IFC International Finance Corporation
World Bank Group

LIGHTING ASIA
INDIA PROGRAM
Catalyzing Markets for Off-Grid Lighting

AN INNOVATION OF IFC International Finance Corporation World Bank Group

The opportunity to impact energy

New Delhi, June 5, 2013

Support provided by Italy and the United States

International Finance Corporation

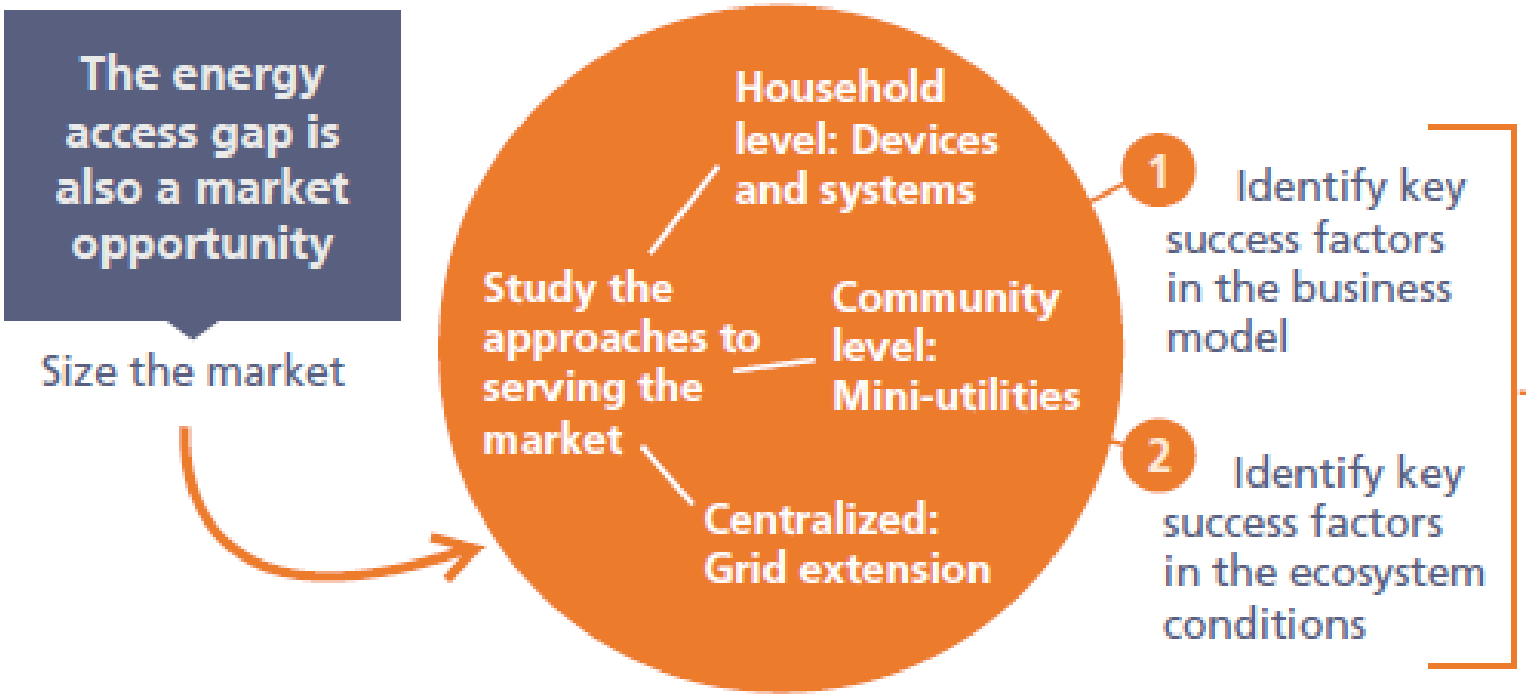
- IFC is a Member of the World Bank Group, established 1956
- Shared Mission: To Promote Economic Development and Reduce Poverty
- Promotes private sector development; our clients are private companies in 179 countries
- Advisory Services and Investment Services (Equity/Quasi-Equity, Long-term Loans, Risk Management)



Low penetration of off grid clean energy technologies: Vast majority is in rural areas and relies on fuels that are inefficient, hazardous and generate pollution

Opportunity for a large scale commercial solution to increase access to modern energy services and serve our Development Objective

The Energy Access Gap: Private Sector View



From investment gap…IEA estimates that it achieving universal energy access by 2030 will cost $48 bn annually… to commercial opportunity: the poor spend $37 bn each year on kerosene for lighting and biomass fuels burned on inefficient stoves

The Program

- What will IFC program include?
- How will it do it?
- What will it achieve?

- Business Support
- Access to Finance
- Quality Assurance
- Market Intelligence
- Knowledge Management



What does it include: Products and Services

Solar and rechargeable lanterns



Integrated device combining small solar panel, batteries, and typically LED lights; sometimes offers limited external charging, e.g., cell phones. Also covers rechargeable lanterns

Solar kits



Plug-and-play system including portable solar panel, batteries, multiple lights, and sockets for running small appliances, e.g., black and white TV, radio

Solar home systems



Fixed installation, typically on rooftop, provides good storage of a few days, can run lights and appliances, e.g., refrigerator, TV, fans

Mini-grids

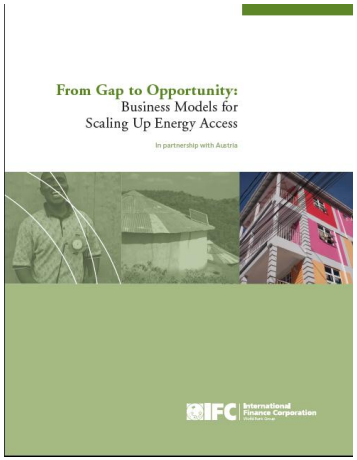


Small generation facilities using diesel, biomass, hydro, wind, or solar with distribution network to a local community

LED luminaries are emerging as an affordable substitute for fuel-based lighting for low income families and small businesses

Business Models Compared

An increasingly dynamic market & active players (IFC surveyed 300+ companies)



ENERGY ACCESS BUSINESS MODELS COMPARED	Solar Lanterns	Solar Home Systems and Solar Kits	Mini-Utilities	Grid Extension
Commercial, enterprise-based (fully or nearly financially-viable; product sales or fee-for-service)	d.Light, India NEST India Greenlight Planet, India Total, West Africa, Indonesia Barefoot Power, India Mosar Baar, India Nuru Energy, Rwanda Samyo, Kenya	Grameen Shakti SHS, Bangladesh Sundaya, Indonesia TataBP, India Dang, Ghana Soluz PV, DR Technosol, Nicaragua SELCO, India	Husk Power India - IFC DESI Power, India VEE, Cambodia PowerSource, Phillippines REPRO, Rwanda Batdaong, Cambodia	CODENSA, Colombia COMASEL, Senegal* North Delhi Power Limited, India Ahmedabad Electricity Company, India
Quasi-Commercial (partially subsidized, using CSR or PPP approach)	Phillips Solar, India Schneider, India TERI, India Osram, Kenya	ONE, Morocco PERMER, Argentina KES, South Africa Nura, South Africa	Bonny Utility Company, Nigeria SEEDS, Sri Lanka CRERAL, Brazil Koraye Kurumba, Mali	ONE-PPP, Morocco CEMAR Brazil Guatemala, Distribution Company PPP
Non-commercial (primarily publicly-funded; Government or donors)	USAID, Afghanistan	Light Haiti, Haiti UNDP/GEF, Botswana World Bank, Ethiopia Pacific Islands	Nepal Community Utilities Community mini-grids Bolivia Practical Action, Peru	South Africa Vietnam China
Number of users connected to t	~10 000	50000+	100 000+	500 000+

Why do we focus on Quality Assurance: How do you know what you are buying?



Quality Assurance

- Variety of system types, prices, and quality levels now available
- Quality assurance is needed to protect buyer interests and avoid market spoiling
- IFC / World Bank Lighting Programs drew on partnerships to establish Quality Assurance Framework with partners (listed)
- IEC has adopted this IFC/WBG QA as a the new global standard for solar off-grid lighting

IEC
SCHATZ ENERGY RESEARCH CENTER
U.S. DEPARTMENT OF ENERGY
GC GLA NAVIGANT
Fraunhofer ISE
giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Newsflash

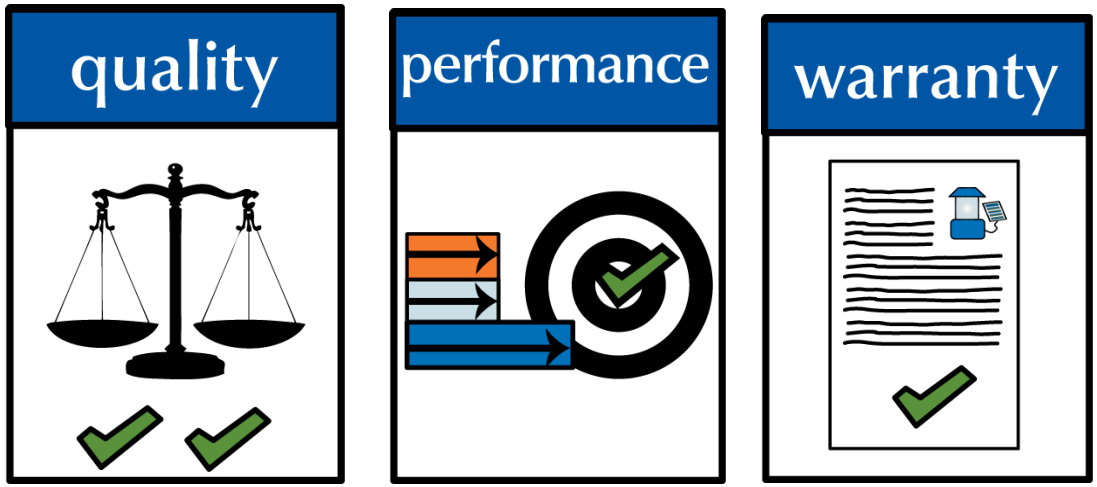
IEC 62257-9-5


82/xxx/CD
COMMITTEE DRAFT (CD)

Title:
Recommendations for small renewable energy and hybrid systems for rural electrification –
Part 9-5: Integrated system – Selection of stand alone lighting kits for rural electrification

Quality Assurance : Testing Labs

- There are six labs globally, recent addition of TERI – first lab to test according to IEC standards in South Asia



Fraunhofer ISE

UNIVERSITY OF NAIROBI

Lighting Research Center Rensselaer

SCHATZ ENERGY RESEARCH CENTER

CERER (Senegal)

teri

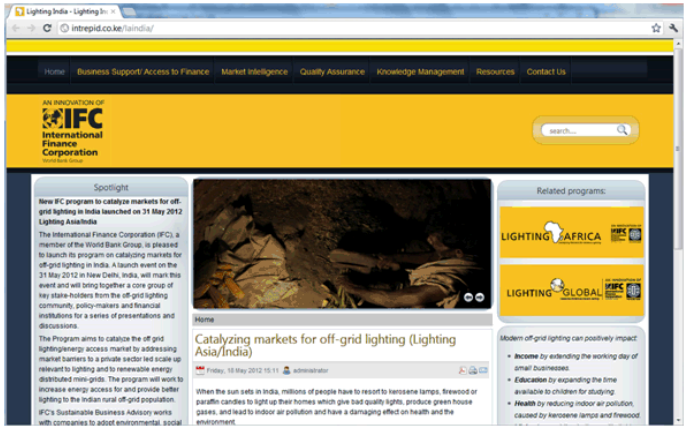
Associate Companies



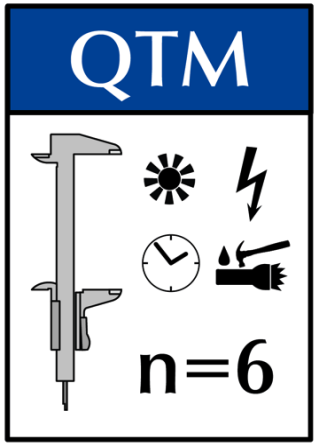
Market Intelligence / Knowledge Management

- Dissemination of market intelligence information
- Consumer awareness campaign
- www.lightingasia.org





Comprehensive testing is the foundation



•Component Tests	•Sampling	• Randomly selected from warehouse or marketplace
	•Photometrics	• Luminous flux (lumens—total output) • Standardized distribution (illuminance)
	•Battery & •Charge Control	• Battery Capacity (Amp-hours, voltage) • Degree of protection (voltage cutoffs)
	•Solar Module	• Power output (Watts) • Current-voltage characteristics (I-V Curve)
•System Tests	•Full Battery Run Time	• Measured using standardized cycle (hours of operation)
	•Solar Charge Run Time	• Modeled estimate (daily hours of operation after solar charging)
	•Physical Ingress & Water Protection	• Incorporates enclosure (IP class) and system-level protection (coatings, etc.)
	•Durability	• ~~Drop test from one meter (pass/fail)~~ • Switch and connector durability • Internal wiring and solder inspection • ~~Lumen Maintenance~~