



**Action Learning Event
Four Round Tables, a Technical Conference and a Field Visit on**

Upscaling Mini Grids for Least Cost and Timely Access to Electricity Services

“OPERATIONALIZATION”

FAIRMONT THE NORFOLK HOTEL | NAIROBI, KENYA | MAY 23-27, 2016



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, Japan, Lithuania, the Netherlands, Norway, Sweden, Switzerland and the United Kingdom, as well as the World Bank.

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Welcome

It is our great pleasure to announce a learning event that comprises four roundtables, a conference and a field visit on ***Upscaling Mini Grids for Least Cost and Timely Access to Electricity Services***. The event will be held in Nairobi, Kenya 23–27 May 2016.

The event comes at a time when micro and mini grids provide great promise for electrifying large groups of people who never had access to electricity before. The event will host participants from 20 countries most of whom are managers and decision makers of mini grid programs in Africa. While mini grids have a long history and were an integral part of the power sector development of many of the current high income countries, they are only now emerging as a scalable option for meeting the energy demand in Sub-Saharan Africa, South and East Asia and Small Island Developing States. In these areas, according to the IEA, mini grids are a least cost and timely option for more than 120,000 villages and towns.

The event is coordinated by Climate Investment Funds (CIF) and the Energy Sector Management Assistance Program (ESMAP)—through the UK DFID-supported Global Mini Grids Facility. The \$8.3 billion CIF provide scaled-up climate financing to 72 countries to pursue low carbon, climate resilient development. 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 a trust funded program.

In addition to a technical conference, this action learning event hosts three round tables targeting specific stakeholder groups to allow operational experts and decision makers to come together to share and discuss solutions to advance the uptake of mini grids in the rural marketplace. Invited participants will have the opportunity to visit an operational mini grid project in Kenya that brings together many of the key elements to allow for sustainable upscaling.

The event focusses on “**operationalization**” emphasizing problem solving in a timely fashion with and for the participants, addressing the day-to-day challenges many of you are facing in accelerating the upscaling of many mini grids. It will accommodate specific group discussion around programs and markets, as well as several issue centered discussions led by some of the global experts in the field. These issues range from standardized regulations, access to long term financing, and quality assurance framework to buy-in and ownership of the communities served.

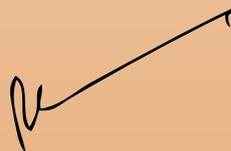
The CIF and ESMAP Organizing Committee is actively engaged with the Government of Kenya and other partners—particularly DFID, AFD, GIZ and USAID—in the preparation of the event and it will be a great honor and pleasure to welcome you to our learning event on Upscaling Mini Grids for Least Cost and Timely Access to Electricity Services.



Mafalda Duarte

Program Manager

Climate Investment Funds



Rohit Khanna

Manager

Energy Sector Management
Assistance Program

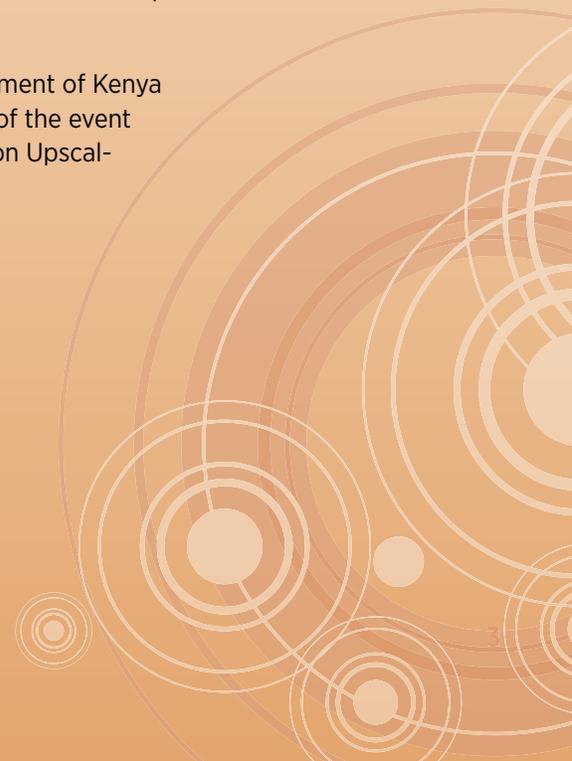




Photo: ©Jim Finucane, 2009

Mini Grid Context in the Global Setting

Mini grids are expected to play a critical role in meeting the Sustainable Energy for All (SE4ALL) goal of universal energy access by 2030. According to IEA, an estimated forty percent of the world's poor live in villages which are typically too far from the grid to be feasibly reached via grid extension in the near term. This is particularly true in Sub-Saharan Africa, where a majority of the population is expected to be in rural areas for the foreseeable future. For these load centers, decentralized mini grids are a practical alternative for a variety of technical and financial reasons. Clean energy mini grids are one of the main High Impact Opportunities within the SE4ALL initiative. They are also a priority in most of the SE4ALL Action Agendas under development in Africa.

In the past, proliferation or acceptance of mini grids as a credible energy access option was constrained by a number of factors: gaps in policies and regulations, a lack of long-term financing, and a lack of capacity or interest among power producers. More recently, technological and institutional innovations, and cost reductions have made mini grids a more attractive option. However, a lack of knowledge and exposure to global best practices continues to create policy and commercial barriers that hold back the expansion of sustainable mini grids. While mini grids have a long history and are widely used in several parts of the world, they are now emerging as a viable option for meeting the energy demand in Sub-Saharan Africa, and South and East Asia.

In response, several initiatives have been launched to address these challenges. In Kenya, a donor coordination working group on mini grids has been established. Recently, a draft brief was presented as a summary of donor activity surrounding mini grids in Kenya, and outlines the guidance required from the Government to efficiently and effectively realize the potential¹ of mini grids to help Kenya reach its electrification targets. The updated brief will be available as input for the round table discussion.

The United Kingdom's Department for International Development (DFID) Green Mini Grids Africa Program (GMGs Africa) has supported three linked projects: GMG investment programs in Tanzania and Kenya; and a Regional Facility to promote GMGs. The regional facility is further divided into three components: (a) the country support packages on policy and regulatory matters led by the Sustainable Energy Fund for Africa (SEFA) team at the African Development Bank; (b) the GMG market development program led by the SE4ALL Africa Hub team at the African Development Bank; and (c) action learning led by the World Bank/ESMAP.

The CIF's Clean Technology Fund (CTF) and the Scaling Up Renewable Energy Program in Low Income Countries (SREP) are supporting the scaled-up demonstration and deployment of renewable energy in middle- and low-income countries. A series of projects supporting clean energy mini grids—based on renewable energy technologies including storage in systems with variable renewables, or RE-diesel hybrid systems—have been approved and are in startup phases, while others are in the pipeline.

ESMAP at the World Bank—leveraging the core funding from DFID—has initiated a Global Facility for Mini Grids to accelerate the pace of electrification to large groups of people. The facility will mainstream least cost mini grids into World Bank Group operations as well as develop the policy- and business-relevant knowledge and data needed to accelerate mini grid deployment. For more information see Annex A.

The objective of this event is to bring these initiatives/programs and related stakeholders together to discuss and isolate two or three issues for each of the stakeholder groups and seek solutions/action plans for these to accelerate the uptake of the mini grid sector for least cost and timely access to electricity services in the different countries. A facilitator ensures that a process of action learning is established and/or continued based on/in follow up to last year's event in Tanzania. Beyond the group specific outcomes, it is envisioned that the overall lessons generated through the event will inform future efforts in the global mini grid sector on how to effectively scale up.

¹A report commissioned by DFID to consulting firm IED estimates that about 23% of the population is best served by mini grids demonstrating a high potential for mini grids in Kenya. A similar, geospatial electrification planning study is currently being undertaken by the MOEP. Results are expected August 2016; these results will provide an updated view on the potential of mini grids.



Mini Grid Context in the Host Country

Approximately two thirds of the Kenyan population lives in the Southern belt, extending from east to west, and are within reach of the national grid. However, the northern portions from the east to the west are sparsely populated. They will be expensive to interconnect to the national grid. Kenya has established mini grids, initially diesel-based mini grids and more recently has integrated wind and solar generation into these mini grids. The Kenya off-grid program to electrify remote centers has been running since the early 1980s.

Currently, there are twenty-one mini grid stations,² nineteen of which are owned by the Rural Electrification Authority (REA) and managed by Kenya Power (KP). The other two stations (Garissa and Lamu) are owned and managed by Kenya Electricity Generating Company (KenGen). The total installed capacity for these mini grids is 24.8MW comprising of 23.7MW thermal, 0.55MW wind and 0.569MW solar.³ Of the stations operated by KenGen, Lamu was recently connected to the national grid, and Garissa will be soon connected to the grid as well. Other smaller mini grids are community owned and operated; the private sector and civil society have installed at least a dozen wind/solar/micro hydro/hybrid mini grids.⁴

According to a recent study,⁵ there are 11 mini grid sites currently under construction by REA. The Rural Electrification Master Plan of 2009 and the SREP project document for mini grids of 2013 also identified another 42 potential sites for mini grid development. A report commissioned by DFID to consulting firm IED estimates that about 23% of the population is most economically served by mini grids, indicating a significant potential for mini grids in Kenya. A similar, geospatial electrification planning study is currently being undertaken by the Ministry of Energy and Petroleum (MoEP). Their results, expected in August 2016, will provide an updated view on the potential of mini grids. The Kenya SE4ALL Action Agenda identifies as one of the priority actions the need for the development of a mini grid policy and programme.⁶

The Kenya donor coordination working group on energy access and mini grids has prepared a working paper. The paper is underpinned by the recent and ongoing studies performed by DFID and Agence Française de Développement (AFD) and isolates the following issues to be addressed in follow up activities: (a) Licensing/Permitting; (b) Power purchase agreements; (c) Retail electricity tariffs; (d) Grid extension and mini grid transfer; (e) Concessions and grid connection; and (f) County government collaboration framework.

Several initiatives with private investments have been launched including Powerhive, an energy solutions provider for emerging markets announced that it has closed a \$20M Series A financing round. This will support Powerhive's expansion into new markets in Africa and the Asia-Pacific, as well as continued growth in Kenya where the company has operated rural microgrids since 2012. The financing round comes on the heels of an announcement a month earlier that Powerhive received an \$11M equity investment in the company's flagship project, which will serve approximately 90,000 people in western Kenya. At its existing microgrids, Powerhive's electricity service supports the use of productive equipment and vital community services such as health clinics and schools. Powerhive was the first private firm to be licensed to distribute energy by the Kenyan Energy Regulatory Commission (ERC), and also recently received approval for their tariff.

²Most are diesel-based while some are hybrids with solar and wind.

³KPLC Annual Report and Financial Statements, Year End 30 June 2015.

⁴Sustainable Energy for All (SE4ALL) Kenya Action Agenda, January 2016.

⁵Lamu is now connected to the grid through a 220kV line from Rabai (Mombasa), while the 132kV line Kindaruma-Mwingi-Garissa line is under construction.

⁶Sustainable Energy for All (SE4ALL) Kenya Action Agenda, January 2016.



Detailed Program and Agenda

FAIRMONT THE NORFOLK HOTEL | HARRY THUKU ROAD | TINGA 2 ROOM | NAIROBI, KENYA

Round Table: Green Mini Grids Africa (BY INVITATION ONLY)

TIME	DAY 1 MONDAY MAY 23	
07:30	Registration (coffee and pastries offered)	Parallel Session
08:00	Welcome and Introductions <ul style="list-style-type: none"> • Engineer Isaac Kiva, Director of Renewable Energy at the Ministry of Energy and Petroleum • Mr. Mac Cosgrove-Davies, Global Lead Energy Access, World Bank 	
08:30	Green Mini Grids Africa Program Overview: Status and Issues <ul style="list-style-type: none"> • Mr. Steven Hunt, Senior Energy Innovation Advisor, DFID-UK, • 10m Interventions by Experts, Facilitator 	HOMER Training Introduction
10:00	Coffee Break	
10:15	GMG Tanzania: Status and Issues <ul style="list-style-type: none"> • Mrs. Leanne Jones, DFID-TZ • 10m Interventions by Experts, Facilitator • Dr. Richard Hosier, Task Team Leader, Tanzania Energy, World Bank • Mr. Estomih Sawe, Exec. Director, TaTEDO GMG Kenya: Status and Issues <ul style="list-style-type: none"> • Mrs. Sabita Thapa, DFID-KE • 10m Interventions by Experts, Facilitator 	
12:30	Lunch	
14:00	Green Mini Grid Market Development Program (GMG MDP) and GMG Country Programs: Status and Issues <ul style="list-style-type: none"> • Mr. Joao Cunha, SEFA Coordinator, AfDB • Dr. Daniel Schroth, SE4ALL Africa Hub Coordinator, AfDB • Mr. Jeff Felten, GMG MDP Program Officer, AfDB • 10m Interventions by Experts, Facilitator Knowledge Development and Learning: Status and Issues <ul style="list-style-type: none"> • Mr. Jon Exel, Lead for Global Facility on Mini Grids, World Bank • 10m Interventions by Experts, Facilitator • Mr. Timothy Young, Program Coordinator, Practical Action 	HOMER Training Advanced

16:00	Coffee Break
16:15	Bringing Together Objectives and Results Across the Program, and Evaluation <ul style="list-style-type: none"> • Mr. Steven Hunt, Senior Energy Innovation Advisor, DFID-UK
16:45	Consolidation and Summary <ul style="list-style-type: none"> • Mr. Steven Hunt, Senior Energy Innovation Advisor, DFID-UK

Round Table: SREP Countries (BY INVITATION ONLY)

FAIRMONT THE NORFOLK HOTEL | HARRY THUKU ROAD | TINGA 2 ROOM | NAIROBI, KENYA

TIME	DAY 2 TUESDAY MAY 24	
08:30	Registration for SREP Country Round Table	Parallel Session
09:00	Welcome and Introductions <ul style="list-style-type: none"> • Mrs. Dana Rysankova, Sr. Energy Specialist, World Bank • [SREP Focal Point], Manager, SREP Focal Point, Country Welcome, Brief Overview of SREP Support to Mini Grids <ul style="list-style-type: none"> • Mrs. Shaanti Kapila, Senior Knowledge Management Officer Administrative Unit, Climate Investment Funds • Mr. Rafael Ben, Energy Specialist, Climate Investment Funds Tour de Table Introductions of SREP Countries	
09:30	Regulatory Frameworks (Country-Specific Issues) Framing the Issue <ul style="list-style-type: none"> • Mr. Henry Vanderpuye, Access Manager, Ghana Energy Development and Access Project, Ministry of Power, Ghana • Dr. Chris Greacen Discussion Among Participants <ul style="list-style-type: none"> • Facilitator 	HOMER Training Introduction
10:15	What Happens When the Grid Arrives? Framing the Issue <ul style="list-style-type: none"> • Mr. Morris Kayitare, Director of Primary Energy and Social Energies, Energy Development Corporation Ltd., Rwanda • Mr. Serge Khalife • Mr. Ashish Shrestha Discussion Among Participants <ul style="list-style-type: none"> • Facilitator 	
11:00	Coffee Break	
11:15	Building the Ecosystem for Mini Grid Markets: Strengthening Local Capacity Among Stakeholders Framing the Issue <ul style="list-style-type: none"> • Mr. Tim Young, Program Coordinator, Practical Action Discussion Among Participants <ul style="list-style-type: none"> • Facilitator 	

12:00	<p>Discussion on Solutions: What Can SERP, MDBs and This Group Do to Tackle These Issues?</p> <ul style="list-style-type: none"> • Facilitator <p>Summary and Closing</p> <ul style="list-style-type: none"> • Mrs. Shaanti Kapila • Mr. Rafael Ben
13:00	<p>Lunch</p>
<p>Round Table Kenya Mini Grid Sector Ballroom Open to <u>all</u> participants</p>	
13:30	<p>Registration for Kenya Round Table</p>
14:00	<p>Kenya Overview</p> <ul style="list-style-type: none"> • Mr. Joseph Njoroge, Principal Secretary State Department of Energy, Ministry of Energy and Petroleum <p>The Market and Some Facts</p> <ul style="list-style-type: none"> • Dr. Peter Lilienthal, CEO, HOMER • Mr. Murefu Barasa, Managing Partner, EED Advisory Limited <p>Private Sector Experiences</p> <ul style="list-style-type: none"> • Mr. Christopher Hornor, Founder and CEO, Powerhive • Mr. Sam Slaughter, Co-Founder & MD, Powergen • Dr. Sam DUBY, CTO, Steamaco • Eng. James N. Mwangi, Chair/Energy, KEPSA <p>Financiers</p> <ul style="list-style-type: none"> • Mr. Arthur Honore, Program Officer—Energy & Climate Change, French Development Agency • Mrs. Jasmin Fraatz, Manager, GIZ <p>Q&A participants, Facilitator</p> <p>Consolidation</p> <ul style="list-style-type: none"> • Mr. Joseph Njoroge, Permanent Secretary State Department of Energy, Ministry of Energy and Petroleum
15:00	<p>Coffee Break</p>
15:15	<p>Solutions</p> <p>4 Global Experts Inputs</p> <p>Regulations</p> <ul style="list-style-type: none"> • Dr. Chris Greacen, Mini Grid and Regulatory Specialist, Thailand <p>Pricing and Subsidies</p> <ul style="list-style-type: none"> • Mr. Peter Lilienthal, CEO, HOMER <p>Pace of Implementation</p> <ul style="list-style-type: none"> • Mr. Ashish Shrestha, Mini Grid Specialist, Nepal <p>Interconnection</p> <ul style="list-style-type: none"> • Mr. Dan Waddle, Sr. VP, NRECA International <p>Q&A, Facilitator</p>
16:45	<p>Consolidation and Roadmap, Facilitator</p> <p>Summary and Closing</p> <ul style="list-style-type: none"> • Mrs. Ruth Kagia, Senior Adviser in the Office of the President of Kenya

Technical Conference (Open to all participants)

FAIRMONT THE NORFOLK HOTEL | HARRY THUKU ROAD | BALLROOM | NAIROBI, KENYA

TIME	DAY 3 WEDNESDAY MAY 25
07:30	Registration
08:00	Welcome and Introductions <ul style="list-style-type: none">• Hon. Charles Keter, Cabinet Secretary, Ministry of Energy and Petroleum• Mrs. Diariétou Gaye, World Bank Country Director for Kenya• Mr. Francesco Catucci, Head of Mini Grid, Enel Green Power
08:30	Press and Photos
9:00	Introduction, Facilitator Workable Regulations <ul style="list-style-type: none">• Dr. Chris Greacen, Mini Grid and Regulatory Specialist, Thailand Pricing and Subsidies <ul style="list-style-type: none">• Dr. Peter Lilienthal, CEO, HOMER Subsidy Delivery <ul style="list-style-type: none">• Dr. Subodh Mathur, Economist Concessions <ul style="list-style-type: none">• Mr. Richard Hosier, Sr. Energy Specialist, World Bank Productive Uses <ul style="list-style-type: none">• Mr. Tim Young, Program Coordinator, Practical Action Q&A, Facilitator
10:00	Coffee Break
10:15	Breakout Sessions, Facilitator Standardized Regulations —Led by Dr. Chris Greacen Pricing and Subsidies —Led by Dr. Peter Lilienthal Subsidy Delivery —Led by Dr. Subodh Mathur Concessions —Led by Dr. Richard Hosier Productive Uses —Led by Mr. Tim Young Reporting Back, Participants Global Experts Feedback Summary, Facilitator
12:30	Lunch
14:00	Pace of Implementation <ul style="list-style-type: none">• Mr. Ashish Shrestha, Mini Grid Specialist, Nepal Interconnection & Technical Specifications <ul style="list-style-type: none">• Mr. Serge Khalife & Dr. Dan Waddle, NRECA Quality Assurance Framework <ul style="list-style-type: none">• Dr. Chris Greacen, NREL Community Participation and Training <ul style="list-style-type: none">• Mrs. Lakshmi Iyer, Digital Green Training Center and Capacity Building <ul style="list-style-type: none">• Dr. Vijay Modi Q&A, Facilitator

15:30	Coffee Break
15:45	Breakout Sessions, Facilitator Pace of Implementation —Led by Mr. Ashish Shrestha Interconnection —Led by Mr. Serge Khalife & Dr. Dan Waddle Technical Specifications & Quality Assurance Framework —Led by Dr. Chris Greacen Community Participation —Led by Mrs. Lakshmi Iyer Training Center & Capacity Building —Led by Dr. Vijay Modi Reporting Back, Participants Global Experts Feedback, Facilitator
16:45	Consolidation and Summary —Led by Lucio Monari, Practice Manager, Africa Energy
17:30	Reception

Field Visit: SteamaCo, Remote-Controlled Mini Grids

FAIRMONT THE NORFOLK HOTEL | HARRY THUKU ROAD | FIELD VISIT | NAIROBI, KENYA

TIME	DAY 4 THURSDAY MAY 26
07:30	Meet for Departure
08:00	Bus Ride to Entasopia
11:00	Lunch
12:00	Field Visit
15:00	Observations Global Experts Feedback Summary
16:00	Bus Ride
19:00	Back to Hotel

TIME	DAY 4 THURSDAY MAY 26
16:00–17:30	Center of Excellence for Mini Grid Operations—Led by Dr. Vijay Modi
	Parallel Session

Round Table: Private Sector

FAIRMONT THE NORFOLK HOTEL | HARRY THUKU ROAD | TINGA 2 ROOM | NAIROBI, KENYA

TIME	DAY 4 FRIDAY MAY 27		
07:30	Registration (coffee and pastries offered)		Parallel Session
08:00	Welcome and Introductions <ul style="list-style-type: none"> • Mr. Malcolm Cosgrove-Davies, Global Lead on Energy Access, World Bank • Cliff Owiti, Kenya Renewable Energy Associate, KEREA • Ryan Fetterly, SteamaCo 		
8:30	Market Overview Discussion Interventions from Experts <ul style="list-style-type: none"> • Francesco Catucci, Enel • Rui Filipe Marques, EDP/ABB • Kamal Gupta, Schneider Electric • Alberto Rodriguez, TTA • Sam Slaughter, PowerGen • Rik Wuts, Powerhive • Trevor DeVris, Canadian Solar Isolating Issues		
10:30	Coffee Break		
11:00	Discussion on Solutions 5m Interventions from Experts Consolidation and Roadmap 5m Interventions from Experts Summary and Closing		
12:30	Lunch		
13:30	Registration for New Developments Round Table (Open to all Participants)	Parallel Session	Parallel Session
14:00	Welcome and Introductions		
14:30	Interventions from Experts RISE/MTF <ul style="list-style-type: none"> • Mrs. Dana Rysankova, Sr. Energy Specialist, World Bank Power Africa <ul style="list-style-type: none"> • Katrina Pielli, Senior Policy Advisor GOGLA <ul style="list-style-type: none"> • Koen Peters, Executive Director Husk Power <ul style="list-style-type: none"> • Adedotun Eyinade, Director/Business Development IDCOL <ul style="list-style-type: none"> • Syeeda Yeasmeen Meer, Investment Officer SNVWORLD <ul style="list-style-type: none"> • Chandi Mutubuki-Makuyana, Senior Advisor 	HOMER Training Session II Advanced (14:00–17:30)	Club ER Round Table
16:45	Consolidation and Summary		

ANNEX A: PROGRAM DESCRIPTIONS

Initiative/Program 1 | Green Mini Grids Africa—The DFID-funded program

This program aims to help transform the Green Mini Grids (GMG) sector in Africa from a nascent and sporadic series of pilot projects, to a thriving industry on track to contribute the IEA's estimated 40% of universal electricity access by 2030. This will be achieved by creating a critical mass of experience and evidence of GMGs success in two leading countries, coupled with improved policy and market conditions for investment in mini grids regionally.

The UK has committed a total of £75m to support the development of clean energy mini grids in Africa. This includes support to mini grid investment and deployment in Kenya and Tanzania, along with a wider regional preparation and support facility run by the African Development Bank, and an Action Learning Facility run by the World Bank/ESMAP.

The DFID program provides for an annual opportunity for different parts of the program to come together to learn from each other's experiences, ensure coherence, and work on joint issues so as to maximize impact on the GMG sector as a whole. The Action Learning and Exchange (ALE) group, comprising the respective DFID leads, implementation partner leads and leading partner government counterparts will be the primary participants of the event. However, it will also include a select number of leading market participants and sector experts to provide feedback and challenge, as well as connect the GMGs Africa projects into wider efforts in the sector, including the SE4ALL Clean Energy Mini Grids High Impact Opportunity, SREP and other initiatives.

Initiative/Program 2 | Clean Energy Mini Grids—SREP

Both of the major energy sector Climate Investment Funds (CIFs)—the Clean Technologies Fund (CTF) and the Scaling-Up Renewable Energy in Low Income Countries (SREP) Program—are supporting the scaled-up demonstration and deployment of renewable energy in middle- and low-income countries. Clean energy mini grids (CEMGs)—based on renewable energy (RE) technologies (including storage in systems with variable renewables) or RE-diesel hybrid systems—are one potentially promising option for delivering reliable energy in a sustainable manner.

While some initiatives are also ongoing within CTF, mini grids are of particular interest to SREP countries. The SREP has allocated more than \$140 million to mini grid projects identified through country investment plans in 13 countries (out of 27 SREP countries), representing a relevant and strategic part of the SREP portfolio, with strong ownership from countries. An additional \$55 million has been allocated to mini grid projects through the CTF Dedicated Private Sector Program on Renewable Energy Mini Grids and Distributed Power Generation.

Initiative/Program 3 | Global Facility on Mini Grids—ESMAP

ESMAP at the World Bank—with core funding from DFID and committed funds from Danida—initiated a Global Facility for Mini Grids to accelerate the pace of electrification to large groups of people by mainstreaming least cost mini grids into World Bank Group operations as well as develop the global and local knowledge associated to achieve this. While mini grids have a long history and are widely used around the world, they are now emerging as a viable option for meeting the energy demand in Sub-Saharan Africa and South and East Asia. Mini grids are the expected least-cost option for more than 120,000 villages and towns in these regions. The initiative is part of the joint effort on the SE4ALL High Impact Opportunity on Mini Grids. The Global Facility for Mini Grids (GFMG) has two pillars:

- GFMG Pillar 1: Accelerate the pace of electrification for large groups of people by working together with operational task teams and clients to mainstream least cost mini grids into World Bank Group operations and national electrification programs. Where possible, these mini grids will be powered by renewable energy.
- GFMG Pillar 2: Develop the required knowledge to assist in achieving the first objective and contribute to the frontiers of global knowledge development and learning. This development will look at the experience of mini grid projects worldwide.

ANNEX B: FIELD VISIT BACKGROUND INFORMATION, STEAMACO, ENTASOPIA

Winner case study summary SteamaCo, Kenya



Solar PV power station for the Entasopia micro-grid, Kenya



"I've started a hairdressing salon now that I have power for a hair dryer." Nancy, Entasopia

Ashden Award for Business Innovation, supported by Citi

Supported by



remote

monitoring and payment



25

micro-grids managed



businesses

started because of electricity

"SteamaCo's innovative product is helping to take energy access in off-grid rural areas to the next level. By developing hardware and cloud-based software to remotely monitor energy use and payments, it has overcome one of the key barriers to making micro-grids investable."

Ashden judging panel

The challenge

1.5 billion people don't have electricity. On paper, independent renewable-powered grids can make economic sense for providing affordable power, and with investment these could rapidly bring electricity to many more people. But the favourable economics can easily be overturned unless the micro-grid works reliably and customers pay regularly. Both of these are challenging in remote areas.

SteamaCo's approach

The founders of SteamaCo know first-hand the challenges of running microgrids. They therefore developed a system to manage the monitoring, control and payments remotely.

SteamaCo's hardware, which micro-

"Without tools like SteamaCo, micro-grids would not be possible, commercially."

Sara Slaughter, co-founder, PowerGen renewables

grid owners purchase and install in their power station, monitors and controls the supply to each customer. It talks to SteamaCo's web-based software, regularly sending data, like power use, and receiving data, like mobile-money payments. The software, which is leased by micro-grid owners, processes data and provides a dashboard for them to see the performance of their systems. For reliability, all data transfer is by SMS.

SteamaCo systems currently manage 25 micro-grids supplying renewable power (80 kW total) to about 1,000 homes and small businesses in Kenya

and Tanzania. Other systems manage different technologies, including a water grid in Nepal.

Micro-grid electricity powers homes, and enables businesses like electrical repair and hairdressing to start. With a SteamaCo system, payment is easy and flexible for users.

The SteamaCo system helps owners to keep track of the technical and financial performance of micro-grids. Real-time information, from the whole grid down to the individual user, means that problems can be identified early, and performance optimised.

Why they won

The 2015 Ashden Award to SteamaCo recognises how its founders have built an innovative technology-based business that removes a barrier to investment in micro-grids.

SteamaCo profile

For-profit business
US\$290k income 2014, 46% from sales
12 staff



info@ashden.org
www.ashden.org/winners/SteamaCo15
Disclaimer last updated May 2015

Harrison Leat, CEO
harrison@steama.co
www.steama.co

ANNEX C: HOMER[®] PRO TRAINING

Dr. Peter Lilienthal, the CEO of HOMER Energy and the original developer of NREL's HOMER software, will conduct an in-person training workshop in the HOMER Pro software. The workshop will consist of two half-day sessions and be offered twice during the week of May 23–27.

The first half-day sessions will be an introduction to HOMER covering the fundamental concepts of the HOMER software. Participants will leave with an understanding of the interface and modular design. They will also work simple modeling projects from beginning to end and interpret the results. Participants will learn how HOMER calculates the technical feasibility, economic value, and other metrics of different designs through its powerful sensitivity analyses and its ability to simulate and optimize thousands of system designs in minutes.

The second half-day sessions will cover advanced topics in wind, solar, large systems with multiple generators, small 100% renewable systems, and waterpumping applications. This will include modeling multiple solar arrays, using the maximum power point tracker and dedicated inverter, understanding wind data and turbine models, and understanding HOMER's approach to operating reserves. The introductory workshop is a prerequisite for this advanced workshop.

ANNEX D: SPEAKERS AND MODERATORS' BIOS



Murefu Barasa,
Managing Partner at EED Advisory Limited

Murefu is the Managing Partner at EED Advisory Limited, a boutique consulting firm with service offerings in the energy and environment sector. He is an experienced renewable energy and energy access consultant having led engagements for several clients including the World Bank Group, UN agencies, UK Department for International Development (DfID), Government of Kenya (Ministry of Energy and Petroleum), Government of Tanzania (Ministry of Energy and Minerals) and Government of Rwanda (Ministry of Infrastructure). Among other assignments, he supported the World Bank Group design of a US\$5-million 5-year program in Tanzania (SREP) to support private investments in mini grids and is currently part of a team supporting the *Agence Française de Développement* (AFD) and the Department for International Development (DfID) to develop a £30-million project to support mini grids in Kenya. He previously worked for Practical Action—Nairobi, Camco Clean Energy—Nairobi and for the African Development Bank—Tunis. Murefu holds a BSc in Environmental Studies from Kenyatta University (Kenya) and a Masters in Environmental Science from Yale University (USA).



Rafael Ben,
Energy Specialist, Climate Investment Funds

Rafael (Rafa) is an Energy Specialist for the Scaling-up of Renewable Energy Program (SREP). He joins us from the World Bank Energy and Extractives Global Practice where he worked as a consultant on renewable energy projects (mostly CSP and geothermal), in MENA, Africa and LAC. He was also part of the IFC Advisory Services Clean Energy team, analyzing the portfolio of renewable captive power projects. Prior joining the World Bank, Rafa held different positions in the public and private sectors, among them, bioethanol project manager at Acciona, renewable energy engineer at the Spanish Institute for Aerospace Technology (focused on hydrogen and fuel cells), and business development manager for the European market at the Chinese wind turbine manufacturer Sinovel.

Rafael is a Spanish national. He holds a Chemical Engineering degree and a Masters on Renewable Energy and Energy Markets.



Francesco Catucci,
Head of Mini Grid, Enel Green Power

Francesco graduated cum laude in Electrical Engineering at the Polytechnic University of Bari, Italy. He began his professional career designing and overseeing construction of manufacturing plants in Italy, East Europe and North Africa. Francesco joined Enel in 2008 in the Nuclear Technical Area where he was involved in the design and construction of two reactors in Slovakia.

In 2012 he was appointed CEO's Business Assistant at Enel Green Power North America having the responsibility to manage company-wide strategic programs.

In 2014, Francesco became responsible for overseeing North American operations and performance improvement for a portfolio of 2GW renewable plants. In January 2016, he was appointed head of Mini Grid for Enel Green Power with the responsibility of defining, developing and implementing mini-utility business models for the electrification of areas with no access or poor access to electricity.



**Malcolm Cosgrove-Davies (Mac),
Global Lead for Energy Access, World Bank**

Mac is a US National who started with the World Bank in 1992 as a contract employee for the Asia Alternative Energy Unit (ASTAE) focusing on rural and renewable energy in South and East Asia. He formally joined the Bank in 1999 as a Sr. Energy Specialist. Mac has worked in the Africa region for nearly ten years, and returned to South Asia for about three years before serving as Energy Practice Manager in LAC for three years. He is currently the Bank's Global Lead for Energy Access.

Mac's career includes deep experience across the energy sector, including team leadership and supporting roles covering grid and off-grid energy access, small and large renewable energy, energy sector reform/restructuring, emergency power, hydropower, thermal power and transmission. His passion for the energy access agenda has been nurtured throughout his career, including highlights such as the Sri Lanka Energy Services Delivery Project, Lao Rural Electrification Project, and Uganda Energy for Rural Transformation Program. In his current role he seeks to lead the World Bank's Energy Practice in expanding and further leveraging its energy access work, including building effective and impactful links within and outside the institution.



**Jon Exel,
Lead for Global Facility on Mini Grids, World Bank**

Jon leads ESMAP's Global Facility on Mini Grids. The facility's objective is to mainstream least cost mini grids into operations as well as develop the knowledge to achieve this. Jon also task manages the energy access for the urban poor program.

Jon has over two decades of experience in energy access and alternative energy sector. He previously worked with the World Bank (1998 to 2004) on renewable energy operations in Asia and Africa. Jon has also worked with private investors, national governments, NGOs, and started the first registered mini-hydro development company under the new energy policy and regulations in Croatia.

He has worked with diesel, solar, hydro, wind and biomass based energy systems. His experience is in the delivery of energy services to large groups of end users and revolves around business delivery models; business plans; (pre-) investment plans; market intelligence; and how institutions and businesses deliver these services.

Jon has lived and worked in Liberia, Indonesia, Bosnia and Herzegovina, East Jerusalem, and Cambodia. Jon is a Dutch national and holds Masters in Energy Engineering and Business Administration.



**Jasmin Fraatz,
Manager, GIZ**

Jasmin has more than 8 years of global working experience in the renewable energy sector, predominantly in East Africa. She currently manages the energy portfolio of the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH in Kenya. One of the many objectives of the energy portfolio is to improve the access to electricity in remote areas with the participation of the private sector. As an energy expert, Jasmin builds on a strong background on off-grid electrification, energy policy advisory, and business development. She has set a priority on developing innovative concept in the field of renewable energies with high impact on the rural population and viability for the private sector. The focus is on simple solutions with world-wide replication potential. Jasmin holds a Master in Economics and a MBA with focus on renewable energies.



**Dr. Chris Greacen,
Mini Grid and Regulatory Specialist, Thailand**

Chris works on policy and hands-on implementation of renewable energy from village to government levels. As co-director of the non-profit organization Palang Thai, he helped draft Thailand's Very Small Power Producer (VSPP) policies and conduct studies in support of the country's feed-in tariff program. As a World Bank consultant, he helped develop the off-grid component of Myanmar's National Electrification Program. From 2008 to 2014 he worked as a World Bank consultant assisting the Tanzanian Energy Water Utilities Regulatory Authority (EWURA) developing the regulatory framework for Tanzania's Small Power Producer (SPP) program. He has worked on renewable energy mini grid projects in Thailand, Cambodia, Vanuatu, Micronesia, India, and North Korea. Chris has a Ph.D. in Energy and Resources from the University of California at Berkeley, where his doctoral dissertation focused on community-scale micro-hydropower projects in Thailand.



Kamal Gupta

Kamal has over 24 years of experience with mostly MNC's in Power Electronics and Renewable Energy. His experience includes technology transfer and absorption in three organizations; global sourcing and procurement of components products and their integration; create alternates, contract manufacturing as strategic management tool; business development in channel and institutional for domestic and global markets; and cost effective approach for entire function to beat the competitions heat; renewable energy business in all aspects like solar, wind, and energy storage.



Arthur Honore, Program Officer—Energy & Climate Change, French Development Agency

Arthur is a Programme Officer at the French Development Agency. He is based in the AFD Nairobi office and is in charge of the daily follow-up of AFD portfolio in the energy sector in Kenya. AFD has developed a long time partnership with the Kenyan authorities in the sector and has already committed more than 800 MEUR. It is supporting the Kenyan electricity sector across the overall value chain: geothermal drilling, generation through renewable energies, transmission and interconnections, distribution, access and demand side management. AFD is active in the access sector through a wide range of activities, from past rural and urban electrification programs to the recently approved 120 MEUR contribution (90MEUR from AFD, 30 MEUR grant from the Africa Infrastructure Trust Fund of the EU) to the Last Mile Connectivity initiative promoted by the GoK. In the mini grid sector, AFD will finance the hybridization of Kenya Power's mini grids and is about to roll-out in Kenya a 30 ME initiative funded by the UK Government to support private sector investment in mini grids. Arthur joined AFD in 2006 and was in the energy team at AFD headquarters in Paris before joining the Kenya office.



Dr. Richard Hosier, Sr. Energy Specialist, World Bank

Richard (Dick) is a Senior Energy Specialist in the Africa Energy of the World Bank (GEE07). He served from 2008 to 2013 as a Senior Climate Change Specialist in the Bank's Environment unit and from 2004–2008, he served as the Team Leader for Climate and Chemicals at the Global Environment Facility (GEF) Secretariat. Prior to 2004, he spent over ten years as the Principal Technical Adviser on Climate Change for the United Nations Development Program's GEF Unit, based in New York. Previously, he served as a Senior Research Fellow of the Stockholm Environment Institute based in Dar Es Salaam, Tanzania (1989–1993); an Assistant Professor of Energy Management and Policy and International Development and Appropriate Technology at the University of Pennsylvania in Philadelphia (1985–1993); and as a Research Fellow and Project Manager for the Beijer Institute of the Royal Swedish Academy of Sciences based in Nairobi, Kenya; Harare, Zimbabwe; and Stockholm, Sweden (1980–1985). Dick has worked in over 50 developing countries and published more than 30 refereed journal articles; 50 scientific papers; and four book-length research monographs all focusing on energy for development, natural resource management and climate change. He holds a PhD in Geography from Clark University in Worcester, Massachusetts.



Steven Hunt, Senior Energy Innovation Advisor, DFID-UK

Steven is a Senior Energy Innovation Advisor at the UK Department for International Development. At DFID he co-ordinated the development of Results-Based Financing for Low Carbon Energy Access (RBF) and Green Mini Grids Africa, amongst other policy and programme initiatives. Steven is a former chair of the SE4ALL Clean Energy Mini Grids High Impact Opportunity, and plays a focal point role in DFID in this sector. Steven is also Senior Technical Advisor to the Energy Africa campaign, which seeks to support household solar market acceleration in Africa. His previous experience comes from the energy, technology consulting and NGO sectors.



Lakshmi Iyer, Ethiopia Country Director for Digital Green

Lakshmi is the Ethiopia Country Director for Digital Green, and is based in Addis Ababa. She has an MA degree from Cornell University in International Agriculture and Rural Development with a focus on agricultural extension services for smallholder farmers. Prior to receiving her MA, Lakshmi moved to India to design development focused programs, where she established the Grassroots Development Laboratory working with Piramal Foundation, aiming to design scalable, low-cost solutions for rural communities. Lakshmi has worked for various organizations implementing agriculture-related value chain activities in multiple countries in Eastern Europe as well as East and West Africa.



**Leanne Jones,
Climate and Environment Advisor, DFID-UK**

Leanne is a Climate and Environment Adviser at the UK’s Department for International Development, leading DFID Tanzania’s work in the energy sector, with a focus on energy access. Prior to her recent relocation to Dar, Leanne was leading work in DFID’s Research and Evidence Division on innovation in climate and environment products, business models and enabling environments. Life before DFID consisted of advisory work for manufacturing companies, undertaking carbon and water footprinting, and on policy development for emissions trading. Leanne is one of the international judges of the Ashden Awards for Sustainable Energy.



**Ruth Kagia,
Senior Adviser in the Office of the President of Kenya**

Ruth is a Senior Adviser in the Office of the President of Kenya. She is an education and human development expert, advising R4D on its education portfolio. Recently retired from a distinguished 22 year career at the World Bank, she most recently served as Country Director for Southern Africa, where she managed the Bank’s portfolio in South Africa, Botswana, Namibia, Lesotho and Swaziland. She has also served as Global Education Director, where she worked extensively on Millennium Development Goals issues and led the establishment of the Education for All Fast Track Initiative. Prior to her work at the Bank, Ruth worked for more than ten years with the Kenyan government on in education, research and management. She holds degrees from the University of Nairobi and Harvard University.



**Shaanti Kapila,
Senior Knowledge Management Officer, Administrative Unit, Climate Investment Funds**

Shaanti is a Senior Knowledge Management Officer within the Climate Investment Funds (CIF) Administrative Unit where she develops and implements knowledge and learning activities across the CIF programs. Before joining the CIF, Shaanti worked at the Asian Development Bank where she supported the development of investment and advisory activities related to energy access. Prior to that Shaanti worked at the Center for Development Finance in Chennai, India where she led the center’s action research agenda on renewable energy and environmental issues. She has a Master’s degree in International Relations from Yale University.



**Hon. Charles Keter, M.G.H.,
Cabinet Secretary, Ministry of Energy and Petroleum**

Hon. Charles Keter is the Cabinet Secretary, Ministry of Energy and Petroleum. Prior to his appointment, Hon. Keter was the Senator for Kericho County and Deputy Leader of Majority in Senate.

During his 13-year career in politics, Hon. Keter was also the Assistant Minister for Energy and Member of Parliament for Belgut constituency, which was rated the best in (CDF) Constituency Development Fund Management in the year 2012.

His political career was preceded by nine years of experience in the Telecommunications sector, with expertise in IT, systems analysis and anti-fraud.

Hon. Keter holds a Global Executive MBA from the United States International University (USIU)—Africa and a Bachelor’s Degree in Double Maths from Kenyatta University.



**Serge Khalife,
NRECA**

Mr. Serge Khalife has electric utility development experience in the Middle East, Africa and the Caribbean. He has implemented numerous electrical infrastructure improvements and management systems streamlining projects. Mr. Khalife also has experience in interconnecting various type of distributed generation (DG) systems, including utility scale, grid interactive photovoltaic systems. His expertise include, DG project evaluation, DG impact and feasibility studies on the grid, and performing electric distribution engineering and design. In addition, Mr. Khalife has experience in implementing company-wide programs such as Outage Management System, GIS Based Management and Design Systems, Emergency Load Shed Plans, and Customer Management Systems. More recently Mr. Khalife has been working on electrification planning using GIS and conventional tools and integrating new technologies in the field data gathering.”



**Eng. Isaac N Kiva, OGW,
Director of Renewable Energy at the Ministry of Energy and Petroleum**

Isaac is currently the Director of Renewable Energy at the Ministry of Energy and Petroleum. He has wide experience in public sector management, having worked in energy and senior Government positions for over 20 years. Isaac holds a Bachelor of Science degree in electrical engineering from University of Nairobi. He is a registered member of the Institution of Engineers of Kenya. He is a board member of Kenya Power.



**Dr. Peter Lilienthal,
CEO, HOMER**

Peter is the CEO of HOMER Energy. Since 1993, he has been the developer of the National Renewable Energy Laboratory's HOMER® hybrid power optimization software, which has been used by over 150,000 energy practitioners in 193 countries. NREL has licensed HOMER Energy to be the sole world-wide commercialization licensee to distribute and enhance the HOMER model.

Peter was the Senior Economist with International Programs at NREL from 1990–2007. He was the lead analyst and one of the creators of NREL's Village Power Programs. Peter earned a Ph.D. in Management Science and Engineering from Stanford University. He has been active in the field of renewable energy and energy efficiency since 1978. This has included designing and teaching courses at the university level, project development of independent power projects, and consulting to industry and regulators. His expertise is in the economic and financial analysis of renewable and micro-grid projects.



**Subodh C. Mathur,
Economist, Associate Professor American University**

Subodh is an economist. He possesses strong conceptual and quantitative skills, and wide-ranging international and U.S. policy and operational experience. He has been a consultant to the World Bank on rural and renewable energy since 1992, helping to design path-leading projects. Subodh's work has focused on Sub-Saharan Africa and Asia, where he has extensively travelled rural areas.



**Syeeda Yeasmeen Meer,
Assistant Manager, Renewable Energy, IDCOL**

Syeeda was born in Dhaka, Bangladesh. She has completed Masters in Business Administration from the Institute of Business Administration, University of Dhaka with a major in Finance. She later joined the Infrastructure Development Company Limited (IDCOL) as an Investment Officer, Renewable Energy on August 2012. Currently, she is working as an Assistant Manager, Renewable Energy in IDCOL. Syeeda is involved in Solar Irrigation Program, Solar Mini Grid projects, Bio-electricity Generation Projects financed by IDCOL.



**Emma Miller,
Shell Foundation**

Emma joined the Shell Foundation in 2015. She works on the Access to Energy portfolio, with a specific focus on rural utilities. She is also developing Shell Foundation's strategy in China.

Emma has a BA in International Economics, an MSc in Economics and Finance. She spent three years working in Finance within the Shell Group before joining Shell Foundation. Previously she worked at Qualcomm Ventures. Later she worked in a few London tech start-ups to gain a better understanding of the start-up industry.



**Lucio Monari,
Sector Manager for Africa Energy**

Lucio has been Sector Manager for Africa Energy group since September 2011. In this capacity, he oversees a portfolio of about 25 lending operations for about US\$7 billion ranging from guarantee to private sector projects to renewable development projects, utility reforms and investment financing. Prior to joining the Africa Region, Mr. Monari worked in the Latin America and South Asia regions of the World Bank on several energy projects related to sector reform, energy access and renewable energy. In addition, Lucio has also led Analytical and Advisory Activities and has published several reports on various power sector aspects, including subsidies and impacts of reforms. He has worked extensively in Pakistan, India, Bangladesh, Sri Lanka, Dominican Republic, Honduras, Argentina, Uruguay and other countries in the Latin America region. Prior to joining the World Bank, he worked in the international negotiations department responsible for the acquisition of concession contracts of AGIP SPA, the national oil company. Mr. Monari holds a degree in Economics from the University of Bergamo and an MBA from the Scuola Mattei in Milan, Italy.



**Catherine Morris,
Senior Mediator, CBI**

Catherine brings over 30 years of experience in energy and environmental policy, regulation and stakeholder engagement to her role of Senior Mediator at CBI. Catherine has designed, convened, and mediated/facilitated stakeholder forums and negotiations on a broad range of energy and environmental topics. She recently designed and led the stakeholder process for a 3-year, first-of-its kind electricity transmission planning effort for the Eastern U.S. She also designed and facilitated a joint fact-finding on the role of nuclear power in the U.S., which has been used in university curriculums and cited by the media to define the intersection of industry, consumer advocates, regulators and environmental groups on the safety, waste management and economics of nuclear power. Catherine helps stakeholders across diverse organizations and sectors to develop and implement more effective agreements by relying on credible experts and analysis to support their joint learning and negotiations.

Catherine joins CBI after working for 10 years with The Keystone Center, and before that as a state utility regulator, a writer for The Electricity Journal, and a policy analyst with a number of energy and environmental organizations including the U.S. EPA, the Center for Clean Air Policy, Environmental Law Institute and IES, an energy engineering firm. Catherine is listed on the roster of conflict resolution professionals of the U.S. Institute for Environmental Conflict Resolution. She works out of CBI's Washington, D.C. office.



**Chandirekera Sarah Mutubuki-Makuyana,
Senior Advisor, Renewable Energy, SNV**

Chandirekera (Chandi) is a renewable energy expert with multi-country project design, coordination and management experience (Malawi, Mozambique, Zambia, Zimbabwe and Kenya). Her experience in renewable energy covers micro hydro, solar, biogas and mini grids. She is also an expert in designing and developing financing, business, economic strategies and models for ensuring sustainability of decentralized renewable energy service delivery to isolated communities. Under her coordination, eight micro hydro schemes were installed and rehabilitated in Zimbabwe, Malawi and Mozambique, with a design capacity to generate 195kW and one solar mini grid with design capacity of 100kW in Gwanda, Zimbabwe. She is a recognized energy expert who has presented papers at various technical conferences in the world including chairing a pre-conference workshop on Potential for Ocean Energy in Southern Africa by Clean Power Conference. One of her projects, E-Mindset received an award from the Global Energy Awards. In 2012 she was appointed a member of the Conference Advisory Committee and also of the Conference Paper Reviewing Committee of the Clean Power Conference. Chandi is the author of The Tariff Calculator, a viability model which has been tested in micro hydro schemes and solar grid schemes in Zimbabwe, Malawi and Mozambique.



**Dr. Eng. Joseph Njoroge,
Principal Secretary State Department of Energy, Ministry of Energy and Petroleum**

Joseph was appointed to his current position of Principal Secretary in the Ministry of Energy and Petroleum in May 2013 and became the PS in the State Department for Energy following reorganization of government in December 2016. He has wide experience in power engineering and management. Prior to his appointment as PS he was the Managing Director of Kenya Power. Dr. Eng. Njoroge holds a Bachelor of Science degree in electrical engineering and Master of Business Administration with a major in strategic management. He is a Chartered Electrical Engineer, a member of the Institution of Engineering and Technology, UK, a Registered Consulting Engineer, and is also a Fellow of the Institution of Engineers of Kenya. He is also Chairman of the MBA Chapter of University of Nairobi Alumni Association. He holds a PhD from University of Nairobi's School of Business



**Alberto Rodriguez,
Head of Africa Projects, TTA**

Alberto is head of Africa Projects, Trama TecnoAmbiental. Alberto holds a multidisciplinary double MSc degree in Engineering and Management of Energy and Environment (ME3) from Ecole de Mines de Nantes (France), Kungliga Tekniska Hogskolan (Sweden) and Madrid Polytechnic University (Spain).

Alberto has over 5 years of experience in engineering solar energy systems and managing and implementing solar PV projects in Africa and Europe. He currently heads the African operations of TTA, with a particular focus on East and West Africa. Alberto has worked in the off-grid electrification field in Kenya and East Africa for over three years, carrying out several technical studies and surveys for GIZ, AFD and the World Bank. He is currently leading the implementation of 8 privately owned and operated mini grids in Burundi and Tanzania.

Alberto specializes in solar PV-hybrid mini grids and hybridization of brown fields. He is interested in economically sustainable models for mini grids and is passionate about decentralized energy and community empowerment through energy.



**Dana Rysankova,
Sr. Energy Specialist, World Bank**

Dana is a senior energy specialist at the World Bank. For the past 15 years, Dana has been spearheading projects in a number of Latin American and African countries, including Bolivia, Brazil, Honduras, Haiti, Kenya, Tanzania, and Guinea, as well as regional programs like Lighting Africa. Her focus is energy access and distributed renewable energy. Currently, Dana Rysankova covers energy access issues in the Energy Sector Management Assistance Program (ESMAP) at the World Bank. She also leads a global initiative for developing a multi-tier framework for tracking energy access in the context of SE4ALL.



**Estomih N. Sawe,
Executive Director, TaTEDO**

Estomih has been working since 1997 for the TaTEDO (a Centre for Sustainable Modern Energy Initiatives in Tanzania) as an Executive Director. He has a Bsc. (India) and MSc. (USA) in Engineering and several specialized certificates and diploma trainings in sustainable modern energy technologies, practices, management and policy related issues. He has over 20 years experience in Renewable/Rural Energy combining extensive experience working with Government, University (IRA), consultancy firms and renewable energy non-governmental organizations. Estomih has wide experience in rural/renewable energy studies, projects development, planning, field implementation, enterprise and institutional development, energy policy analysis, management systems development, rural energy demand assessments, community mobilization and participatory planning and implementation methods. He has been involved in the formulation of the 1992 Tanzania energy policy and the review of the 2003 national energy policy.



**Dr. Daniel Schroth,
SE4ALL Africa Hub Coordinator, AfDB**

Daniel is the coordinator of the Sustainable Energy for All (SE4ALL) Africa Hub hosted by the AfDB in the Energy, Environment and Climate Change Department in partnership with the AU, NEPAD and UNDP. Daniel also coordinates *in-ter alia* the Africa Climate Technology and Finance Center project, the Bank's engagement in the EU-Africa Infrastructure Trust Fund and the Secretariat to the African Energy Leaders Group. Daniel has extensive experience in energy policy. Prior to joining the AfDB, he worked for several years for the European Commission in both headquarters and the field, for the European Bank for Reconstruction and Development (EBRD) and in the private sector. Daniel holds a Ph.D. and Masters in International Relations with a focus on international energy policy from the University of Cambridge, and business degrees from Reims Management School and the European School of Business Reutlingen.



**Ashish Shrestha,
Mini Grid Specialist, Nepal**

Ashish is the World Bank's Focal Point in Nepal for the Scaling-Up Renewable Energy in Low Income Countries Program (SREP). He coordinates both the large biogas and mini grid projects and also supports preparation of the SREP Investment Plan for Bangladesh. In addition to his analytic work on decentralized energy access in Nepal, he also coordinates the Bank's regional initiative on the mitigation of short-lived climate pollution in South Asia. He was previously a researcher with the World Bank's Development Economics Research Group focusing his research on the nexus of clean energy and climate change, including bio-energy and forest carbon, as well as sustainable transportation. Ashish holds an M.A. in Sustainable International Development from Brandeis University and a B.A. in Economics from Hamilton College.



**Sam Slaughter,
Co-Founder and CEO of PowerGen Renewable Energy**

Sam is co-founder and CEO of PowerGen Renewable Energy, a solar project implementer and micro-grid developer in East Africa. PowerGen has built several hundred kW-scale solar power systems throughout seven regional countries in the past five years, including over 30 solar micro-grids. Sam is a graduate of Harvard University's School of Engineering and Applied Sciences.



**Dr. Bernard Tenebaum,
Energy and Regulatory Consultant**

Bernard (Bernie) is an independent energy and regulatory consultant. He has served as lead advisor to the World Bank on power sector reform and regulation projects in Brazil, China, India, Mozambique, Tanzania and Nigeria. He is a co-author (with Chris Greacen, Tilak Siyambalapitya and James Knuckles) of the World Bank book *From The Bottom Up: Using Small Power Producers to Promote Electrification and Renewable Energy in Africa*. Prior to joining the World Bank in 2000, he served as the Associate Director of the Office of Economic Policy at the U.S. Federal Energy Regulatory Commission. He is an author/co-author of *Regulation by Contract: A New Way to Privatize Electricity Distribution?*; *Governance and Regulation of Power Pools and System Operators: An International Comparison*; *Electrification and Regulation: Principles and a Model Law*; and *A Handbook for Evaluating Infrastructure Regulatory Systems*. Bernie is a member of the editorial board of the International Journal of Regulation and Governance. He is a Phi Beta Kappa graduate of Colgate University and received his Ph. D. in economics from the University of California, Berkeley.



**Dr. Sabita Thapa,
DFID-KE**

Sabita is the Climate Change and Natural Resources Adviser at DFID Kenya. She primarily works in climate change, energy, forestry and water sectors.



**Dr. Daniel Waddle,
Senior Vice President of NRECA International**

Daniel is the Senior Vice President of NRECA International. He has worked on rural energy and rural electrification issues for more than 35 years. Daniel is currently managing a portfolio of rural electrification and utility efficiency program activities in Latin America, Africa, and Central and South Asia that focus on low-cost expansion of access to electricity through establishing and strengthening rural electric utilities using conventional grid extension and off-grid energy solutions. His technical expertise includes specialization in biomass power conversion; small hydro-electric system design and analysis; solar photovoltaic system and program design; electric power system design and analysis; and, agricultural processing systems. Daniel has also led multiple efforts to design and implement national rural electrification programs and projects; geographic information system design and analysis; electric distribution utility performance benchmarking; and, electric utility management improvements.



**Timothy Young,
Program Coordinator**

Tim has over 25 years of experience in technology and development. He has worked for the past 5 years at Practical Action where he supports the energy access teams in Africa, South Asia, and Latin America to develop programs and projects that test new approaches to achieve universal energy access for off-grid communities. In 2014 Tim coordinated Practical Action's winning bid for the largest energy access contract with the EC, which will see four solar mini grids powering irrigation schemes, local businesses, schools and clinics.

Tim's previous roles include Project Management in the Philippines and two years as a Development Consultant in Sri Lanka local and international emergency response and development NGOs. Tim has a degree in mechanical engineering from the University of Bristol and an MSc in Agricultural Development from Wye College, University of London

List of Participants and Final Presentations

The final list of participants and all available presentations will be posted online after the event has concluded.

Please visit our webpage at: <http://www.esmap.org/node/56884>

GLOBAL FACILITY ON MINI GRIDS

A lack of knowledge and exposure to proven practices available around the world continues to create regulatory, commercial, and implementation barriers that hold back the expansion of sustainable mini grids. In response, the Energy Sector Management Assistance Program (ESMAP) initiated a Global Facility on Mini Grids to accelerate the pace of electrification to large groups of people by upscaling least-cost mini grids into World Bank Group operations, as well as develop the knowledge associated to achieve this.

Focusing on Sub-Saharan Africa, South and East Asia, and Small Island Developing States, the Global Facility has two main focus areas:

Pillar 1 | Operational Upscaling. Under this pillar, the facility supports activities to mainstream least-cost mini grids into World Bank Group operations. Where possible, these mini grids will be powered by renewable energy.

Pillar 2 | Global Knowledge Development and Learning. Under this pillar, the facility supports activities to develop the required knowledge to assist in achieving the first objective. This development will look at the experience of mini grid projects worldwide and dissemination proven practices through partnerships, including the Clean Energy Mini Grids High Impact Opportunity of the SE4ALL initiative.

The Global Facility is designed to complement a range of programs being implemented in the area of clean energy mini grids by other development agencies. In particular, the Facility constitutes the knowledge management component of the Green Mini Grid Market Development Programme program supported by DFID in Africa with other implementing partners, such as the African Development Bank and the Rural Energy Agencies of Kenya and Tanzania.

Knowledge outputs under the Facility will directly benefit client governments by informing their policies and programs to attract private sector investment for clean energy mini grids. Such outputs (i.e., research studies, case studies, and guidance notes, will also be used by World Bank operational teams and partners, and will be widely disseminated through events organized by the Facility and through SE4ALL's Clean Energy Mini Grids High Impact Opportunity.

PROGRAM AT A GLANCE MAY 23-27
FAIRMONT THE NORFOLK HOTEL | HARRY THUKU ROAD | NAIROBI, KENYA
DAY 1 AND 2 | MAY 23 AND 24

Stakeholder Round Tables	<p>The first two days will be open to three primary groups: Kenya mini grid stakeholders; GMG Africa program, and SREP. These groups will be a mix of project partners directly involved with project design and implementation, and will focus on the work programs and issues in their respective programs. After the initial scene setting, details of the emerging project designs and delivery plans will be presented, and challenges will be openly discussed.</p> <p>The objectives will be to ensure coherence, awareness and coordination among the approaches and goals taken in different countries. This will entail setting in motion a collaborative process towards these goals, and that lessons learned in different programs are effectively taken up elsewhere.</p> <p>Each round table will host about 20 participants and is expected to run for 2 to 4 hours.</p>
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DAY 3 | MAY 25

Technical Conference	<p>Going wider than the specific programs, this day will involve invited experts and market participants to provide feedback on a set of pre-identified issues facing the mini grid sector, as well as to help compare and explore the market barriers to mini grid expansion. This forum will seek to discuss the policy, technology and financing challenges with a particular focus on possible actions and solutions to be taken up in the different projects. It is expected that three to five technical topics will be highlighted; and that an estimated 60 to 80 experts will participate.</p>
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DAY 4 | MAY 26

Field Trip	<p>The fourth day will feature an optional field visit to one or two mini grid sites, arriving back in the evening. It is expected that an estimated 30-40 experts will participate.</p>
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DAY 5 | MAY 27

Stakeholder Round Table Private Sector	<p>Significant interest from private sector emerged during the preparation of the event including companies leading the change in the East African mini grid markets as well as several of the leading multinational in the microgrid industry in the high income countries. The private sector round table provides the opportunity for companies with (potential) “skin in the game” to discuss industry-wide issues and to find an avenue to address these.</p>
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