

High Impact Opportunity (HIO)

Clean Energy Mini-Grids – mini- and micro-grids are village, town or district scale electrical distribution networks either unconnected to, or able to operate autonomously from, the main electrical grid.¹ Clean Energy Mini-Grids are mini-grids which are powered by either renewable energy, or a hybrid of renewable energy and fossil fuel generation.² Mini-grids can be delivered and managed in different models, including by utilities, through private actors (“mini-utilities”), or a combination of both. “Mini-utilities” can be formed by private or community-based (e.g. co-operative) developers and operators, in partnership with governmental and community institutions.

Scope Summary

According to the International Energy Agency (IEA) World Energy Outlook 2011, over 40% of all installed capacity to achieve universal access to electricity by 2030 (almost 400TWh) will be most economically delivered through mini-grids. Given the more remote locations of many of the communities that will be served in this way, and the cost reductions in renewable energy technologies, this objective can be met entirely with clean energy mini-grids. However despite advances in technology and cost reductions, the pace at which clean energy mini-grids are being developed and financed remains off track to achieve the 2030 target.

This HIO aims to use Sustainable Energy for All (SE4ALL) as an international framework to multiply the impact of existing and upcoming efforts in the area of clean energy mini-grids. It will focus on supporting the establishment of an enabling ecosystem for accelerated investment, deployment and replication of clean energy mini-grids towards the global 40% by 2030 target.

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¹ Although a range of sizes and system types exist within “mini-grids”, the HIO seeks an inclusive definition which simply differentiates the sector from stand-alone household systems and grid-extension approaches.

² Similarly, a range of energy sources can be used in clean energy mini-grids from renewable-only to hybrid with fossil fuels in different proportions. The HIO does not specify a minimum level of renewables proportion, however with a clear sense of direction towards higher renewable shares.

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1 High Impact Opportunity Overview

1.1 Overview and Description

Mini-grids can be a viable and cost effective route to electrification where the distance from the grid is too large and the population density too low to economically justify a grid connection, but where the population density (or the demand from an anchor customer) is great enough to allow an economy of scale in delivery compared with a series of stand-alone household systems. Mini-grids will provide an enhanced service level (hours of service and maximum power) compared with household systems, and, depending on local resources and technologies employed, can be comparable to a well-functioning grid. Mini-grids will in some instances be an intermediate step towards grid-connection, and should be forward-compatible with this eventuality. However in many contexts they can also be the final solution – most obviously in islands, but also in other isolated locations. While both grid expansion and household systems (such as solar PV) are expanding and must accelerate further, the intermediate scale of community-level mini-grids is currently off-track to meet its projected greater-than-40% share of electricity access by 2030.

The use of diesel mini-grid systems is expanding to serve the better-off who do not have access to the national grid, while a range of clean energy mini-grid technologies also exists (particularly using bioenergy, hydro, solar, wind and hybrids of these with diesel). However, despite their increasing cost-competitiveness as well as their autonomy, reliability and flexibility - and despite the fact that low-carbon options are progressively replacing installed diesel systems – clean energy mini-grids in developing countries have not yet achieved widespread replication outside of donor-financed projects. Many demonstration projects proving the technical feasibility of this solution have been carried out around the world, but the business case for the public-private partnerships needed to scale energy access through this route has not yet fully been made. The pace at which clean mini-grids are being constructed remains limited, due to a number of key barriers including:

1. **Inadequate regulation, policy gaps or uncertainty** – Frequently unclear levels of policy commitment to clean energy mini-grids are an issue, as well as possible changes in electrification plans, regulatory requirements or incentives, and uncertain actual delivery of incentives promised. The inability to charge cost-reflective tariffs is a key barrier, as is uncertainty over whether the grid will arrive, and what happens if it does.
2. **Early stage market fragmentation and unmade linkages** – This is particularly an issue between local/national businesses, communities and sectors (such as agriculture, health or water) with demand for power, and the international developers, technology providers and financiers who each hold different parts of the necessary elements for successful mini-grid development.
3. **Capacity issues and lack of standardisation** – With regulatory, resource and financial situations varying between projects, mini-grid types and countries, most clean energy mini-grids are currently bespoke, often requiring external specialists. A market ecosystem is required in which more standardised technology and operation/management elements are available, while also building capacity of these elements.
4. **Lack of proven commercial business models** – Given the above, evidence is required of the ability of clean energy mini-utilities (in partnership with public support, recognising the compelling development and economic case for rural electrification) to produce reliable cash flows to support further investment and private sector leverage.
5. **Lack of access to affordable longer term finance** – In the context of the above, private banks and investors perceive a greater risk in a mini-grid than a grid-connected generation project, while also having little sector experience/exposure. However, Development Finance Institutions are showing increasing interest and recognition of the opportunity.

In spite of these barriers, and recognising the opportunity of clean energy mini-grids, an increasing number of national and international firms and agencies are developing projects aimed at both hybridising existing diesel mini-grids with renewable sources, as well as installing green-field mini-grid systems to serve communities, anchor customers and businesses. The HIO will seek to further enable, enhance and promote these ongoing and upcoming High Impact Initiatives (HIIs) (see section 3) with a view to increasing their rate of deployment and their market transformation impact. The HIO will do this by galvanising action on the five interlinked barriers facing the sector set out above, with the engagement of public, private and civil society expertise and resources. See section 1.5 for Objectives and Actions in detail.

1.2 SE4ALL Objective(s) Being Addressed

A substantial country-level and international clean energy mini-grids sector would contribute to SE4ALL's targets on achieving universal energy access and doubling renewable energy generation, as discussed in the SE4ALL Global Tracking Framework. Co-benefits would include supporting wider rural development, enhanced agricultural productivity, local enterprise development, job creation and health and education outcomes (particularly where schools and clinics are connected to the mini-grid). Central to the HIO will be supporting the deployment of the most cost-effective and efficient technologies and end-use appliances.

It will foster the development of Decentralised Electricity (Sectoral Action area B of the SE4ALL Action Agenda)³, particularly these dimensions:

- B1) Provide support for regulatory reform that incentivises scalable and sustainable business and financial models
- B4) Develop, finance and implement small-scale renewable energy and smart grid solutions for areas where conditions do not allow for large-scale interconnected grids, such as islands or remote areas
- B5) Develop minimum national and regional performance standards for energy related supply, distribution and end-use equipment, based on independent testing, labelling and certification (governments and manufacturers)

The intervention will aim at achieving its objectives mainly through capacity building and knowledge sharing (Enabling Action area Z) as well as addressing business model and technology innovation (area X). The intervention will contribute to improving energy and planning policies (area W) and finance and risk management (area Y) relating to clean energy mini-grids.

³ Sustainable Energy for All: A Global Action Agenda (April 2012): Chapter 2: Action Areas, Page 8 (<http://www.un.org/wcm/webdav/site/sustainableenergyforall/shared/Documents/SEFA-Action%20Agenda-Final.pdf>)

1.3 Key Partners

The following list indicates the range of interest in the HIO which has been expressed in the initial preparation and consultation, and it not final or exclusive. This list will be expanded based on registration of interest after the initial launch. Membership of the HIO is open to all on the basis that members register their interests and skills with regards to clean energy mini-grids, and describe what they will contribute towards the objectives of the HIO.

Partner Name & Type of Organization	Role in High Impact Opportunity
<p>African Development Bank (AfDB)</p> <p>(Multilateral Development Bank)</p>	<p>AfDB manage the Sustainable Energy Fund for Africa (SEFA), a multi-donor facility aiming to catalyse private-sector led investments in small/medium sustainable energy projects in Africa. SEFA operates through three financing windows providing: i) project preparation, ii) equity financing and iii) enabling environment support and seeks to strengthen the AfDB's engagement in the deployment of mini-grids. The AfDB hosts the SE4ALL Africa Hub in partnership with the African Union, The New Partnership for Africa's Development (NEPAD) and UNDP and will in this capacity promote the development of SE4ALL Action Agendas and Investment Prospectuses in Africa.</p> <p>Role/Contributions to the HIO</p> <ul style="list-style-type: none"> SEFA potential support to clean energy mini-grids is through a proposed HII in Africa, delivered through its new "enabling environment support" window, targeting policy, regulatory and capacity issues of energy sector actors, as well as tackling national programmatic and planning processes. In addition to this AfDB are able to promote mini-grid components in SEFA and AfDB funded renewable energy projects, where applicable and viable.
<p>Africa Power</p> <p>(Private Business)</p>	<p>Africa Power is an independent power company which purchases, installs, maintains and operates renewable and sustainable, low-carbon, off-grid power systems in rural areas of emerging economies in East Africa, where there is no access to grid electricity. It seeks to empower rural, 'off-grid' communities in Sub-Saharan Africa by providing "Sustainable Electricity for All" using cell phone towers as anchor clients and provide power to unconnected households, businesses (micro-enterprises) and community facilities (the A-B-C model) thereby reducing poverty, increasing local economic activity and jobs, and improving health, education, communication and gender equality.</p> <p>Role/Contribution to the HIO</p> <ul style="list-style-type: none"> Demonstrate the potential for commercially viable, and hence financially sustainable, off-grid and mini-grid installations and long-term operation, ultimately without subsidy. Share knowledge and best practise. Contribute to creation of relevant standards and technical guidelines. Participation in relevant workshops, committees and round-tables, contributing with its field experience. Provide knowledge and input on the requirements and regulatory frameworks necessary to increase private sector investment in rural electrification projects.

<p>Alliance for Rural Electrification (ARE)</p> <p>(Industry Association)</p>	<p>ARE is an international association promoting all kinds of off-grid renewable energy solutions to electrify rural areas in emerging markets. Amongst other actors, ARE represents private and non-profit clean mini-grid researchers, designers, constructors and operators/maintainers as well as mini-grid equipment providers and manufacturers. Members have significant experience in developing clean-mini-grid projects, including capacity building, trainings and/or technical assistance. ARE objectives include sharing best practices on technical, financial and regulatory aspects and stimulating sector development.</p> <p>Role/Contributions to the HIO</p> <ul style="list-style-type: none"> • Act as administrative Secretariat for HIO and its members. • In consultation with the HIO Chair, preparation and support to meetings of the Steering Committee, including the preparation of meeting materials for advanced approval by the Chair and subsequent distribution to HIO members. • Mobilise support for and promotion of the HIO through information and engagement events and capacity building activities e.g. match-making, workshops. • Prepare publications on specific HIO activities e.g. best practices. • Provide policy, finance and technical guidance in order for the HIO to fulfil its main objectives, notably in terms of specific areas of expertise in the fields of sustainability, public policy and industry solutions. • Act as a gatekeeper towards the SE4ALL Secretariat and ensure effective reporting of all developments of relevance, including best practices and positive successes as well as any issues of concern. • Co-ordinate outreach and communications campaigns with the SE4ALL Secretariat.
<p>CLUB-ER</p> <p>(Rural electricity agencies network)</p>	<ul style="list-style-type: none"> • The Club of national agencies and structures in charge of rural electrification (CLUB-ER) is a network of around 30 public institutions responsible for rural electrification in Africa • The aims of the CLUB-ER is to improve the access to electricity by strengthening the capacities of these African institutions and by sharing their best practices and lessons learnt to find the appropriate solutions in this field • The Club seeks also to be a tool for lobbying and advocacy in the field of rural electrification through participation to international events and through the production of position papers • The CLUB-ER has a MoU with the ECREEE to work on Mini-grids <p>Role/Contributions to the HIO</p> <ul style="list-style-type: none"> • The CLUB-ER will bring the network of over 30 African agencies and structures in charge of rural electrification. This network can function as a hub for dissemination and outreach activities within HIO initiatives both in terms of communication (newsletter) and through its annual general meetings. • The CLUB-ER has already organized to trainings on Green Mini-grids and a thematic session at its GA in 2012 and is committed to further work in this area (capacity building activities). A training on Renewable energy financing is in preparation.

<p>Devergy</p> <p>(Private Business)</p>	<p>Devergy is an energy services company providing energy access to rural villages in Tanzania. Devergy's build and deploy cost effective smart micro-grids, ranging in size from a few watts up to 250W of power per household. Devergy's customers enjoy solar lighting, phone charging, TV and refrigerators at an affordable cost. The proprietary technology means that Devergy are able to remotely monitor and control the micro-grids, acquiring fundamental data on the energy usage patterns of the customers. This collected data leads to optimal business models and the proposal of new business models that are closer to customer needs. Devergy is currently active in two regions in Tanzania and has licensed its technology to partners in Ghana, with a total customer base of over 1,000.</p> <p>Role/Contributions to the HIO</p> <ul style="list-style-type: none"> • Possible contribution to objectives 1 to 4. • Participation in relevant workshops and round-tables, contributing with its extensive field experience • Active recommendations and suggestions for policy makers and regulators on how to best foster and incentivise the rural mini-grids sector. • Design and testing support for energy efficient appliance and loads. • Field testing and proposition of innovative distribution and sales models. • Contribution to the preparation of a sector standard for low voltage DC interfaces, to allow interoperability of appliances across sites and companies.
<p>Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)</p> <p>(Implementing Agency)</p>	<p>On behalf of the German Federal Ministry of Economic Cooperation, and other governments in the framework of the international Partnership Energizing Development, GIZ supports the planning and implementation of rural electrification projects with a focus on mini-grids in 20 countries around the world. GIZ brings experience from the implementation of approximately 300 mini-grids around the world spanning the entire range of technologies (hydro, solar, wind, biomass) and operational / business models (utility, private, community, anchor) including the promotion of productive use of energy. GIZ is a member of the Club of National Agencies and Structures in Charge of Rural Electrification in Africa (CLUB-ER) and supports the activities of the Club and its members in the area of mini-grids.</p> <p>Role/Contributions to the HIO</p> <ul style="list-style-type: none"> • Support to the development of guidelines for policy makers and practitioners, documentation of lessons learnt, implementation of research and impact assessments as well as capacity development measures in the area of mini-grids and rural electrification. • Contribute to the positioning of mini-grids on the international agenda. • Support the exchange of experiences and knowledge among practitioners and decision makers (e.g. via international events or online platforms like Energypedia). • Facilitate the engagement of relevant stakeholders in the rural electrification sector, including government institutions, energy companies and other representatives of the private sector, associations, scientific groups, civil society and directly affected citizens. For example, public institutions, such as national electricity authorities and regulatory agencies, are developed and strengthened through the provision of conceptual and strategic policy advice. In other cases, the activities of companies and non-governmental organizations are supported. Furthermore, campaigns and training schemes educate and inform electricity users and experts in the field of mini-grids • Contribution of resources to secretariat activities of the HIO. • Contribution to or co-ordination of activities under specific objectives of the HIO.

<p>ECOWAS Center for Renewable Energy and Energy Efficiency (ECREEE)</p> <p>(Specialized regional Agency)</p>	<p>ECREEE is the specialized Agency of the Economic Community of Western Africa States- ECOWAS for Renewable Energy and Energy Efficiency. It works on 4 results areas i.e. policy, capacity building, investment and business promotion and knowledge management, ECREEE contributes to mitigate the existing barriers to the deployment of Renewable Energy and Energy Efficiency in the 15 member states. ECREEE has been called upon by the ECOWAS Authorities to act as the SE4ALL Focal point for the region. ECREEE together with all MS has launched a process to support the development SE4ALL Action Agendas and investment prospectus. The development and implementation of concrete SE4ALL projects will be supported.</p> <p>In the frame of the ECOWAS Rural Electrification Program, ECREEE has several on-going activities in the clean energy mini-grids field i.e. the second call of the ECOWAS Renewable Energy Facility is in the process to be launched and will consecrate on mini-grids. ECREEE also has a focus on capacity building and awareness raising on Mini Grids i.e. a mini-grid technical manual in Cote d'Ivoire is co-funded which will be made available for other countries as well. Further activities on Mini-grids: mapping of the current projects and initiatives in the region, regional study tours (Ghana and soon Ivory Coast), alliance with some DFIs to explore financing of mini-grids deployment in the region, GIS based approach to rural electrification decision making process, pilot projects in Cape Verde, HOMER regional training.</p> <p>Role/Contributions to the HIO</p> <ul style="list-style-type: none"> • Support the integration of clean energy mini-grids within national energy plans and regulations: following up on the ECOWAS Renewable Energy Policy adopted in 2013, where also a goal of deploying 128.000 mini-grids is set for 2030, ECREEE is currently supporting the 15 member states in developing their national renewable energy action plans which will also include the mini-grids • Increase co-ordination and interaction in the mini-grids sector, drawing in also new partners, enabling increased partnerships/joint ventures: ECREEE is constantly tracking key initiatives that are being undertaken in the member states to share experiences and scale up successful experiences • Agreement and knowledge of key concepts, techniques, technologies and standard approaches on clean energy mini-grids: ECREEE works as a knowledge management hub for the region and the ECOWREX (www.ecowrex.org) has been designed specifically for sharing experiences • Increased development and testing of Business Models and increased visibility of outcomes via transparent evaluation and reporting of sector performance: ECREEE is following closely some very advanced experiences in the region i.e. Senegal • Increase visibility and recognition of clean energy mini-grids amongst financiers: ECREEE is exploring the partnership with some DFIs for scaling up investments in the region in the framework of the de-risking and lending initiative
<p>Energias de Portugal (EDP)</p> <p>(Private Business)</p>	<p>EDP Group operates in 13 countries and represents 29 nationalities and has vast experience in production and distribution of energy. EDP has a high commitment to the extension of the universal access to energy, being present in the SE4ALL initiative. EDP aims the creation of social and environmental value simultaneously with the financial self-sustainability of the activity. EDP involvement in access to energy projects should be consistent with the international expansion of the EDP group</p> <p>Role/Contributions to the HIO</p>

	<ul style="list-style-type: none"> • EDP is working with UNEP to assess the economic viability of new clean energy mini-grid systems in currently unserved locations in Mozambique. • After preparing viable business cases for potential target locations, the project partners will support local stakeholders with the actual implementation of the clean energy mini-grids projects. This support will include the recommendation of appropriate technologies, adaptation of existing or development of new regulatory frameworks and related policy, identification of appropriate financing mechanisms and the design of tender documents. • After this assessment phase, financed by EDP, and depending on the results and recommendations of the Business Plans due to be presented until the end of the year, the company is available to co-finance its implementation as a High Impact Initiative with up to one million euros, together with other partners.
<p>EU Energy Initiative Policy Dialogue Facility (EUEI PDF)</p> <p>(Multi-donor platform)</p>	<p>The EUEI PDF is a flexible instrument of the EU Energy Initiative (EUEI) supporting the creation of an enabling environment for investments in sustainable energy markets across Africa, Southeast Asia, Latin America and the Pacific. This is achieved through undertaking policy and strategy advisory work with partner countries and regions; building institutional capacity for executing agencies, regulators and public-private partnerships; and knowledge sharing. Set up in 2004, EUEI PDF has undertaken more than 80 projects at national, regional and thematic levels. In the context of its policy advisory work, EUEI PDF provides technical assistance on clean mini-grids policy & regulatory framework development to policy-makers and regulatory agencies.</p> <p>From 2014, under the Africa-EU Renewable Energy Cooperation Programme (RECP), both direct services (market information, transaction advisory, matchmaking between African and European partners) as well as indirect support (facilitation of access of market participants to support instruments) will be provided; this will explicitly also cover mini-grid market segments and – participants. EUEI PDF is also providing advisory on the development of energy service delivery models, including business models for mini-grid deployment. This includes, for example, further analysis of the relevant market systems and success factors (e.g. through the currently ongoing study on “Framework and Analysis of Key Energy Market Systems”).</p> <p>EUEI PDF also hosts the secretariat of the Africa-EU Energy Partnership (AEEP), and can thus ensure linkage of the HIO with the AEEP’s activities at macro (intercontinental) and meso (regional / national) levels, contributing network in Africa and Europe accordingly.</p> <p>Role/Contributions to the HIO</p> <ul style="list-style-type: none"> • EUEI PDF has undertaken and is currently pursuing a range of activities related to mini-grids, for example the launch and dissemination of the Mini-Grid Policy Toolkit, support on regional guidelines for mini-grid regulation, and various dialogue and consultation events. EUEI PDF will also possibly launch new thematic studies on the topic of clean energy mini-grids. Work on mini-grids is expected to be a major component of EUEI PDF’s future thematic portfolio, addressed by a number of instruments and activities. These activities could be set in the context of the HIO in an appropriate way, e.g. as HIIIs. In addition, experience, information, contacts, etc. can be shared. • Support in positioning and co-ordination of the HIO with European energy development co-ordination partners. • Possible limited financial support to the HIO.
<p>Firefly Solar Generators</p>	<p>Firefly is a designer and manufacturer of hybrid and solar powered and mini-grid generation equipment, based in the UK with a Kenyan trading subsidiary and a number of international wholesalers with widespread cover across Africa. Firefly is currently installing mini and micro-grid</p>

(Private Business)	<p>projects in Kenya.</p> <p>Role/Contributions to the HIO</p> <ul style="list-style-type: none"> • Participation in research and the sharing of best practice that will lead to the increased delivery of clean energy mini-grids. • Contribution to relevant specialist groups. • Contribution and participation in regional partnership meetings that are focused on the long term aim of developing mini-grid projects on the ground. <p>Delivery of a High Impact Initiative (HII) under the HIO</p>
<p>Global Village Energy Partnership International (GVEP International)</p>	<p>GVEP International provides technical assistance and business/financial advice to SMEs operating in the African energy sector that deliver new or improved access to energy for the poor. Activities are focused in East Africa, with a smaller presence in West Africa. GVEP provide advisory services and access to capital for SMEs and social enterprises, and capacity building and micro-finance for micro-entrepreneurs. GVEP work with capital providers and other market participants to assist companies to become investment-ready and achieve scale-up. GVEP are fully engaged in the development of the mini-grid sector and support a number of businesses that deliver electricity services through distributed generation models. GVEP are actively engaged in a number of productive use initiatives to support small and micro scale businesses make the most of newly available and reliable power. GVEP are positioned well to support mini-grid businesses and project developers through their Nairobi-based advisory team, and micro-enterprise support teams spread throughout 4 African country offices.</p> <p>Role/Contributions to the HIO</p> <ul style="list-style-type: none"> • Deliver technical assistance and consultancy to companies in the mini-grid space. • Facilitate engagement with financiers and provide transaction advisory support with lenders, investors, grant-makers, insurers, guarantors, and other relevant parties. • Develop and implement enterprise development support to stimulate demand for electricity by productive users (employing income generating activities). • Draw on our internal experience to facilitate information and knowledge sharing with relevant stakeholders. • Support the design and implementation of project evaluations, and impact surveys and studies. • Contribute to capacity building of policy makers, regulators, financial institutions and entrepreneurs to test and scale-up mini-grid models. • Contribute to specific objectives of the HIO e.g. supporting the integration of mini-grids within national energy plans and regulations, supporting companies to test commercially viable business models, and building consensus on key concepts, techniques, technologies, and standard approaches.
<p>IED Invest (Private business)</p>	<p>IED-Invest finances and operates mini-grid systems in developing countries mobilizing funds through equity, loans and grants. IED-Invest has identified, designed, assisted in installation and is currently supervising operations a 200 kW power plant based on a rice husk in Cambodia and the tender procedures for a 1,22 MW small hydro power plant in Cameroon has already been launched. A feasibility study for a new gasifier in Cambodia is already completed and the tender processing will soon be launched.</p> <p>Role/Contributions to the HIO</p> <ul style="list-style-type: none"> • IED-Invest will share its experience, best practices and lessons learned capitalized on its Mini-

	<p>grid projects</p> <ul style="list-style-type: none"> • Will contribute to relevant specialist groups discussions
<p>International Renewable Energy Agency (IRENA)</p> <p>(International Organisation)</p>	<p>IRENA is an intergovernmental agency that seeks to make an impact in the world of renewable energy by maintaining a clear and independent position, providing a range of reliable and well-understood services that complement those already offered by the renewable energy community and gather existing, but scattered, activities around a central hub. IRENA is the hub for Renewable Energy under SE4ALL, and the Director General is a member of the SE4ALL Advisory Board.</p> <p>Role/Contributions to the HIO</p> <ul style="list-style-type: none"> • Raise awareness and facilitate the engagement of governments, donors and development partners around the HIO. • Draw in the experience of working with policy makers and practitioners of IRENA Member States in clean energy mini-grids; and facilitate information and knowledge sharing with relevant stakeholders. • Use the biennial International Off-grid Renewable Energy Conference as a platform for the exchange of experiences and knowledge among all relevant stakeholders in the HIO. • Support the concept of clean energy mini-grids as a model for expansion of energy access in island countries, countries with islands and virtual islands. • Assist countries in planning for expanded energy access through the development of island roadmaps, with a focus on electrification of remote islands through the use of renewable energy based mini-grids, and on transition of island grids to high share of renewables. • Contribute towards, or co-ordinate activities under specific objectives of the HIO such as supporting the integration of clean energy mini-grids within national and international energy plans and regulations, testing commercially viable business models, and building consensus on key concepts, techniques, technologies and standard approaches on clean energy mini-grids.
<p>Kenyan Ministry of Energy and Petroleum</p> <p>(Government Department)</p>	<p>The Government of Kenya is committed to universal energy access for the people of Kenya, increasing the supply of power towards our economic growth objectives, and to maximizing the contribution of clean energy sources to achieving these objectives. Mini-grids are already important in electrifying a significant number of off-grid towns in Kenya, and we are seeking to maximize the potential of Clean Energy Mini-Grids to play a significant role in the universal electrification of dispersed communities, enterprises and public services – in parallel to expanding grid coverage and delivery through off-grid household systems.</p> <p>Role/Contributions to the HIO</p> <ul style="list-style-type: none"> • Kenya is developing a clean energy mini-grids project under the Scaling-Up Renewable Energy Programme (SREP) focusing on hybridising existing diesel mini-grids with Solar PV, in which France has committed assistance. Further, it is co-operating with Germany and The World Bank on introducing new clean energy mini-grids into the Arid and Semi-Arid lands in Kenya, and welcomes the proposed support of the UK to attract private investment and participation into the clean energy mini-grids sector more widely. • The GoK will further seek to create an enabling environment for the expansion of the clean energy mini-grids sector in Kenya, enabling decentralised delivery and enhanced participation by financiers, developers, communities and counties. • The GoK will create a co-coordinating body for the clean energy mini-grids sector in Kenya in co-operation with donor partners, the MDBs and international organisations, and actively

	<p>engage with other key stakeholders from the private, civil society and academic communities.</p> <ul style="list-style-type: none"> • The GoK will participate in knowledge exchange and sharing with other countries developing their clean energy mini-grids sectors, and welcomes the UK support to this through the Green Mini-Grids Africa High Impact Opportunity Initiative.
<p>Practical Action (International NGO)</p>	<p>Practical Action are a civil society lead organisation on SE4ALL engagement at global and national level and are therefore in a good position to connect different strands and initiatives. Practical Action have expertise in applying participatory market systems development to clean energy mini-grids and provide Analysis and advice on national and regional policy and regulatory frameworks for decentralised mini-grids. Practical Action are also engaged with national civil society and have experience in linking the implementation of mini-grids to national and global policy.</p> <p>Role/Contributions to the HIO</p> <ul style="list-style-type: none"> • Sharing over 25 years’ experience in implementing clean energy mini-grids, including looking back studies. • Participation in HIO Objectives 1,3 and 4, in particular the contribution of discussion papers on clean energy mini-grids, and facilitation and participation in discussion groups/forums. • Implementation of a High Impact Initiative (HII)
<p>Renewable Energy Policy Network for the 21st Century (REN21) (International Organisation)</p>	<p>REN21 is a multi-stakeholder network that advances the global transition towards renewable energy. It brings together players from industry, international organisations, NGOs, research and academia, and civil society. Working in collaboration with more than 500 international experts, REN21 provides information on renewable energy in industrialised and developing countries for power, heating and cooling and transport; the organisation also tracks how renewable energy is contributing to increased energy access. REN21 publishes the annual Renewables Global Status Report as well as regular Regional Status Reports. REN21 also convenes regular events to support the exchange of information and ideas in the field of renewable energy such as the biennial International Renewable Energy Conference, the REN21 Summer Academy, and a series of thematic workshops and webinars.</p> <p>Role/Contributions to the HIO</p> <ul style="list-style-type: none"> • Raise awareness among policy makers of the possible business models and supporting policies needed to ensure successful mini-grid implementation. • Provide a platform for collecting and sharing data and information on the status of clean mini-grids world-wide. • Provide a continuous tracking of the status and advancements of clean energy mini-grids. Information would be presented in the REN21 Renewables Global Status Reports, on the Renewables Interactive Map, and in the anticipated Distributed Renewable Energy Status Report. • Contribute to awareness raising activities on the role of clean energy mini-grids at international events and workshops • Provide various international opportunities where mini-grid work can be presented: International Renewable Energy Conferences (IRECs), REN21 Summer Academy, REN21 2014 outreach events.
<p>Rockefeller Foundation</p>	<p>The Rockefeller Foundation has launched the Smart Power for Environmentally-sound Economic</p>

(Philanthropic Organisation)	<p>Development (SPEED) an effort that supports the development and testing of scalable models of decentralized renewable energy generation and distribution systems which can exploit the anchor-load potential offered by mobile phone towers in India. This is coupled with strategies to support the development of small and micro enterprises in villages to boost long-term demand, ensure sustainability of the ESCO, and support productive usage of electricity to spur economic growth. SPEED's ultimate goal is to impact the lives of poor or vulnerable populations by delivering affordable, reliable and clean energy to rural communities, thereby improving their quality of life and facilitating opportunities for economic development.</p> <p>Role/Contributions to the HIO</p> <ul style="list-style-type: none"> • Share the lessons learned and best practices uncovered in the mini-grid pilot projects in India, including characteristics of successful business models, ESCO risk mitigations and incentives. • Collaborate on the design of approaches to mitigate non-commercial risks associated with local economic development. This would include aspects of micro-enterprise development and "latent" demand stimulation, activities which can enhance the financial viability of the mini-grid project. An objective of such engagement could be the standardization of methods to assess these opportunities and build appropriate solution sets to stimulate replication. • Support a High-Impact Initiative on SPEED expansion in India.
SE4ALL Global Facilitation Team (GFT)	<p>The GFT is the central co-ordination structure for the SE4ALL initiative, and performs a facilitation role with regards to all HIOs, as well as the country-level actions.</p> <p>Role/Contributions to the HIO</p> <ul style="list-style-type: none"> • Ensuring the visibility and inclusion of clean energy mini-grids as an option in Action Agenda and other planning/policy processes (see objective 1 and 5)
Siemens Energy (Private Business)	<p>The Siemens Energy Sector is the world's leading supplier of a broad spectrum of products, services and solutions for power generation in thermal power plants and using renewables, power transmission in grids and for the extraction, processing and transport of oil and gas. Siemens Energy's portfolio includes, amongst others, turnkey solutions for hybrid power generation combining renewable and fossil power generation as well as performance monitoring of distributed generation units and energy storage devices.</p> <p>With its hybrid power solutions, Siemens ensures reliable power while integrating high levels of solar and/or wind energy with fossil (e.g. diesel, HFO) generation units of all sizes. This hybridization leads to a significant reduction in fuel consumption and costs, and carbon emissions. Each project is customized for local conditions based on a detailed analysis of the customers' load requirements, solar and wind resources. Beyond 100% peak penetration of renewables is enabled by the utilization of integrated energy storage, ensuring fossil generating units are shut down.</p> <p>Siemens Performance Monitoring Solutions enable the reliable monitoring and efficient control of renewable and conventional energy sources, via local or remote access, anytime, anywhere. Ensuring the highest profitability, reliable operation and providing dependable forecasting are key.</p> <p>Role/Contributions to the HIO</p> <ul style="list-style-type: none"> • Provide support for the identification of technical requirements with regards to hybrid or fossil

	<p>fuel-free mini-grids</p> <ul style="list-style-type: none"> • Assess and derive automation requirements as well as importance of “Economic Dispatch” to optimal steering of mini-grids • Identify technical and economic possibilities for local utility and power plant providers in off-grid regions • Assess economic viability of hybrid mini-grids which are technically able to integrate volatile renewable energy sources and to reach a high renewable energy penetration degree while ensuring grid stability • Development of business and operation models for clean energy mini-grids
<p>Task 9 IEA Photovoltaic Systems (Working group)</p>	<p>Photovoltaic Power Systems (PVPS) is one of the 40 multilateral technology initiatives (Implementing Agreements) of the International Energy Agency (IEA). The PVPS has a Task working group on “Deployment of PV services for regional development” with the objective of promote the implementation of appropriate and efficient technical solutions through the development of partnerships with selected Asian and African “megaphones” (financial institutions, regional / professional organizations such as the ADB, AfDB, CLUB-ER, ASEAN Center for Energy, etc.)</p> <p>The Task 9 has a subtask on PV and Hybrid systems and has produced several publications related to this topic. At the moment, the task is working on future trends in mini grids, starting from the fact that feedback from the field tends to show that grid expansion is happening faster than expected especially connecting load centers with “anchor loads” – so small scale (mini grid) distributed generation (<1MW) integration into the main grid may perhaps see a substantial growth in the future, as an interim solution to access.</p> <p>Role/Contributions to the HIO</p> <ul style="list-style-type: none"> • Can contribute on objective 3 “Agreement and knowledge of key concepts, techniques, technologies and standard approaches on clean energy mini-grids” through the contribution and revision of documents • Can share the results of its work
<p>UK Department for International Development (DFID) (Government department/donor)</p>	<p>DFID leads the UK Government’s fight against poverty in developing countries. DFID’s Secretary of State is a member of the SE4ALL Advisory Board and the UK’s International Climate Fund includes a commitment to support low carbon development, which includes the expansion of clean power generation and energy access in low income countries.</p> <p>Role/Contributions to the HIO</p> <ul style="list-style-type: none"> • Assist in the start-up and co-ordination of the HIO. • Promote donor and government co-ordination and awareness around the HIO. • Contribution of the outputs of DFID-commissioned studies and data on clean energy Mini-Grids. • Support a High Impact Initiative on clean energy mini-grids in Africa (TBC).
<p>United Nations Environment</p>	<p>UNEP, established in 1972, is the voice for the environment within the United Nations system. UNEP acts as a catalyst, advocate, educator and facilitator to promote the wise use and sustainable development of the global environment. To accomplish this, UNEP works with a wide</p>

<p>Programme (UNEP)</p> <p>(International Organisation)</p>	<p>range of partners, including United Nations entities, international organisations, national governments, non-governmental organisations, the private sector and civil society. UNEP's current work and interest in clean energy mini-grids is based upon its ongoing programme that aims to demonstrate the commercial viability of mini-grids in developing countries, both brownfield (replacing diesel in existing mini-grids) and greenfield (new grids for currently unserved sites). Several locations have been targeted in Africa, Asia and Latin America, with a view to making a significant contribution to the goals of SE4ALL. Different business models will be demonstrated (including public sector finance where necessary) to reduce the risk for potential future investors. Linking the necessary policy frameworks and appropriate clean energy technologies with the required financial mechanisms will be the focus of this UNEP initiative, which is a key part of the current 2014-15 work programme.</p> <p>Role/Contributions to the HIO</p> <ul style="list-style-type: none"> • Demonstrate the potential for commercially-viable, and hence financially sustainable, mini-grid installation and long-term operation. Taking account of the need for accessible finance, supportive policy frameworks and appropriate technology. • Able to draw upon wide international experience of effective renewable energy use in developing countries and is well-positioned to facilitate the development of bankable and replicable mini-grid applications. • Well-placed to bring value from the broader context of mini-grids, including integration with other key related issues such as the impact on water, food, waste and land resources.
<p>United Nations Foundation Energy Access Practitioner Network (UNF EAPN)</p> <p>(Practitioner Network)</p>	<p>UNF EAPN represents its 1500 strong membership in 191 countries working to provide a range of decentralised renewable energy solutions to populations in areas not accessible through the grid.</p> <p>Role/Contributions to the HIO</p> <ul style="list-style-type: none"> • Feed in to the HIO of the practitioner experience of success and barriers on the ground as well as examples of innovative business models, cross-sector linkages etc. to facilitate learning and knowledge-sharing. • Play a convening role that brings together stakeholders representing a variety of fields such as international institutions, policy makers, private sector including multinationals as well as social enterprises and civil society. • Serve as a platform to conduct outreach to practitioners under the HIO. UNF EAPM hosts a mini-grids Working Group with a membership of over 100 practitioners based in both developed and developing countries.
<p>USAID</p> <p>(Government Department/donor)</p>	<p>"Beyond the Grid" is an innovative new framework under President Obama's landmark Power Africa initiative to increase energy access for underserved populations across Sub-Saharan Africa and unlock investment and growth for off-grid and small-scale energy solutions. By partnering with impact investors, philanthropists, and practitioners, Beyond the Grid will mobilize new financial resources, technologies, and expertise to close the energy access gap.</p> <p>Role/Contributions to the HIO</p> <ul style="list-style-type: none"> • Addressing HIO Barrier 1 - Inadequate regulation, policy gaps or uncertainty - Power Africa's "Beyond the Grid" will strengthen the enabling environment through targeted interventions with governments, NGOs, donor partners, and other stakeholders, including: institutional, policy and regulatory planning, development and reform; capacity building for the public sector. • Addressing HIO Barrier 2 - Early stage market fragmentation and unmade linkages – Power

	<p>Africa's "Beyond the Grid" will produce market intelligence, including assessments of the environment for clean energy investments</p> <ul style="list-style-type: none"> • Addressing HIO Barrier 4 - Lack of proven commercial business models – Power Africa's "Beyond the Grid" will identify and scale technically and financially viable business models by providing financial and technical assistance: • Addressing HIO Barrier 5 - Lack of access to affordable longer term finance – Power Africa's "Beyond the Grid" will catalyze private sector investment through risk mitigation, technical assistance, and financial support; and partnering with impact investors, philanthropists, and practitioners to mobilize financial resources.
<p>US Department of Energy (DOE)</p> <p>(Government Department)</p>	<p>U.S. DOE serves as the Secretariat for the Clean Energy Ministerial (CEM), an annual meeting of ministers from 23 major-economy governments to drive technology and policy progress through the work of thirteen CEM initiatives. One CEM initiative is the Global Lighting and Energy Access Partnership, of which DOE, DFID, and UNF, are existing members. Members work to advance and catalyze private sector delivery of clean energy products and services, holding a shared belief that the scale of the challenge is so great that public sector procurement programs or philanthropy will never be adequate to the need. Global Lighting and Energy Access Partnership (Global LEAP) also works to identify and promote superefficient off-grid appliances as an important piece of the energy access solution set. Work on mini-grids builds on the recommendations from the public-private roundtable on mini-grids held at the Fourth Clean Energy Ministerial meeting in Delhi in April 2013.</p> <p>Role/Contributions to the HIO</p> <ul style="list-style-type: none"> • Define a framework for consumer energy quality assurance for mini-grid systems. This has two elements, for which it will be very important to accommodate all emerging business models in the market: 1.) The development of commonly accepted guidelines that define different levels of service for isolated mini-grid systems, 2.) Development of an accountability framework so that it is possible to validate and/or demonstrate that a specific level of service is being provided. Accountability ensures “truth in advertising” both for the consumer as well as for the organisation(s) financially backing the service. • Ongoing engagement with stakeholders in different regions where mini-grids have a key role to play in delivering energy access to ensure that the framework developed is a tool that is used and useful. With regard to this piece of work a team from the National Renewable Energy Lab has been brought on to lead the technical work. • In India, engagement with stakeholders around the QA framework for mini-grids will happen in the context of the U.S.-India initiative called PEACE, or Promoting Energy Access to Clean Energy, and leverage the private sector membership of the Off-Grid Alliance. (Regional stakeholder workshop slated for summer 2014.) • In Africa, engagement with stakeholders will happen in the context of the Power Africa “Beyond the Grid” sub-initiative and leverage the private sector partners there. (Regional stakeholder workshop to take place by end-2014.)
<p>World Bank Group</p> <p>(Multilateral Development Bank)</p>	<p>The World Bank Group (WBG) is a global multilateral agency working to achieve two goals: end extreme poverty within a generation and boost shared prosperity. Expanding energy access and promoting renewable energy and energy efficiency options are important priorities for WBG and are pursued through its various organisations such as the International Development Association (IDA), The International Bank for Reconstruction and Development (IBRD), The International Finance Corporation (IFC), and The Multilateral Investment Guarantee Agency (MIGA) as well as trust funds like The Energy Sector Management Assistance Program (ESMAP) and The Asia</p>

Sustainable and Alternative Energy Program (ASTAE). The President of WBG co-chairs the high level advisory board of the SE4ALL initiative along with the United Nations Secretary-General, and WBG is a member of the SE4ALL executive committee. WBG also hosts the SE4ALL global knowledge hub.

Role/Contributions to the HIO

- Provide technical assistance support to identify, develop and support the scale-up on micro- and mini-grids companies that are commercially-viable and have strong potential for replication.
- Promote innovative business models using renewables as well as hybrid solutions in Africa and Asia.
- Develop and disseminate knowledge on various aspects of promoting mini-grids to a range of public and private sector stakeholders to aid scale up.

The above list will be managed as a spreadsheet by the HIO secretariat until such time as the SE4ALL initiative has a wider database which can register memberships and activities of the various HIOs and HIIs.

1.4 Goals

The Clean Energy Mini-Grids HIO will be established with the goal of co-ordinating and supporting the development of action on mini-grids globally, towards the overarching **objective for 40% of new electricity connections by 2030 to be achieved via Clean Energy Mini-Grids.**

Using time and resources generated initially from within the group, the HIO members will pursue the following goals, which correspond with the five key barriers indicated in section 1.1:

1. **Inadequate regulation, policy gaps or uncertainty** – the HIO will seek to **support integration of clean energy mini-grids within national and international energy plans and regulations** – particularly in opt-in countries where mini-grids are included in SE4ALL action agendas and investment prospectuses.
2. **Early stage market fragmentation and unmade linkages** – the HIO will seek to **increase co-ordination and interaction in the mini-grids sector, drawing in new partners, enabling increased partnerships, joint ventures and cross-sectoral projects** - as demonstrated by High Impact Initiatives (HIIs) and member activity.
3. **Capacity issues and lack of standardisation** – The HIO will seek to create **agreement and knowledge of key concepts, techniques, technologies and approaches**, supporting improved performance across the clean energy mini-grids sector
4. **Lack of proven commercial business models** – The HIO will seek to **increase development and testing of business models** through HIIs, and **increase visibility of outcomes via transparent evaluation and reporting of sector performance** – including in SE4ALL reporting.
5. **Lack of access to affordable longer term finance** – The HIO will seek to increase **visibility and recognition of clean energy mini-grids** as a viable electrification approach amongst financiers particularly at SE4ALL Advisory Board and other events – with a view to increasing the availability of private and public financing for clean energy mini-grids.

1.5 Objectives

The functions, activities and structure of the HIO will be developed to address the above goals over the first year of the operation of the HIO from June 2014. In that first year, a co-ordination group including at least ARE, GIZ, EUEI PDF, UNF, UNEP, DFID and the GFT will guide the activities of the HIO, engaging a wider membership and co-ordinating startup activities. The HIO will have a secretariat function, which will be hosted by ARE in cooperation with UNF, and have the function of providing logistic and thematic support to the HIO membership. However, it will be the co-ordinated activities of the members towards the objectives of the HIO which will define the success or failure of the effort. The following forms the initial basis for the activities of the HIO, with the organisations indicated who would be co-ordinating the consultation and further development of the activities in the first year.

1. **Support the integration of clean energy mini-grids within national and international energy plans and regulations.**

CO-ORDINATORS: EUEI PDF and GFT

Possible activities include:

- 1.1 Supporting the SE4ALL Global Facilitation Team and the SE4ALL Regional Hubs inputting into the SE4ALL Action Agenda and Investment prospectus processes.
- 1.2 Research and comparison on the effectiveness and key issues with regards to policy environments for Clean Energy Mini-Grids – provision of toolkits/approaches.
- 1.3 Supporting the follow-up to SE4ALL Action Agendas with more focused support on policy and regulatory preparation for scale-up of clean energy mini-grids – e.g. mapping demand distribution, and inclusion of mini-grids in electrification planning

2. **Increase co-ordination and interaction in the mini-grids sector, drawing in new partners, enabling increased partnerships/joint ventures.**

CO-ORDINATORS: UNF EAPN and ARE

Possible activities include:

- 2.1 Creation of a Clean Energy Mini-Grids HIO section on the SE4ALL website (or similar) compiling links and information on clean energy mini-grids
- 2.2 Encouraging sector stakeholders to input their High Impact Initiatives (HIIs), activities and commitments.
- 2.3 Track key initiatives (HIIs) that are being undertaken within the mini-grids HIO and provide a platform for visibility for these HIIs.
- 2.4 Regional and international partnership building meetings amongst interested parties as well as webinars and other matchmaking events, including at country levels.

3. **Agreement and knowledge of key concepts, techniques, technologies and standard approaches on clean energy mini-grids.**

CO-ORDINATORS: GIZ and UNF EAPN

Possible activities include:

- 3.1 Production of a clean energy mini-grids quickstart guide setting out a framework for progress on clean energy mini-grids including definitions and approaches.

- 3.2 Compilation of discussion papers and running webinars and/or a conference (or conference component of a larger event) focusing on mini-grids to bring together agreement on the key concepts.
- 3.3 Creation of specific discussion groups or forums on clean energy mini-grids, drawing from and building on the SE4ALL Practitioner Network Mini-Grids group.
- 3.4 Mandate specialist working groups where necessary to co-ordinate joint research of relevance across the clean energy mini-grids sector.

4. Support to increased development and testing of business models and increased visibility of outcomes via transparent evaluation and reporting of sector performance.

CO-ORDINATORS: UNEP and IRENA

Possible activities include:

- 4.1 Providing advice and linking experience in the development of HII testing new business models.
- 4.2 Commissioning case studies and evaluations of business models and supporting exchange visits.
- 4.3 Ensure that the SE4ALL Accountability Framework is able to properly register and reflect clean energy mini-grid activities, and that a section of the SE4ALL Accountability and tracking reporting is covering clean energy mini-grids, and reflecting relevant statistics gathered.
- 4.4 Over the lifetime of the HIIs, make sure that status reports on progress (what is working, what is not working, etc) are captured and used in overall reporting for the HIO.

5. Increase visibility and recognition of clean energy mini-grids amongst financiers

CO-ORDINATORS: DFID and TBC

Possible activities include:

- 5.1 Ensuring visibility of clean energy mini-grids experience and results amongst financiers, including at high level events in the SE4ALL calendar involving private and public financiers, including Advisory Board meetings.
- 5.2 Improving data and benchmarks on funding requirements and returns, including most efficient use of public support to enable private investment
- 5.3 Supporting the creation of HIIs providing financing at scale for clean energy mini-grids.

1.6 Workplan

The following outlines a plan for the first year of the HIO. A longer term workplan will be developed in co-operation with the partners over that period and incorporated in the first annual report.

Activity	Co-ordinator	Q2 2014	Q3 2014	Q4 2014	Q1 2015	Q2 2015
HIO Launch						
Establish HIO membership systems and extend membership	Secretariat					
Set up online information and data exchange systems	Secretariat					
Mini-Grid Sector Mapping (by region, be	Secretariat, HIO					

actor group, by topic)	members					
Consultations on actions under the 5 objectives	Objective Co-ordinators					
Reporting on the first year and decisionmaking on structure and priorities in the future	HIO Co-ordinators					

2 Reporting Framework

- Half yearly update report at SE4ALL Advisory Board meeting in Q4 2014.
- Report after each country events
- Annual report into the global accountability and results framework for SE4ALL in Q2 2015

3 HII Summaries

- **Smart Power for Environmentally-sound Economic Development (SPEED) initiative** - SPEED is an effort that aims to address the basic needs of poor and vulnerable people who lack access to electricity and spur economic development in rural India. The Rockefeller Foundation and partners do this by identifying innovative opportunities to attract energy service companies (ESCOs) to invest in building decentralized renewable energy power plants in rural areas.
- **UNEP is co-ordinating a programme to demonstrate clean energy hybrid mini-grids in remote areas of developing countries as an investment opportunity.** Brownfield sites (existing diesel-powered mini-grids) and greenfield sites (communities with no current electricity supply) sites are being targeted in Africa, Asia and Latin America. The aim is to identify relevant locations, undertake extensive community engagement to fully understand the potential local markets, and then prepare business plans that indicate a commercially viable (and therefore sustainable) operation. The programme will then use local energy resources to implement clean energy mini-grids, generate the necessary returns and thereby showcase the private sector investment opportunity. Several such demonstrations are planned in different countries, each with a different financial model. Components of several models can then be combined as necessary for replication, depending upon the local conditions.