



this issue

Developing a solar lantern
market in Sub-Saharan Africa

KEY ACHIEVEMENTS

7 million people in Sub-Saharan Africa gained access to *Lighting Africa* products

Awareness campaigns reached more than 22 million people at 1,500 village forums

International Electrotechnical Commission (IEC) approved *Lighting Africa*'s quality assurance framework as an industry standard

Modern lighting product sales grew by 120% in 2012 over previous year

1.3 million solar-powered lighting products sold in 20 African countries since 2007

ESMAP Support Helps *Lighting Africa* Brighten Off-Grid Communities

More than 600 million people in Sub-Saharan Africa are not connected to an electricity grid and must rely on expensive and hazardous fossil fuel-based sources of energy to meet their lighting needs. In 2007, the World Bank and the International Finance Corporation (IFC) launched *Lighting Africa*, a pioneering initiative to develop a commercial market for the manufacture and sale of quality solar lanterns across Sub-Saharan Africa.

In switching from fuel-based to solar lighting, rural populations can improve their health, increase their savings—households typically spend about 10 percent of their income on kerosene—and benefit from better lighting and more productive time in their homes, schools, and businesses. Since its creation, *Lighting Africa* has enabled close to 7 million people in the Democratic Republic of Congo, Ethiopia, Ghana, Kenya, Liberia, Nigeria, Senegal, and Tanzania gain access to renewable alternatives to fossil fuel-based lighting—

an achievement far surpassing the program's original goal of reaching 2.5 million beneficiaries by 2012.

ESMAP has played a key role in this successful outcome by providing US\$750,000 in technical assistance to help design *Lighting Africa*'s conceptual framework and fund the program's implementation. ESMAP assistance—provided through the World Bank's Africa Renewable Energy and Access Program (AFREA)—has also financed a wide range of technical and market development studies that underpin *Lighting Africa* and continue to guide the program today.

The *Lighting Africa* program consists of five main components:

1. Quality Assurance | Establishing quality specifications and developing testing methodologies to promote the manufacture and distribution of quality products

“Anywhere you went in Africa you could find solar lanterns, but they tended to break or lose functionality within weeks of purchase. There was no way a consumer could tell which product to buy because there were no quality assurance standards with which to rate them.”

Dana Rysankova
Senior Energy Specialist
World Bank Africa Region



“The people with the greatest need for reliable, off-grid lighting are the ones hit hardest by faulty products that come with inflated claims. Our job at the lab is to make sure that solar lanterns on the market perform as expected.”

Dr. Michael Gatari
Lighting Africa laboratory
at University of Nairobi

2. Market Intelligence | Informing the design of suitable products for the African market
3. Business Support and Access to Finance | Assisting manufacturers and distributors in achieving their business goals and supporting new business models to deliver low-cost and high-quality off-grid lighting and supporting distributors and consumers to locate potential sources of funding
4. Consumer Education | Generating awareness about and building demand for modern off-grid lighting products
5. Policy and Regulation | Engaging governments to create an enabling policy and regulatory environment and supporting them in integrating modern off-grid lighting in their electrification plans

Dana Rysankova, a Senior Energy Specialist with the World Bank’s Africa Region, said Lighting Africa’s first priority in 2007 was establishing a quality assurance mechanism to differentiate between the numerous brands of solar lanterns that had begun to flood the African market.

“Anywhere you went in Africa you could find solar lanterns, but they tended to break or lose functionality within weeks of purchase,” Ms. Rysankova said. “There was no way a consumer could tell which product to buy because there were no quality assurance standards with which to rate them,” she said.

As such, early ESMAP support to Lighting Africa funded development of a set of quality assurance specifications and testing methodologies with which to measure lantern performance.

The Lighting Global Quality Test Method (LG-QTM) subsequently created by Germany’s Fraunhofer Institute for Solar Energy Systems has since become the cornerstone of Lighting Africa and now serves as a quality benchmark for manufacturers to attain when making solar products—and for consumers to look for when buying them.

In addition, in April 2013 Lighting Africa celebrated the news that its quality assurance framework for solar LED lighting devices had been approved by the International Electrotechnical Commission (IEC) to be the industry standard. The IEC’s new global standard represents an important step that enables governments to harmonize their national standards, thereby paving the way for the further market expansion of Lighting Africa’s quality-assured devices.

The substandard solar lanterns available on the African market have traditionally been plagued with problems such as rapid loss of brightness and short battery life. In contrast, products that meet or exceed LG-QTM specifications guarantee consumers at least four hours of consistent light after a sunny

IMAGES

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day of recharging.

In order for the LG-QTM test methods to be made available to manufacturers serving the African market, ESMAP support helped establish a laboratory at the University of Nairobi—the first of its kind in Africa—where solar lanterns are tested for performance, durability, and manufacturing quality.

Dr. Michael Gatari, who runs the University of Nairobi laboratory, estimated that 70 percent of the solar lamps on the African market are substandard—a problem, he said, that represents "a fundamental development challenge."

"The people with the greatest need for reliable, off-grid lighting are the ones hit hardest by faulty products that come with inflated claims," he said. "Our job at the lab is to make sure that the solar lanterns on the market perform as expected."

Over the past three years, the University of Nairobi laboratory has tested 67 low-power lighting products, more than 40 of which have met or exceeded Lighting Africa's stringent standards and are now available on the African market.

With a turnaround of four to six weeks and a cost of approximately US\$ 750, the facility's screening method is faster and cheaper than other methodologies. At present, the only other laboratories equipped to perform similar tests are in China, Germany, and the United States—and testing at each is considerably more expensive than in Kenya. Tests conducted at the University of Nairobi lab include performance measurements such as total lumen output, daily hours of service provided, lumen maintenance, battery storage capacity, and charging system performance.

As well as developing quality assurance standards and a testing laboratory, Lighting Africa also provides manufacturers and distributors with information that helps them enter—and thrive in—the growing solar lantern market. This includes extensive market

intelligence or product design and customer preferences

"Even though there were many manufacturers making solar lanterns for the African market, they often lacked an understanding of what types of product people in rural Africa really needed," Ms. Rysankova said. "What designs did people like? What features should a lantern have? These are questions that Lighting Africa's research helped to answer."

In 2010, ESMAP support was mobilized to conduct consumer surveys in more than 10,000 off-grid households in Ethiopia, Ghana, Kenya, Tanzania, and Zambia.

The survey looked at how much people were spending on fossil-fueled light sources, the range of solar products that were already available, and asked potential consumers what attributes they would like for a solar lantern to feature. The survey's findings underscored that solar products destined for rural areas had to be rugged and durable enough to withstand the dirt, rain, and dust that often accompany agricultural use. The study's results were summarized and shared with manufacturing companies, businesses, and project developers who were subsequently better able to understand consumer demand, behavior, and preferences.

Lighting Africa also provided solar lantern manufacturers and distributors with a wide range of business support services, including access to finance, feedback with ongoing product research and development, and assistance in making contact with potential business partners. To date, more than 1,900 companies and 2,500 individuals have benefited from these services.

Lighting Africa also launched awareness campaigns to educate consumers about the benefits of solar products and to win-back customers who had bought lamps with exaggerated product claims in the past and were understandably wary of doing so again. These awareness campaigns have to date reached more than 22 million people at 1,500 village forums.



ESMAP support also helped Lighting Africa work with governments to integrate modern, off-grid lighting into their rural electrification programs and to remove regulatory or policy bottlenecks. In Ethiopia, for example, a policy and regulatory study conducted by Lighting Africa led to the government waiving duties on all off-grid lighting products that met or exceeded Lighting Africa's recommended performance targets.

In FY2012, continued ESMAP support helped Lighting Africa programs expand their reach in the Democratic Republic of Congo, Ethiopia, Nigeria, Senegal, and Tanzania. Sales of modern lighting products—most of them solar-powered—grew by 120 percent in 2012 over the previous year, with a total of 1.3 million products sold in 20 African countries since the program's launch.

The success of Lighting Africa in building sustainable markets for cleaner, affordable, and high quality solar lighting has led to its integration into a range of upcoming World Bank programs, including rural electrification schemes in Burkina Faso and Mali.

ESMAP MISSION

The Energy Sector Management Assistance Program (ESMAP) is a global knowledge and technical assistance program administered by the World Bank. It provides analytical and advisory services to low- and middle-income countries to increase their know-how and institutional capacity to achieve environmentally sustainable energy solutions for poverty reduction and economic growth. ESMAP is funded by Australia, Austria, Denmark, Finland, France, Germany, Iceland, Lithuania, the Netherlands, Norway, Sweden, and the United Kingdom, as well as the World Bank.



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 **ESMAP**
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