki@hasoftkenya.com
Wanjiru	Maina	Solarland	China	Exhibitor	wanjiru.maina@smartsolar.co.ke
Kenneth	Mitambo	Explore Kenya Inclusive	Kenya	Exhibitor	kndua@explorekenya.org
JAMES	MUNGAI	SOLAR WORLD EA LTD	Kenya	Exhibitor	jmungais@yahoo.com
David	Mwangi	Phocos AG (rep office East Africa)	Kenya	Exhibitor	david.gitiba@phocos.com
RODGERS	NALIANYA	IRRISUN LTD	Kenya	Exhibitor	rodgersnalianya@gmail.com
Louis	Nyamwaya	Chloride Exide (K) Limited	Kenya	Exhibitor	louis@chlorideexide.com
Samwel	Ogal Odhiambo	Sollatek Electronics (K) Ltd	Kenya	Exhibitor	samm.odhiambo@sollatek.co.ke
Elizabeth	Otieno	Kibera Community Youth Programme	Kenya	Exhibitor	eotieno39@yahoo.com
Manwoo	Park	Uniglobe HNT	South Korea	Exhibitor	michaelpark@uniglobe.co.kr
Rita	Ricciardi	Dreampower Ricciardi SRL		Exhibitor	r.ricciardi75@gmail.com
Ghulam	Shabbir	Universal Trading Co	Pakistan	Exhibitor	shaikhforce@hotmail.com
Richard	Sheffle	The Africa Enterprise Challenge Fund	Kenya	Exhibitor	richard.sheffle@aecfafrica.org
Nick	Sowden	ToughStuff	Kenya	Exhibitor	nick.sowden@toughstuffonline.org
Pepijn	Steemers	D.light Design East Africa Ltd	Tanzania	Exhibitor	pepijn@dlightdesign.com
hiroyuki	tanaka	SANYO Gulf FZE	UAE	Exhibitor	tanaka@sanyogulf.com
Radhika	Thakkar	Greenlight Planet	India	Exhibitor	radhika@greenlightplanet.com
Eric	Youngren	Solar Nexus International	USA	Exhibitor	ericyoungren@gmail.com
Wei	Yuyan	Kangheng Green Energy Co., Ltd.	China	Exhibitor	jianrong.wang@vtechcn.com
Wei	Yuyan	Veritas Tech	China	Exhibitor	jianrong.wang@vtechcn.com
Tobias	Zwirner	Phaesun GmbH	Germany	Exhibitor	tobias.zwirner@phaesun.com
Alban	Jacquin	Schneider Electric	France	Exhibitor/Contributor	alban2.jacquin@fr.schneider-electric.com
Nick	Kelso	Philips	Netherlands	Exhibitor/Contributor	Nick.Kelso@philips.com
Glen	MacGillivray	Glenergy Inc.	Canada	Exhibitor/Contributor	glen@glenergy.ca
Nana	Assamoah-Manu	IFC	Kenya	Lighting Africa Team	NAsamoahmanu@ifc.org
Patrick	Avato	IFC	USA	Lighting Africa Team	pavato@ifc.org
Abdoulaye	Ba	GMX	Senegal	Lighting Africa Team	ablaye.ba@coser-energy.com
Leo	Blyth	IFC	Kenya	Lighting Africa Team	LBlyth@ifc.org
Raihan	Elahi	AFTEG	Ethiopia	Lighting Africa Team	relahi@worldbank.org
Albert	Eliason	International Finance Corporation	Ghana	Lighting Africa Team	aeliason@ifc.org
Francis	Gagnon	IFC	USA	Lighting Africa Team	FGagnon@ifc.org
Winifred	Halm De-Souza			Lighting Africa Team	
Arne	Jacobson	Humboldt State University	USA	Lighting Africa Team	Arne.Jacobson@humboldt.edu
John	Jaudel	World Bank	USA	Lighting Africa Team	johnjaudel@gmail.com
Simon	Kiranditu			Lighting Africa Team	
John	MacLean	EEFC		Lighting Africa Team	jmaclean@eefinance.net
Lindsay	Madeira	IFC	USA	Lighting Africa Team	lmadeira@ifc.org

Guy Patrick	Massoloka	IFC	Kenya	Lighting Africa Team	AMassoloka@ifc.org
Akua	Oyalere			Lighting Africa Team	
Maria Hilda	Rivera	The World Bank	USA	Lighting Africa Team	mriveraramirez@worldbank.org
Mathew	Sebonia	EEFC		Lighting Africa Team	msebonia@eefinance.net
Judy	Siegel	World Bank	USA	Lighting Africa Team	judy@energyandsecurity.com
Frank	Altena	Philips Lighting	Netherlands	Speaker	frank.altena@philips.com
Sam	Andrews	Barefoot Power	China	Speaker	sama@barefottpower.com
Melissa	Baker	TNS Research International		Speaker	**melissa.baker**@research-int.com
John	Barorot	Safari Com	Kenya	Speaker	
Ranganayakulu	Bodavala	THRIVE	India	Speaker	ranga@thrive.in
Akanksha	Chaurey	TERI	India	Speaker	akanksha@teri.res.in
Eric	Chesire	Kenya Bureau of Standards	Kenya	Speaker	
Felistas	Coutinho	Tujijenge Afrika	Tanzania	Speaker	felistasc@tujijenge.org
Ogunlade	Davidson	Minister of Energy and Water Resources, Sierra Leone	Sierra Leone	Speaker	ogunladedavidson@hotmail.com
Omar	Dawood	SANYO	UAE	Speaker	Omair.Dawood@sanyo.gulf.com
Corrinne	Figueredo	IFC	USA	Speaker	Cfigueredo@ifc.org
Omane	Frimpong	Wilkins Engineering Ltd.	Ghana	Speaker	Wilkins@africaonline.com.gh
Udo	Gattenloehner	Global Nature Fund	Germany	Speaker	gattenloehner@globalnature.org
Augustus	Goanue	Rural & Renewable Energy Agency	Liberia	Speaker	gusgoanue@yahoo.com
Sam	Goldman	D.LIGHT	India	Speaker	sam@dlightdesign.com
Sagar	Gubbi	GSMA Development Fund		Speaker	SGubbi@gsm.org
Gaurav	Gupta	Dahlberg Associates		Speaker	gauruv.gupta@dalberg.com,
Sameer	Hajee	Lights for Life	Canada	Speaker	sameer_hajee@yahoo.com
Mark	Hankins	Marge	Kenya	Speaker	mhankins@africaonline.co.ke
Chris	Harrison	Young & Rubicam Brands	Kenya	Speaker	chris.harrison@yrbrands.com
Carsten	Hellpap	GTZ	Germany	Speaker	carsten.hellpap@gtz.de
Vijay	Iyer	World Bank	USA	Speaker	
John	Keane	Solar Aid	Kenya	Speaker	john@solar-aid.org
Joel	Kolker	Public Private Infrastructure Advisory Facility	Kenya	Speaker	jkolker@worldbank.org
Rajan	kundra	Acumen Fund	USA	Speaker	rkundra@acumenfund.org
Christine	Laurenssen	Research International	Kenya	Speaker	
Wu	Ling	China Solid State Lighting Alliance	China	Speaker	wuling@china-led.net
Gerhard	Mair	Consultant	Austria	Speaker	mairgerhard@gmail.com
Gustavo	Manez Gomis	United Nations Environment Program	Switzerland	Speaker	Gustavo.Manez@unep.org
Lucius	Mayer-Tasch	German Technical Cooperation (GTZ)	Uganda	Speaker	lucius.mayer-tasch@gtz.de
Klaus W.	Mehl	National Lighting Test Centre	China	Speaker	klaus@nltc.cn
Evan	Mills	Lawrence Berkeley National Laboratory	USA	Speaker	emills@lbl.gov
Tom	Morton	J.P. Morgan-Climate Care	Kenya	Speaker	tom.morton@jpmorgan.com
Vitalis	Muthoka	Ecobank Kenya Limited		Speaker	VMuthoka@ecobank.com
Lutengano	Mwakahesya	Tanzania Rural Energy Agency	Tanzania	Speaker	lmwakahesya@rea.go.tz
Kofi	Nketsia-Tabiri	E+Co Africa		Speaker	kofi.nketsia-tabiri@eandco.net
Michael	Oyier	Kenya Television Network	Kenya	Speaker	
Mohamedrafik	Parpia	Zara Solar Limited	Tanzania	Speaker	zarasolar@yahoo.com
Norbert	Pfanner	Fraunhofer ISE	Germany	Speaker	norbert.pfanner@ise.fraunhofer.de
Dustin	Poppendieck	Engeneering Department at Humbolt State University	USA	Speaker	poppendieck@gmail.com
Jean Philippe	Prosper	IFC		Speaker	
Pikay	Richardson	Manchester Business School	United Kingdom	Speaker	pikayrichardson@yahoo.com
Ousmane Fall	SARR	ASER	Senegal	Speaker	ofsarr@yahoo.com
Ueli	Scheuermier	Rural African Ventures	Switzerland	Speaker	ueli.scheuermeier@sunlabob.com
Harald	Schuetzeichel	Stiftung Solarenergie - Solar Energy Foundation	Germany	Speaker	hs@stiftung-solarenergie.org

Mayank	Sekhsaria	Greenlight Planet	India	Speaker	mayank@greenlightplanet.com
Sophie	Van den Berg	Partner in Development	Netherlands	Speaker	sophievandenberg@kabelfoon.net
Alex	Varghese	UNIDO	Kenya	Speaker	A.Varghese@unido.org
Gilles	VERMOT DESROCHES	SCHNEIDER ELECTRIC	France	Speaker	gilles.vermot-desroches@schneider-electric.com
Anton	Zimmermann	Phocos AG	Germany	Speaker	anton.zimmermann@phocos.com
Johannes	Zutt	World Bank		Speaker	jzutt@worldbank.org
Mark	Bent	SunNight Solar	USA	Speaker/Exhibitor	markbent@sunnightsolar.com
Therese	Jordan	Konarka Technologies	USA	Speaker/Exhibitor	tjordan@konarka.com
Anil	Cabraal	Independent Consultant	USA	Speaker/Lighting Africa Team	racabraal@msn.com
Khetsiwe	Dlamini	IFC		Speaker/Lighting Africa Team	
Rodd	Eddy	Lighting Africa		Speaker/Lighting Africa Team	rodd.eddy@yahoo.com eddy
Arthur Itotia	Njagi	IFC	Kenya	Speaker/Lighting Africa Team	ANjagi@ifc.org
Dana	Rysankova	World Bank	USA	Speaker/Lighting Africa Team	drysankova@worldbank.org
Russell	Sturm	IFC	USA	Speaker/Lighting Africa Team	rsturm@ifc.org

Appendix V. Lighting Industry Trade Fair: Exhibitors and Contact Info

Africa Enterprise Challenge Fund
Richard Sheffle
E-Mail: richard.sheffle@aecfafrica.org

Barefoot Power Pty Ltd.
Harry Andrews, Director, Australia
E-Mail: harrya@barefootpower.com
Areas of Interest: Lighting Products, Assembler/Integrator, Lighting Manufacturer, LED Distributor/Marketer

Beijing Oasis New Energy Company
Xinghua Huang, General Manager, China
E-Mail: un@sohu.com
Areas of Interest: Lighting Products, Assembler/Integrator, Local Distributor/ Marketer, Serving Rural Areas

CB ENERGIE
Arnaud Chabanne, Burkina Fasso
E-Mail: cbenergie@yahoo.fr
Areas of Interest: Solar Lantern Manufacturer and Distributor

China Solid State Alliance
Janice Hao, China
E-Mail: haojq@china-led.net
Areas of Interest: Research and Development

Chloride Exide (K) Limited
Louis Nyamwaya, Marketing Manager, Kenya
E-Mail: louis@chlorideexide.com
Areas of Interest: Battery and Solar Panel Distributor

CLIMACENTO GREEN TECH
Stefania Buglioli, Sales and Marketing Director, Kenya
E-Mail: info@climacento.co.ke
Areas of Interest: Lighting Installation and Distribution

D.light Design East Africa Ltd
Pepijn Steemers, Managing Director, India
E-Mail: pepijn@dlightdesign.com
Areas of Interest: LED Manufacturer

Davis & Shirtliff Ltd
Norman Chege, Solar Division Manager, Kenya
E-Mail: norman.chege@dayliff.com
Areas of Interest: Component Supplier

DeCore Nanosemiconductors

Arnand Chabanne
E-Mail: cbenergie@yahoo.fr

Dreampower Ricciardi SRL
Rita Ricciardi, Director, Kenya
E-Mail: r.ricciardi75@gmail.com
Areas of Interest: Lighting Manufacturer/Distributor

Entia Ltd
Eston Kimani, Business Development, Kenya
E-Mail: eston.kimani@gmail.com
Areas of Interest: Lighting Product Distributor

Explore Kenya Inclusive
Kenneth Mitambo, CEO, Kenya
E-Mail: kndua@explorekenya.org
Areas of Interest: NGO, Academia

Glenergy Inc.
Glen MacGillivray, President, Canada
E-Mail: glen@glenergy.ca
Areas of interest: Lighting Product Manufacturer/Importer/ Distributor/Retailer/ Financier

Greenlight Planet
Radhika Thakkar, Global Partnerships, India
E-Mail: radhika@greenlightplanet.com
Areas of Interest: Lighting Product Manufacturer/Distributor

GoodNews Broadcasting System
Salome Githu, Marketing Manager, Kenya
E-Mail: sallygithurgbskenya.com

Irrisun Ltd.
Nalianya Rodgers, Director, Kenya
E-Mail: rodgersnalianya@gmail.com
Areas of Interest: Financier

Jetpro Technology, Inc.
Shih Chen, President, Taiwan
E-Mail: shchen86@hotmail.com
Areas of Interest: Lighting Product Manufacturer

Kangheng Green Energy Co., Ltd
Wei Yuyan
E-Mail: Jianrong.wang@vtechcn.com

Kibera Community Youth Programme
Elizabeth Otieno, Solar Projects, Kenya
E-Mail: eotieno39@yahoo.com

Areas of Interest: Community Based Projects

Konarka Technologies
Therese Jordan, TechnologiesVP Business Development, USA
E-Mail: tjordan@konarka.com
Areas of Interest: Lighting Product Manufacturer

Mega Force Co ltd
Sean Hasketh, Overseas Sales Manager, China
E-Mail: shesketh@rogers.com
Areas of Interest: Lighting Product Manufacturer

Phaesun GmbH
Tobias Zwirner, Managing Director, Germany
E-mail: tobias.zwirner@phaesun.com
Areas of Interest: Component Supplier/Distributor

Philips
Nick Kelso, Communications Manager, Netherlands
E-Mail: Nick.Kelso@philips.com
Area of Interest: Lighting Product Manufacturer

Phocos AG-East Africa
David Mwangi, Sanes Engineer, Kenya
E-Mail: david.gitiba@phocos.com
Areas of Interest: Lighting Product Manufacturer

SANYO Gulf FZE
Omair Dawood, Assistant Marketing Manager, UAE
E-Mail: Omair.Dawood@sanyo.gulf.com
Areas of Interest: Lighting Product Manufacturer

Schneider Electric
Alban Jacquin, Strategy and Innovation, France
E-Mail: alban2.jacquin@fr.schneider-electric.com
Areas of Interest: Manufacturer and Distributer

Solar Electric Ltd
Muyi Lawal, Managing Director, Nigeria
E-Mail: info@solarelectricsystems.net
Areas of Interest: Lighting Product Distributor

Solar Nexus International
Eric Youngren, CEO, USA
E-Mail: ericyoungren@gmail.com
Areas of Interest: Lighting Product Manufacturer,
Distributor, Component Supplier

SOLAR WORLD EA LTD
James Mungai, Project Coordinator, Kenya

E-Mail: jmungais@yahoo.com
Areas of Interest: Importer/Distributor/Retail

SolarAid Kenya
E-Mail: mariannek@solar-aid.org
Areas of Interest: NGO, Academia

Solarland
Wanjiru Maina, Technical Officer, China
E-Mail: wanjiru.maina@smartsolar.co.ke
Areas of Interest: Lighting Product Manufacturer

SolaTaa
Bharat Gohil, Managing Director, Kenya
E-Mail: solataa@gmail.com
Areas of Interest: Importer/Distributor

Sollatek Electronics (K) Ltd
SamwelOgal Odhiambo, Sales Manager, Kenya
E-Mail: samm.odhiambo@sollatek.co.ke
Areas of Interest: Importer/Distributor

SOLUX
Franz Kies, Germany
E-Mail: FranzKies@t-online.de
Areas of Interest: Lighting Product Manufacturer and Distributor

SunNight Solar
Mark Bent, CEO, USA
E-Mail: markbent@sunnightsolar.com
Areas of Interest: Lighting Product Manufacturer

SunTransfer Kenya Ltd
Gathu Kirubi, CEO, Kenya
E-Mail: kirubi@suntransfer.com
Areas of Interest: Distributor/Retailer

TEGEMEO LIGHTING
Nemwel Machuki, Director, Kenya
E-Mail: machuki@hasoftkenya.com
Areas of Interest: Importer/Distributor

Thrive Energy Technologies Pvt Ltd
Dhanumjaya Kadiyala, Head - Business Development, India
E-Mail: dhanu@thrive.in
Areas of Interest: Lighting Product Manufacturer

ToughStuff
Nick Sowden, Commercial Manger, Kenya
E-Mail: nick.sowden@toughstuffonline.org

Areas of Interest: Manufacturer/Importer/Distributor

Trony
Zhang Tongbin, Research and Development Manger, China
E-Mail: zhang.tongbin@trony.com
Areas of Interest: Lighting product Manufacturer

Ubbink East Africa
Haijo Kuper, Managing Director, Netherlands
E-Mail: hkuper@ubbink.nl
Areas of Interest: Manufacturer

UNIDO
Patrick Kimathi, Program Coordinator, Kenya
E-Mail: kimathi@smestoday.co.ke
Areas of Interest: Development

Uniglobe HNT
Manwoo Park, Vice President, South Korea
E-Mail: michaelpark@uniglobe.co.kr
Areas of Interest: Lighting Product Manufacturer

Uni-Supplies and Marketing
Stephen Awenge, Marketing Executive, India
E-Mail: awangestephen@gmail.com
Areas of Interest: Import/Distribution

Universal Trading Co.
Ghulam Shabbir, General Trading, Pakistan
E-Mail: shaikhforce@hotmail.com
Areas of Interest: Component Supplier

Veritas Tech
Wei Yuyan, President, China
E-Mail: jianrong.wang@vtechcn.com
Areas of Interest: Lighting Product Manufacturer

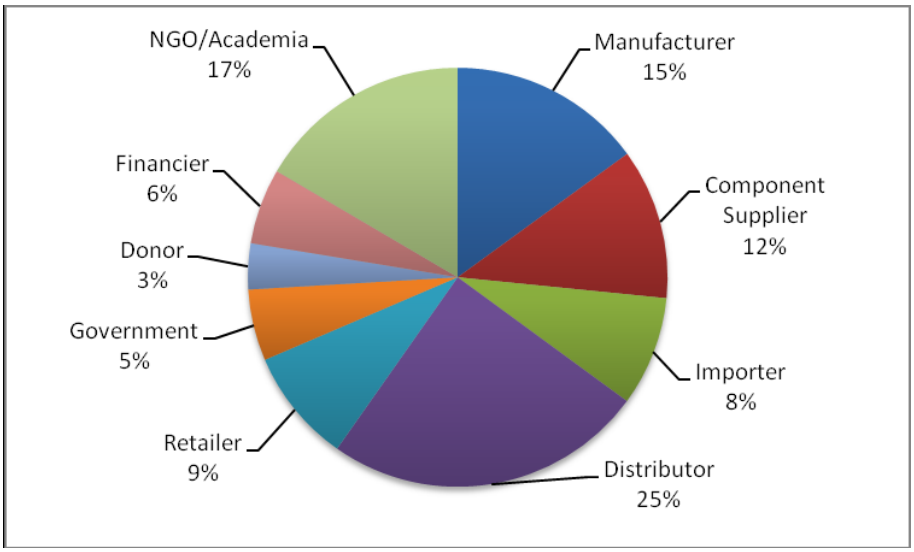
Wambui Enterprises
Roman Kang'ethe
E-Mail: Romanyambura@yahoo.com

Wilkins Engineering,
Agyenim Boateng, Marketing Manager, Ghana
E-Mail: agyenimboat@yahoo.com
Areas of Interest: Importer/Distributor

World Bank Lighting Africa
Guy Patrick Massoloka, Communications, IFC
E-Mail: AMassoloka@ifc.org

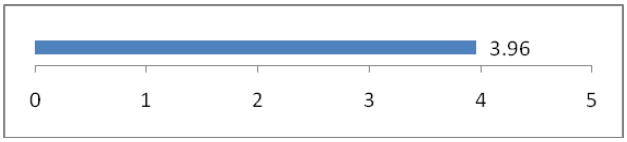
Appendix VI. Lighting Africa 2010 Conference Feedback Questionnaire Results

1. Mark your primary work area(s). (202 respondents of 614 attendees, 32.8% response rate)

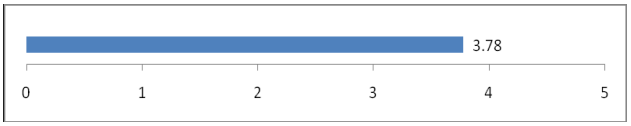


2. Overall conference and trade show. Value of overall Lighting Africa Conference 2010 to you?

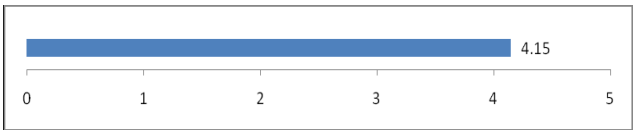
Total average response:



Manufacturer average response:



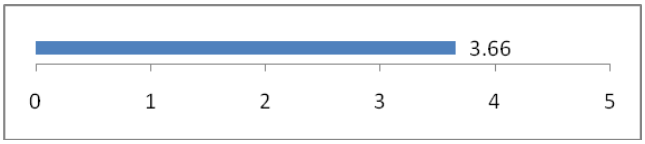
Distributor average response:



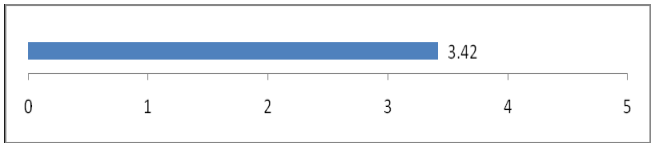
3. Conference presentation topics. To what extent did the Conference presentations/sessions meet and address your expectations in:

a. <u>Product quality assurance</u>

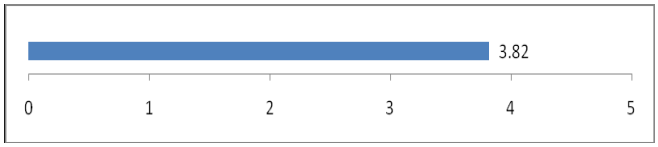
Total average response:



Manufacturer average response:

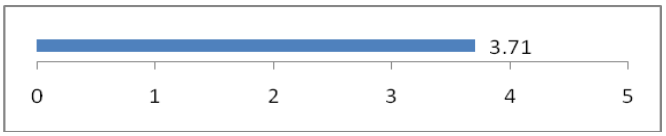


Distributor average response:

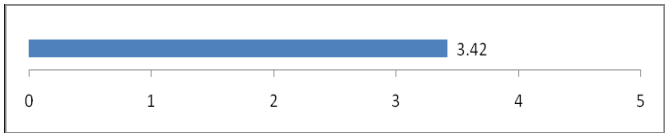


b. Market intelligence and research

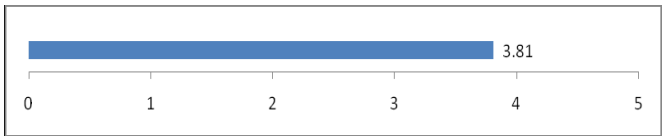
Total average response:



Manufacturer average response:

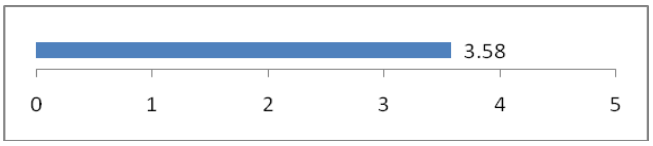


Distributor average response:

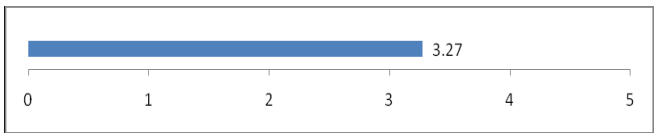


c. Business development support

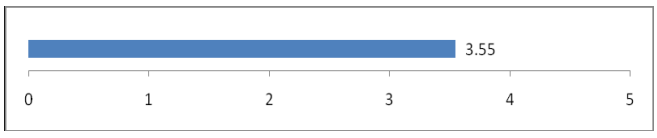
Total average response:



Manufacturer average response:

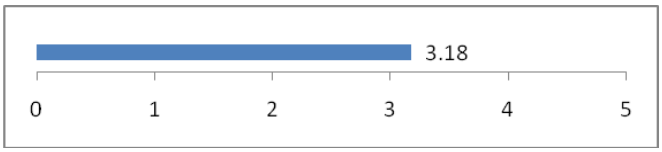


Distributor average response:

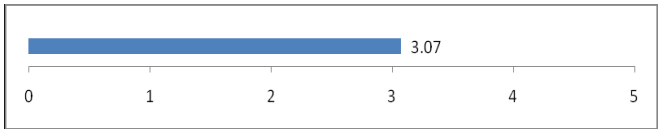


d. Financing access across the value chain

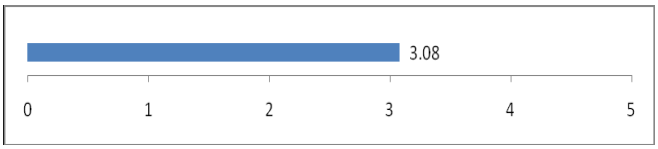
Total average response:



Manufacturer average response:

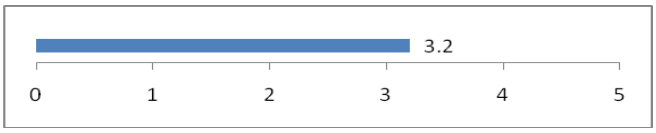


Distributor average response:

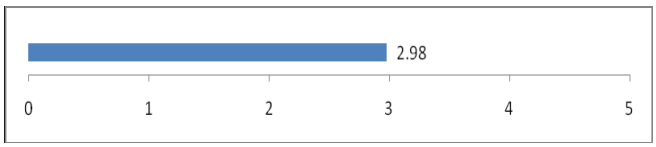


e. <u>Policy and regulation</u>

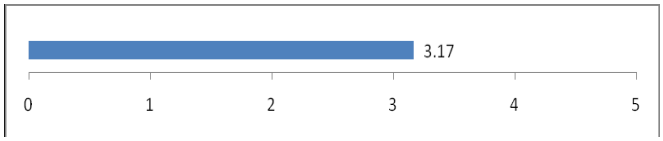
Total average response:



Manufacturer average response:

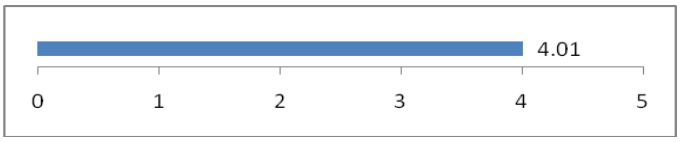


Distributor average response:

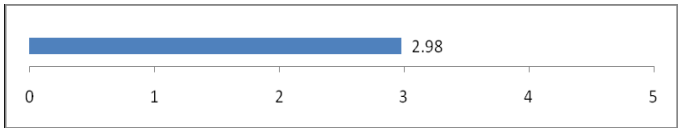


4. Networking and forging partnerships at the conference. To what extent did the conference meet your expectations as a platform for networking and forging partnerships to develop your area of interest?

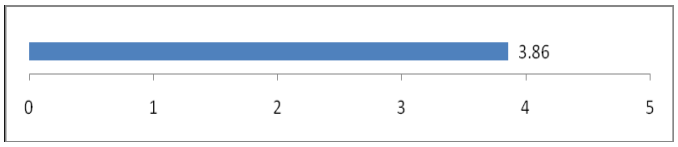
Total average response:



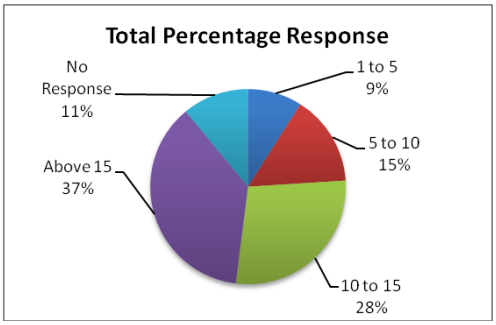
Manufacturer average response:

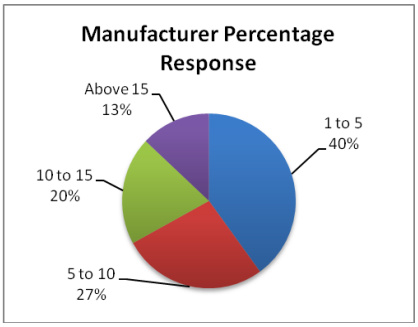


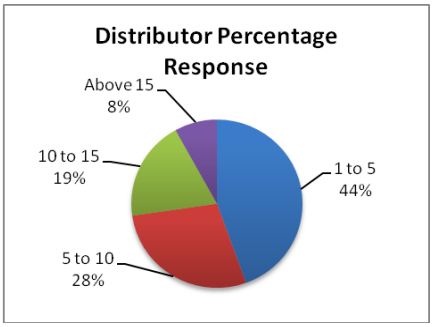
Distributor average response:



5. Manufacturers, Importers, Distributors forging partnerships at the conference. Did you manage to forge any partnerships? Kindly indicate the range of serious leads that you have established to actively pursue:

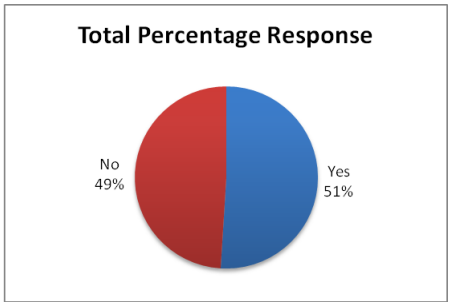


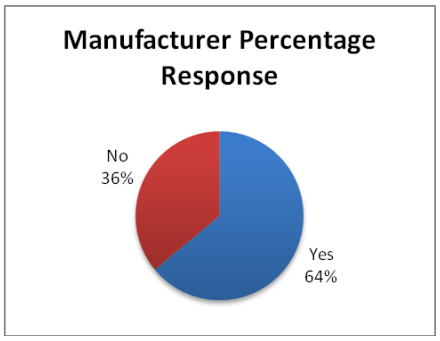


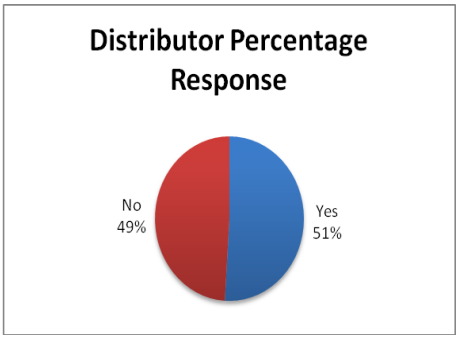


6. Market research reports developed by Lighting Africa.

a. Have you used Lighting Africa Marketing Information or reports?







b. If so, please highlight an example where these reports have contributed significantly to your activities.

- Our company has now entered into a LED lighting business after reading the conference reports.
- New partnership with companies such as NGOs and MFIs in Kenya and other African countries.
- Getting new suppliers, building new partnerships.
- Demand and distribution strategy.
- Obtained sources of solar lighting products at affordable prices to consumers.
- Managed to penetrate rural markets.
- Understanding of LED technology and how to select the best products for the target market; plus pricing issues and how to access the bottom of the pyramid.
- Our program is now able to confidently disseminate information on quality products ranging from US$16 – 50.
- Information on product samples and innovation was useful.
- Finding new sources for solar batteries and LED lights that meet World Bank standards was important.
- Trends analysis; specific analysis on customer needs.
- Decided to modify products to incorporate desired features.
- Technical reports help us develop, train new team members, and validate our assumptions. Market reports help us formalize our strategy on how to enter the market.
- Helping to shape our financing activities.
- Link with other manufacturers and distributors on quality and affordable product access; varied contacts; and guidance on securing finance options.
- Easy ways and links to acquire products and skills, to problem solving in off grid wiring.
- Policy and regulations to counter counterfeit products.
- Useful in preparing marketing briefs.

7. What additional areas would you like to see addressed in a future Lighting Africa Conference?

- Promotion of more local African lighting enterprises.
- Investment awareness meetings and exhibitions by various manufacturers.
- More government policy makers and policy implementers, including at a regional/sub regional level.
- Financing across the value chain.
- Beyond solar, focus on other energy sources for off-grid lighting (micro hydro, wind, biomass, etc.).
- Address environmental issues and social aspects (gender) of off-grid lighting.
- Include a rural site visit and present success stories on how off-grid lighting is improving lives.
- Increase the number of days that the exhibition is open.
- Provide more information on the latest products available and other innovations.
- Provide a list of solar product retailers in Africa to facilitate communication.
- Offer a platform for retailers and other organizations at the grassroots level to present their experiences.
- Impact analysis—what happens after lights are introduced into communities?
- More incisive and aggressive market analysis, especially on the creation of distribution channels.
- Additional support for distributors, helping them make products available to the people.
- Expand conference/program to other regions of the world.
- Make delegate information available prior to the event to facilitate one-on-one meetings.
- More open forum discussions as opposed to power point presentations with Q&A. The value is in the discussion!
- More emphasis on French speaking countries.

8. General comments on the Conference or Lighting Africa activities.

- The conference was educational, well organized/managed, and had good content.
- Speakers were well versed in topic areas and stayed on the agenda and timing.
- Provided a good platform for developing creative marketing strategies and forging partnerships.
- It was a good forum for networking and learning about new products in the market.
- Helped boost business.
- The Conference provided a very important consultation and exchange of research on quality of life intended for the poor. It is also a meeting of senior experts in technology. The approach of the World Bank to require high quality products for the poor is key.
- I was awed by the support the IFC, WB and the various African governments are providing to push the agenda forward.
- I came with many questions and all of them were addressed!
- It is so great to see where we have come in just two years.
- If it were not for Lighting Africa, the continent would still be in the dark.
- Good initiative; lets maintain the momentum.

End of Survey