2ND OFF-GRID ENERGY ACCESS INVESTOR CONFERENCE

17th December, 2014
London
WELCOME

Patrick Walsh, Greenlight Planet/GOGLA BoD
GOGLA’s 47 members (Dec 2014)

Industry Members:

Associate members:
KEY NOTE

Jon Moore, Chief Executive BNEF
Jim Rogers, Former CEO Duke Energy
• An index, report, online tool and data resource on the conditions for clean energy investment in developing countries

• Since 2012, covered 26 Latin American & Caribbean countries

• In 2014, added 19 African and 10 Asian countries, including 25 states/provinces in India and China

• Off-grid focus methodology introduced for 24 countries with lower levels of energy access
CLIMATESCOPE FINDINGS

- East African countries (Tanzania, Kenya and Uganda) leading on energy access and distributed energy

- Value chain: off-grid energy companies in Kenya and Uganda

- Technology enablers: mobile money widespread but not yet used for energy services
JIM ROGERS
FORMER CHAIRMAN, PRESIDENT AND CEO, DUKE ENERGY
BNEF ADVISOR
Off-grid Lighting and Electricity: Market Trends

Koen Peters

December 17th, London
GOGLA Focus: Off-Grid Lighting and Electricity

- Solar Lanterns
- Solar Kits, small Solar Home Systems
- Community and Streetlighting
Why off-grid electricity?

- Much better (healthier, cheaper, cleaner, safer) than conventional technologies
- Least-cost approach to achieving universal energy access by 2030
- Massive demand for electricity service, if offered at appropriate price/investment size
- Fast growing industry: over 100% growth in past years

(c) Lighting Africa
Trends (1): Product Performance

- Across all off-grid lighting products, performance levels have dramatically improved in the past years.
- The product range has grown to emphasize consumer-oriented features and design.
- Evolution of battery technology and prices improve product performance and product range.
Trends (2): beyond light

• Light is increasingly ‘assumed’, customer demand is for add-on functions (from phone charging to fridges)
• IFC Lighting Global: expanding quality standards from lanterns to small solar kits
• Appliances driving demand for off-grid electricity or other way around?
• Market data needed

“All customers come back – but never for the same product”
Trends (3): Pay-as-you-go

- Pay as You Go (PAYG): technological/organizational innovations allowing clients to pay in small installments while controlling risks for suppliers
- Increasing evidence of scalability
- PAYG enabled data-collection may spin-off other players/services
- Shifting balance of power in supply chain?
## Investments: USD 87 million in 2014
(for illustration only – note disclaimers on next slide)

<table>
<thead>
<tr>
<th>Investee</th>
<th>Investors</th>
<th>USD millions</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off Grid:Electric</td>
<td>Solarcity, Vulcan Capital, Zouk, Omidyar</td>
<td>23.00</td>
<td>debt/equity</td>
</tr>
<tr>
<td>M-KOPA</td>
<td>Commercial Bank of Africa, DfID, Shell Foundation, Gates Foundation</td>
<td>20.00</td>
<td>debt+grants</td>
</tr>
<tr>
<td>d-light</td>
<td>DFJ, Omidyar Network, Nexus India Capital, Gray Ghost Ventures, Acumen Fund; the Garage Technology Ventures</td>
<td>11.00</td>
<td>equity</td>
</tr>
<tr>
<td>Mobisol</td>
<td>European Union</td>
<td>7.60</td>
<td>grant (EU)</td>
</tr>
<tr>
<td>Simpa Networks</td>
<td>Various</td>
<td>7.20</td>
<td>debt/equity</td>
</tr>
<tr>
<td>LittleSun</td>
<td>Bloomberg Philanthropy</td>
<td>5.00</td>
<td>debt</td>
</tr>
<tr>
<td>BBOX</td>
<td>Sunfunder, various</td>
<td>2.65</td>
<td>equity and debt</td>
</tr>
<tr>
<td>SunFunder</td>
<td>Koshla Impact, Better Ventures, Schneider Electric</td>
<td>2.50</td>
<td>equity</td>
</tr>
<tr>
<td>Orb Energy</td>
<td>USAID</td>
<td>2.50</td>
<td>loan guarantee</td>
</tr>
<tr>
<td>SolarNow</td>
<td>Novastar Ventures and Acumen</td>
<td>2.00</td>
<td>equity</td>
</tr>
<tr>
<td>SunTransfer Kenya</td>
<td></td>
<td>2.00</td>
<td>debt</td>
</tr>
<tr>
<td>Boond</td>
<td>Opes Impact Fund and Rianta Capital</td>
<td>1.00</td>
<td>equity</td>
</tr>
<tr>
<td>WakaWaka</td>
<td>FMO</td>
<td>0.75</td>
<td>convertible grant</td>
</tr>
<tr>
<td>STM Ethiopia</td>
<td>Niwa + Suntransfer</td>
<td>0.13</td>
<td>equity</td>
</tr>
</tbody>
</table>
Trends (4): Investments

- Investment volume and deal size growing
- Small group of companies received multi-million dollar investments: mostly ‘pay-as-you-go’
- ‘Grant’ component still important, in various forms
- Still limited role for MDBs, local financing

Disclaimers:
- no strict methodology applied, double counting possible
- data not cross-checked and likely incomplete
- no comparable historic data
GOGLA: next steps and priorities

• Market data collection
  ➢ sales, social impacts, investments

• Quality standards and assurance
  ➢ Industry role in future QA system out of IFC
  ➢ Industry views on new standards

• Policy recommendations
  ➢ Industry positions on Public/charity funding for free give aways; VAT; Kerosene subsidies

• Knowledge exchange:
  ➢ 3rd investor conference (18 March, Deutsche Bank/NY)
  ➢ 4th International Off-Grid Lighting Conference and Trade Fair, Dubai, 26-29 October 2015
Thank you for your attention!

For more information, please contact us at:

info@gogla.org
Investing into the Off-Grid Lighting Market

December 2014
Substituting kerosene with SPLs is a USD 2.7 bn market with ~USD 27.3 bn purchasing power freed in addition

Off-grid lighting market spend\(^1\) (in USD bn, 2012)

<table>
<thead>
<tr>
<th>Category</th>
<th>Value (in USD bn)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current kerosene spend</td>
<td>30.0</td>
</tr>
<tr>
<td>Market for SPLs</td>
<td>2.7</td>
</tr>
<tr>
<td>Further potential</td>
<td>0.2</td>
</tr>
<tr>
<td>Freed up capital</td>
<td>27.3</td>
</tr>
</tbody>
</table>

Determined by:
- Number of households (250 mn)
- Average price per solar lantern (USD 25)
- Number of lanterns per household (1.3)
- Lifespan per lantern (3 years)

Freed up capital that can be invested into:
- **Clean energy access**, e.g. SHS for communication and household appliances
- **Social requirements**, e.g. education and health
- **Economic empowerment**, e.g. own businesses, stores

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1. Current Kerosene spend is based on 2012 prices
   Sources: IFC, Lighting Africa, UNEP
We see market potentials for SPL and also larger systems

**SOGLP market potentials**

- **Today**
  - Market volume: USD 0.20 bn

- **Short-term**
  - Potential SPL market: USD 2.71 bn

- **Mid-term**
  - Potential SHS market: USD 6 bn

- **Long-term**
  - Potential SHS + accessories market: USD 50 bn
    - Radio
    - TV
    - Fans
    - Hair dryer etc.

**Source:** Lighting Asia, Energy Practitioner Network, A.T. Kearney,
Today, 97% of the potential SOGLP market are still untapped

**Market penetration**¹
(in % of households)

- **2.8% in Africa 2012**²
  - 110 mn households
  - 4.4 mn lanterns cumulative

- **3.1% in Asia 2011**²
  - 150 mn households
  - 6 mn lanterns and SHS sold

- ~105 mn off grid households
- Expected to rise to 120 mn households and 10 mn SMEs by 2015
- Only 4.4 mn lanterns cumulative sold by the end of 2012

- ~145 mn off grid households
- Only about 6 mn lanterns and small solar home systems cumulative sold by the end of 2011

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¹ Market penetration based on 1.3 solar lanterns per household
² Africa and Asia together represent about 95% of the global off-grid lighting market
Source: Lighting Africa, Lighting Asia, A.T. Kearney,
GOGLA members can address 2.4 bn potential customers today – with further growth potential

**Addressable population**

**World population energy access (2012)**

- **World population**: 7 bn people
- **1.4 bn potential customers without electricity**
- **Another 1 bn potential customers with unstable grids**

*Addressable for GOGLA members*

**Un-electrified population in e.g. Africa (in mn)**

- 698
- 600

Source: Lighting Asia, UN Energy Access Practitioner Network, GOGLA, A.T. Kearney
Like mobile phones, the off-grid population can also afford SOGLP

Affordability of SOGLP in developing countries

Purchasing power for SOGLP is available …

“The demand is huge! People want to live like us, with 10 lamps, outside and inside the house and for their stores”

“Where there is demand, people find a way to get what they want”

The market right now is limited by the supply, not the demand side

Mid-range products (SHS) at USD 60-120 are the fastest growing according to most firms → customers can afford way more than a USD 10 lantern

Companies show up to 480% of sales growth from 2012 to 2013

… as indicated by the penetration with comparably expensive mobile phones

Source: Kantar, IEA, A.T. Kearney, The off-grid lighting market opportunity
We estimate that 45% of off-grid population can afford SOGLP without any financing

Sensitivity of buyers towards consumer financing

Addressable SOGLP market (in % of total)

“If you can establish appropriate user financing, resellers can instantly double their sales”
CEO, manufacturer

“With minor capital restraints removed, our sales could triple”
Finance Manager, Distributor

Our interviews and research show that on average 45% of potential customers are able to purchase off-grid lighting solutions without any financing

To reach the other 55%, appropriate financing mechanisms are needed (e.g. pay-as-you go, mobile payments and modularized systems)

Source: Interviews, A.T. Kearney,
Hence, SPL industry is in hyper growth mode

Global revenues of SPL players
(in USD mn)

Studies and our own research indicate steady and healthy growth rates

Growth is realized through

New customers
- Remains the main focus to increase market penetration and realize full potential

Incremental sales
- Increased household income
- Increased consumer awareness
- Increased access to finance
  ➔ leads to more SPLs per household

Replacements
- Warranties of products already in the market will expire
  ➔ Leads to replacement sales instead of repairs

1. Growth Projections for SPL and SHS sales based on expert interviews
   Source: A.T. Kearney

The off-grid lighting market opportunity
Most companies in this sector are growing profitably

Industry profitability
(in % of interviewed companies)

- 100%
- 40%
- 33%
- 27%

Manufacturers and distributors
Profitable firms
Profitable in <2 years
Not profitable within 2 years

- Rather small companies, still testing their business model → capital needed for expansion
- Also big players that have scaled up enough to realize profits
- Most companies with a proven, profitable business model
- Current lack of profitability due to aggressive growth phase

Firms need capital to reach scale and become profitable

- "We need to scale up"
- "We need to increase our sales"
- "We should just continue our way: the more working capital, the faster"
- "We need to introduce a bigger, more expensive product with a higher margin"
- "We need access to long term growth financing"

Source: A.T. Kearney

1. Interviews and surveys with 30 manufacturers and distributors (December 2013)
The industry has capital requirements of about USD 300 mn short term, USD 7.6 bn longer term

Capital requirements per value chain step\(^1\)
(in USD mn)

- **Today**
  - Manufacturers: 65
  - Transportation: SPL 870
  - Distributors and retailers: 1,900
  - Consumers: SHS 77
  - Consumers: 77

- **SPL**
  - Manufacturers: 1,040
  - Transportation: 1,040
  - Distributors and retailers: 1,800
  - Consumers: 2,300

- **SHS**
  - Manufacturers: 1,300
  - Transportation: 1,300
  - Distributors and retailers: 2,300
  - Consumers: 1,100

- **Total capital requirements**
  - 287
  - 3,908
  - 7,600

1. Capital requirements to be or already satisfied by equity and/or debt, i.e. actual financing demand should be lower than capital requirements

Source: Nia, Lighting Africa, Dalberg Analysis, csimarket.com, A.T. Kearney

- **Need capital for R&D and to pass down good terms to logistics and distributors**
- **Distributors and retailers need to finance upstream and downstream**
- **Huge working capital needs because of long transport and distribution times**
- **About 50% of consumers need to finance their off-grid product in one or the other way**

Needed to realize the market potential

Manufacturers
Transportation
Distributors and retailers
Consumers

Months

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16
Right now, industry players ask especially for working capital

Current examples of industry financing requirements

- **Working capital**
  - A small single-country African distributor needs about USD 250 k in working capital as soon as possible
  - A medium sized design, engineering & manufacturing company needs USD 500 k to 1 mn working capital
  - One of the largest players in the industry that covers the whole value chain needs USD 5 mn working capital

- **Company sales in USD**
  - 0
  - 100,000
  - 500,000
  - 1,000,000
  - 5,000,000
  - 10,000,000

- **R&D**
  - ... and needs further investments of about USD 1 mn only mid term

- **Expand distribution**
  - ... and needs USD 150 to 300 k to finance R&D and capex

- **Consumer finance**
  - ... and has no further capital needs right now, because of an equity raise last year

Source: Expert Interviews, A.T. Kearney
Most industry players are in stages that fit best with impact and venture capital – but relevance of debt financing is growing

Investors along the industry life cycle

1. Given the nature of the industry, these companies are not technology cost intensive, i.e. even at small scale and with a very local focus low, but positive profitability can be achieved at early stages already

Source: A.T. Kearney
Industry players and investors see barriers to finance on the side of their respective counterparts

**Top barriers to finance by stakeholder group**

<table>
<thead>
<tr>
<th>Top 3 barriers stated by the industry</th>
<th>Top 3 barriers stated by investors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No innovative deal/fund structures</strong></td>
<td><strong>Uncertain legal/policy frameworks</strong></td>
</tr>
<tr>
<td><strong>Insufficient knowledge of investors</strong></td>
<td><strong>Limited track record of industry players</strong></td>
</tr>
<tr>
<td><strong>Subcritical deal sizes</strong></td>
<td><strong>Subcritical deal sizes</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Score</th>
<th>Manufacturers and distributors</th>
<th>Investors</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.6</td>
<td>Red</td>
<td>Green</td>
</tr>
<tr>
<td>3.5</td>
<td>Red</td>
<td>Green</td>
</tr>
<tr>
<td>3.4</td>
<td>Red</td>
<td>Green</td>
</tr>
<tr>
<td>3.7</td>
<td>Green</td>
<td>Green</td>
</tr>
<tr>
<td>3.6</td>
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<td>Green</td>
</tr>
<tr>
<td>3.3</td>
<td>Green</td>
<td>Green</td>
</tr>
</tbody>
</table>

Source: Interviews and surveys with 30 manufacturers and distributors (December 2013) and 13 investors (December 2013 - February 2014), Energypedia, A.T. Kearney
INDUSTRY CASE STUDIES AND PRESENTATIONS

Camille van Gestel, WakaWaka
Arnoud de Vroomen, Solar Works
Mansoor Hamayun, BBOXX
WAKA WAKA
share the sun
Product Portfolio
The WakaWaka Virtual Grid

Where: Rwanda
Target: ‘connect’ 9,000 households
       min. activation rate = 65%
Pilot Budget: €1.5M (FMO + private equity)

Down payment: $ 7.50
Instalments: $ 0.75 / week
Payback period: 16 months

Next step: National roll-out
When: 2015 – 2018
Target: 400-800k households
       (20-40% of population)
Overview 2011-14

2011
• R&D

2012
• Q4 go-to market with WakaWaka Light
• R&D
• Cumm. units sold : 35k

2013
• Q2 – introduction WakaWaka Power
• R&D
• Sales : €2.7M (break even)
• Cumm. units sold : 200k
• Launch WakaWaka Foundation

2014
• Q4 – introduction Virtual Grid
• R&D
• Sales : est. €3.5M (break even)
• Cumm. units sold : est. 400k
Tracing impact

WORLDWIDE IMPACT

- WaakaWaka on the map: 131,948
- People impacted: 659,740
- Projects involved: 137
- Countries reached: 33
- Saved on energy expenses per year: 5,595,469
- Tons CO2 displaced per year: 145,671
- Extra hours for work and study per year: 144,483,060

WAKA WAKA
share the sun

waka-waka.com
How is WakaWaka funded?

**Crowdfunding**
• App. €0.9 million in total

**Equity**
• 2.5% at €75k in 2011 (prototype phase)

**Debt**
• 1.8M at av. 4.6% interest
• Av. term 3 years
Growth scenario

Scenario:
Reach 50% of 1.2 bn people by 2030

Revenue (‘000)

- WWL - Western markets
- WWL - Off-Grid markets
- WWP - Western markets
- WWP+ - Western markets
- WWP Virtual Grid - pay as you go
- WW Base - Western markets
- WW Base - Off-grid markets

World: share the sun
Need for Finance

€ 5 M
April 2015

• Stock
• Accounts receivable
• Debt position
• Build team capacity
• Brand awareness
Who are BBOXX and what do we do?

BBOXX offers an **on-grid experience in an off-grid world** powered through a unique financing model to model to sell solar systems to the mass market on a **monthly payment plan**.

BBOXX leads and manages all aspects of its business operations – engineered in London, manufactured in China, followed by distribution to active partners in 14 countries and 30 local shops in Kenya, Rwanda and Uganda.
BBOXX achievements

210,000 lives brightened

- 42,000 products
- Over 1,000,000 Watts of panels installed
- 130 full-time employees
- 30 dedicated BBOXX
- 14 countries active partners distributing
Our product: SMART Solar

BBOXX SMART Solar links customers, equipment, support and payment to raise the standard of solar energy, building a trusted BBOXX brand across all emerging markets.

SMART Solar is a BBOXX energy service that provides remote monitoring and battery battery management to our customers though our solar home systems.
Financing

$ 2.7M

Equity

$ 2.5M

Credit lines


- $1.5M – Line of credit from private impact investor (closed 2014)
- $400K – HSBC Working Capital line (expected Spring 2015)
- $150k – SunFunder consumer asset refinance (closed 2014)
- $300k – Africa Enterprise Challenge Fund Grant and Loan Facility (ongoing until June 2018)

SERIES B INVESTMENT

- First close ~ $1M in October 2014
- Second close ~ $4M in January 2015
The Future

Finance
- **End customer finance** – in order to support greater payment plan numbers.
- **Improved financial structures** – e.g. securitisation

Product
- **Increased product functionality** – to learn more about our customers and provide for all their needs.
- **Greater accessories range** – to provide more modern and demanded products e.g. smart phones.

Service
- **Fantastic customer service and product quality** – reduce repair time, reduce wait time on stock, and increase
- **Training** – continue to implement BBOXX Academy training to all staff to improve business understanding quality.
Join the solar revolution!

www.bboxx.co.uk
info@bboxx.co.uk
solarworks!
POWER BY DESIGN
Table of Contents

1. Background SolarWorks!
2. Products
3. Funding so far
4. Funding needs

There is 1.3 bln people having no access to electricity but another 1 bln having access to intermittent electricity.

Solar is great but where does it leave you in the rainy season?
Background SolarWorks!

2008  Product Development
2009  Set up sales office in South Africa
2010  Strategic cooperation with Lemnis Lighting
       Launch in South Africa
2011  R&D and head office moved to Yes!Delft, the
       incubator of the University of Technology in Delft
2012  Lemnis Lighting bought by NTL Electronics (India)
       Solar Business spun off and continued under SolarWorks!
2013  3 products on the market
       Sales in 7 Countries

Emerging markets are urbanizing rapidly.
Products – Solar Kit

Target group
Anyone with a mobile phone having no or limited access to electricity

Benefits
- At least 8 hours of light on a charge at the highest light level
- Fast charge
- Able to charge from anything between 5-24 Volt
- Charge any phone through usb
Products – Rooflight

Target group
People living in a slum environment having no or limited access to electricity and high risk of theft

Benefits
- Theft-proof
- 10 hrs of light on one charge
- Fast charge
- Fits on any type of roof
Products – Solar Home System

Target group
People living in houses of 30 – 60 m² with no, unreliable or expensive electricity provision

Benefits
- 5 bright white lights
- Intelligence: scans for power input with solar as priority
- Autonomous cycle of about 3 days
- Fast charge
- USB and cigarette lighter plugs
Funding so far

- Stage 1: 2007 – 2008
  Equity funding by founders

- Stage 2: 2010 – 2012
  Equity funding for product and market development as well as working capital

- Stage 3: 2013
  Debt funding for working capital

- Stage 4: 2014
  Equity funding for expansion and additional working capital
Funding needs

- SolarWorks! is expanding
- Funding needs depend on speed of expansion
- Expansion into new regions and new products
- Depending on scenario: 500k-1000k usd in 2015/2016
- About 65% working capital
Thank you

Arnoud de Vroomen

a.devroomen@solar-works.nl
TEA BREAK
INVESTOR CASE STUDIES AND PRESENTATIONS

Vivian Kotun, ResponsAbility
Dirk Muench, Persistent Energy Partners
Rolf Grunwald, DEG Invest
Daniel Firger, Bloomberg Philanthropies
responsAbility Investments AG
Investing in Sustainable Energy

GOGLA, Dec. 17, 2014
Founded in 2003, responsAbility is one of the world’s leading independent asset managers specializing in development investments.

ResponsAbility provides debt and equity investments in emerging economies and sectors such as finance, agriculture, health, education and energy.

Over USD 2.4 billion assets under management, financing 500 companies in 90 countries.

Offices in Switzerland, France, Peru, Kenya, India; counting on 175 employees with longstanding experience and expertise.

Regulated asset manager, managing +10 investment vehicles.

Shareholders and partners include leading Swiss banks and a reinsurance company in addition to management and staff.
Sustainable energy spectrum
Distinctive goals, joint impact

Energy sector development

- Energy access
- Energy efficiency
- Renewable energy

Upcoming global energy access debt fund*

Holding company which builds, owns and operates small-scale renewable energy projects (Africa)

Climate fund mainly providing refinancing to local financial institutions for EE/RE projects; selected direct investments

* Regulatory approval pending; expected Q1 2015
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Persistent Energy Capital

A merchant bank focused on the distributed energy services companies (DESCO) sector

**Team:** Chris Aidun (VC/PE, legal), Dirk Muench (Capital markets, EM) and Peter Adelman (Entrepreneur, engineer)

**Status:** Raising series A for merchant bank
Impact and Return

1. **FINANCIAL RETURN:**
   Generate 30-50% IRR for investors in PEC

2. **IMPACT:**
   Provide off-grid households with *access to modern renewable energy* for *climate neutral socio-economic development.*

**Strategy**

a. **Financial intermediary:**
   - Direct investments of debt and equity
   - Funding
     - Debt/equity placement, asset securitizations
   - M&A

b. **Strategic advisor and consultant to:**
   - DESCO value chain
   - Impact-, financial-, strategic- Investors
Merchant Bank

“Lack of financial intermediaries with a deep industry knowledge and the ability to provide a range of capital from seed to growth are a major barrier to growth”

Investment and Finance Study for Off-Grid Lighting, AT Kearney & GOGLA

• Invest flexibly and with insight in focus sector:
  – Raise equity to invest equity, raise debt to invest debt.
  – Capture value at very early stages

• Generate income
  – Advise companies and investors

• Investors have better liquidity
  – Share value driven by performance of equity investment portfolio, interest income and income from advisory services.
Investments

Current:
- **DEVERGY** Tanzania: Energy service and technology company – owns and operates 10x DC micro-grids. [First commercial and largest investor]
- **FENIX** International: Technology-, asset finance and distribution company – high quality product, PAYG enabled positions the company for fast growth.
- **PEG** Ghana: Asset finance and distribution company – partnership with M-KOPA will enable fast expansion in Ghana and WA. [PEG Ghana was incubated by PEP, PEP is largest investor]

Exited:
- **Off-grid:electric**: Energy service company – provides close to 40,000 households with energy services from range of SHSs.
Forward Focus

• Invest in existing companies along the DESCO value chain.
• Capture opportunities by incubating new businesses in underserved markets.
• Work on all aspects of capital formation around this emerging sector:
  – Equity placements
  – Debt origination
  – Asset securitization
  – Currency risk transfer
About us

• Managed over 40 investments in the energy access sector in 8 countries in sub-Saharan Africa since 2011/12.
• Made 4 investments in early stage high potential companies pursuing the DESCO model in 3 markets
• Advised governments and DFIs for decades on energy access.
• Management combines traditional finance, with emerging market, entrepreneurial and engineering / tech expertise.
DEG – We finance opportunities in future markets

DEG – Deutsche Investitions- und Entwicklungsgesellschaft mbH

GOGLA - Global off grid Lighting Association Conference

DEG at a glance
Facts and Figures 2013

- Established: 1962
- Employees: 500
- Head office: Cologne
- Shareholder: KfW Frankfurt
- Equity: EUR 1.9 billion
- Balance sheet total: EUR 4.8 billion
- New business: EUR 1.5 billion
- Portfolio: EUR 6.8 billion

DEG is a partner for companies investing in emerging markets and developing countries. For more than 50 years, we have been successfully supporting people and markets on the spot.
Principal target Infrastructure sectors

› Power production and distribution: conventional thermal, renewables
  (wind, biomass, hydro, geothermal, solar)
› Telecommunication: mobile, wireless, towers, submarine cables
› Water & waste: treatment, supply, sewage systems, desalination
› Transport: airports, railways, toll roads, harbors
› Oil and gas transmission and distribution
Scope of DEG financings

- Guaranteed loans
- Loans with partial guarantees
- Loans with local security
- Hedged equity participation
- Subordinated loans
- Partially hedged equity participation
- Risk participation

Risks assumed by DEG
Off-Grid – DEG´s perspective

- dedicated Hybrid Electricity Supply
- Mini-Grid
- Solar Home System - in our view the biggest growth potential for the future
Challenges for Solar Home Systems

› quality of equipment

› monitoring individual Solar Systems

› marketing and maintenance network

› access to mobile money

› access to financing
Role of DEG in financing Solar Home Systems

› early stage:
  • financing with up-scaling funds

› development stage:
  • equity finance / subordinated loan

› mature stage:
  • DFI can provide access to local banks, factoring companies, leasing companies for working capital financing preferable in local currency
# Up-Scaling by DEG

## Terms and Conditions

| Objective | Early stage financing of SMEs with innovative business models and high growth potential.  
|           | Full risk sharing by DEG prior to “bankability”.  
|           | Contribution to closing the gap between donor funding and commercial financing |
| Target group | Innovative SMEs in Emerging Markets, with a special focus on Africa. |
| Financial contribution | Up to 50% of the total investment volume (no more than EUR 500,000) as a repayable grant which must be repaid in the event of success of the project.  
|           | DEG’s Up-Scaling program has a total size of EUR 10 million. |
| Requirements | Private sponsors contribute at least 25 % equity.  
|           | A pilot phase has already been completed with proof of concept regarding technology and business model at local level.  
|           | The project shows high growth potential and should be economically viable. |
| Participation | Companies may submit project proposals to DEG at any time. Further documentation can be found at www.deginvest.de. |
Project examples for Up-scaling

› Solar Home System in Tanzania and Ruanda
› Solar Home System in Kenya and Ethiopia
› Solar Home System equipment producer and sales agent, active in Africa and Thailand
Equity capital by DEG
Terms and Conditions

- equity participation in the project company
- minority stake
- voting rights and board seat
- clearly defined exit strategies
Financing combining elements of equity and debt:

› Tailor-made arrangements
› Subordination
› Conversions options
› Risk-oriented yield (equity kicker / EBITDA multiple)
Up-Scaling by DEG

Example: Rural Electrification with Solar Home Systems in East Africa

- Sale of Solar Home Systems in off-grid areas with no access to electricity.
- Through the combination with a cellular mobile modem each individual system can be monitored and controlled via internet.
- Customers pay a monthly installment via M-Pesa (mobile banking).
- Installation of 2000 systems by the end of 2013.
- Goal: By the end of 2018 more than 100,000 systems sold.
- Huge market potential in rural areas – systems are affordable through small monthly installments

DEG investment: EUR 500,000 repayable grant / Up-scaling
Get in touch!

Infrastructure

Rolf Grunwald
Director Infrastructure

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Thank you for your attention!
Bloomberg Philanthropies & Little Sun

BNEF/GOGLA Off-Grid Energy Access Investor Conference

London, UK
17 December 2014
Bloomberg Philanthropies’ Impact Investment

LITTLE SUN, BIG IMPACT

BLOOMBERG PHILANTHROPIES’ IMPACT INVESTMENT IN LITTLE SUN SOLAR LAMPS IS PROVIDING CLEAN AND AFFORDABLE ENERGY TO HOMES, SCHOOLS AND BUSINESSES.

7 out of 10 people in Sub-Saharan Africa lack access to basic electricity.

As a result, most households rely on kerosene for light and spend up to 20% of their total income on kerosene.

Burning kerosene emits dangerous toxins – one hour of burning kerosene is equivalent to smoking 54 cigarettes.

AFRICA NEEDS ALTERNATIVES THAT ARE BOTH ENVIRONMENTALLY AND FINANCIALLY SUSTAINABLE. THAT’S WHERE LITTLE SUN SOLAR-POWERED LAMPS COME IN.

SOLAR-POWERED LITTLE SUN LAMPS:

Last for 2-3 years

Are a work of art designed by Olaflur Eliassen and engineered by Frederik Ottosen.

Provide a sustainable alternative to kerosene, which emits harmful pollutants that are damaging to people’s health and air quality.

Are water-resistant

Are available for purchase online and in select museums and retail stores in the U.S. and Europe.

Are priced affordably for families in Sub-Saharan Africa, while selling in the U.S. and EU at a higher price in order to subsidize sale prices in off-grid communities.

THANKS TO LITTLE SUN, THE 1.6 BILLION PEOPLE WORLDWIDE WITHOUT ACCESS TO ELECTRICITY NOW HAVE AN AFFORDABLE, SUSTAINABLE WAY TO GET LIGHT TO LIVE AND WORK BY.

LITTLESUN.COM
The Little Sun Solar Lamp

- Created by artist Olafur Eliasson and engineer Frederik Ottesen, the Little Sun solar lamp is a work of art that also benefits the environment and public health while supporting sustainable development.

- Last for 2-3 years (currently developing a larger unit with a 5-year battery life, and capacity to charge a cell phone).

- A more affordable, sustainable alternative to kerosene.

- **Specs:**
  - Solar panel: 60 x 60 mm monocrystalline, 0.48 Watt
  - LED: Duris E 5 LED from Osram, runs at 0.5 Watt and emits 40 Lm @ 120 mA
  - Main body: Manufactured in recyclable ABS, highly weather- and UV-resistant
  - Battery:
    - 3 x 1.2V Ni-MH AAA batteries with 600 mA
    - 3 year battery life
    - Time in sun for full charge: 5 hours
    - Hours of light from full charge: 4 hours bright light, 10 hours soft light.
The Little Sun Can be Used in Multiple Ways
The Little Sun Story: a Win-Win-Win

**Smart Social Business**
- Leveraging local entrepreneurship and the economic value proposition to the consumer (significant savings over kerosene) to get the product distributed

**Great Design**
- Attractive enough to sell in the developed world, with retail sales at museums and cultural institutions
- Sales at ~$25-30 USD help subsidize the price in developing markets

**Strong Value Proposition**
- High quality at a low price (subject to low-cost financing and subsidized sales)
- Avoids the “giveaway trap,” i.e. consumers pay because they actually want to use the product
Strong Alignment with Foundation Program Areas

Environment
- Significant CO2 emissions reductions from reduced kerosene use

Public Health
- Significant indoor air quality improvements from reduced kerosene use

Education
- Reliable, affordable light helps students study longer after dark

Art
- Little Sun is the only product in the market designed by an internationally recognized visual artist, and with great connections to arts institutions

Government Innovation
- Market-based, off-grid energy solutions can help governments reach their energy access goals (7/10 people in sub-Saharan Africa don’t have grid access)

Women’s Economic Development / Africa
- Solar light saves households significantly over the cost of kerosene
We considered funding a discrete project with Little Sun to distribute free solar lamps:

- $5M grant
- Grant funding would pay for donation of lamps to schoolchildren in Ethiopia
- $1M per year over 5 years
- $9-10 per lamp would cover lamp costs plus distribution and project management
- Project management and distribution partner needed, likely an NGO or international agency such as UNICEF
- Maximum of 550,000 lamps would be distributed over the life of the project
Bloomberg Philanthropies and Little Sun – A Loan!

We also considered a program-related investment, in the form of a working capital loan, to Little Sun, Inc.:

- $5M total line of credit
- Loan would be dispersed in 4 annual tranches
- Funds to be used to purchase inventories, bridge payment lags in accounts receivables, and to invest in sales channel and new product development
- 100 percent of loan principal to be repaid by borrower
- More than 10,000,000 lamps would be distributed over the life of the project
## Why Did We Choose a Loan Instead of a Grant?

<table>
<thead>
<tr>
<th></th>
<th>Traditional Philanthropic Grant</th>
<th>Partially-Subsidized Loan</th>
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<tbody>
<tr>
<td><strong>Lamps Distributed</strong></td>
<td>~550,000</td>
<td>&gt; 10,000,000</td>
</tr>
<tr>
<td><strong>Carbon Reduction Impact</strong></td>
<td>Low <em>Fewer emissions averted from kerosene combustion</em></td>
<td>High <em>More emissions averted from kerosene combustion</em></td>
</tr>
<tr>
<td><strong>Leverage</strong></td>
<td>None <em>Once lamps are distributed, they are gone for good</em></td>
<td>High <em>With revenue from lamp sales, Little Sun can produce far more</em></td>
</tr>
<tr>
<td><strong>Distribution Cost</strong></td>
<td>High <em>Need to pay an intermediary organization</em></td>
<td>Low <em>Can use local entrepreneurs to sell the product, with no central planning needed</em></td>
</tr>
<tr>
<td><strong>Money Returned</strong></td>
<td>0% <em>No funds returned once grant is fully paid out</em></td>
<td>100% (plus interest) <em>As business becomes more profitable, it can pay for inventory, build reserves, and repay the loan</em></td>
</tr>
<tr>
<td><strong>Waste</strong></td>
<td>High <em>People don’t value what they get for free</em></td>
<td>Low <em>People use and care for what they spend their money on</em></td>
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</table>
Little Sun began distribution in Ethiopia but is rapidly expanding due to the “pull” of significant interest.
PANEL DISCUSSION
Dialogue between Industry and Investors

Moderator: Kostis Tselenis, Quadia

Panelists:
Huashan Wang, Omnivoltaic
Marco Signorini, Solar Way
Pradeep Prusnani, The Shell Foundation
Robert Voskuilen, FMO
Russell Sturm, IFC
Sean Moore, Acumen
Besides leading Lighting Global and Lighting Africa/Asia, how is IFC investing in the industry?
Should the off-grid electrification sector seek closer ties with the mobile telecom industry?
How do you select investees? What is your exit strategy?
How do you finance growth? What funding terms can your business accept?
Should DFIs lead in financing the growth of the off-grid energy sector?
What are the lessons learned about the role of finance in accelerating growth in access to energy?
NETWORKING RECEPTION