

Industry Agenda

Scaling Up Energy Access through Cross-sector Partnerships

Prepared in collaboration with PwC

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Foreword



Roberto Bocca
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A dramatic evolution is under way in the manner in which energy is provisioned and consumed. Today, about 1.3 billion people do not have access to reliable, affordable and clean energy. At the same time these people spend substantial parts of their income – US\$ 37 billion a year, according to the International Finance Corporation – on unhealthy and expensive sources of lighting and energy for cooking or productive uses. A variety of companies are now seeking to commercially meet the increasing demand for energy by actively offering affordable energy services to households, small enterprises and communities, especially to those without grid access.

The United Nations designated 2012 as the year of “Sustainable Energy for All”. Thanks to the significant momentum this created, various initiatives have stepped up their activities to scale up energy access, or kicked off new programmes and projects. Energy access is today seen as more than simply an issue addressed through aid or through Corporate Social Responsibility (CSR), it is increasingly being seen as a business opportunity that can also create impact. Clear demand also exists for market-based and innovative business models.

Since a workshop on energy access held in Davos during the World Economic Forum Annual Meeting 2012, the Forum has been working closely with PricewaterhouseCoopers on a research study intended to help unlock the business opportunity through new business models for energy access in the mini-grid/off-grid market segment. The development of new business models in this area of focus holds the promise not only of providing rural populations with energy for lighting or charging purposes, but also for pursuing productive activities. Mini-grid based models have the potential to stimulate local economic growth and thus have a multiplier impact on the development perspectives and quality of life of rural households. At the same time, negative health impacts of indoor air pollution and environmental impacts are reduced by replacing kerosene lamps and diesel with renewable energy where applicable.

In this study, over 40 experts from across the private, public and civil society sectors were consulted; existing barriers to providing off-grid electricity to rural households were analysed; promising and innovative approaches were further understood. The result: a “cross-sector partnership framework” was developed as a starting point for new cross-sector business models on energy access in peri-urban and rural areas. A profit and loss (P&L) methodology has also been developed to measure and quantify the economic, environmental and social impacts of rural electrification and thus support the business case.

This approach is currently being tested by a cross-sector consortium in Kenya with the aim to scale up and replicate it. While a majority of the study – the framework, its potential, its impact measurement – is still theoretical, the aim of this report is to provide information and offer new perspectives in addressing the energy access challenge through cross-sector collaboration on rural mini-grids. The goal is to encourage as many actors as possible to try out this framework and to test the potential of these cross-sector partnerships at scale. We remain committed to maintaining the key issue of energy access on the global agenda.

Acknowledgements Perspectives

The authors wish to acknowledge and express special thanks to the members of the research project advisory board for their guidance, commitment and enthusiasm that have helped to drive this initiative: Sam Bickersteth (Chief Executive Officer, Climate and Development Knowledge Network), James E. Rogers (Chief Executive Officer, Duke Energy), Heikki Holmås (Minister of International Development of Norway), Chris Locke (Managing Director, GSMA Development Fund), Eric Rondolat (Chief Executive Officer, Philips Lighting), Tulsi Tanti (Chairman, Suzlon), Leena Srivastava (Executive Director, TERI), Jifan Gao (Chairman, Trina Solar), Jon Williams (Partner, PwC) who helped to chair this board, and Gus Schellekens who helped shape and steer the research project team and the outputs and report. A big thank you also goes to the more than 40 professionals involved in the expert working group and to participants in workshops that were held in Nairobi, Geneva, New Delhi, at the World Economic Forum Annual Meeting 2013 in Davos in January 2013 and at the World Economic Forum on Africa in Cape Town in May 2013.



“

Philips is always looking for new and innovative business models to enhance people’s lives with light. Partnering with energy and other sectors is a new approach bringing access to energy to rural areas and thus laying the foundation to improve quality of life and well-being.

”

Eric Rondolat Chief Executive Officer, Philips Lighting



“

Working with our Energy+ initiative on energy access we strongly support the Forum activities and see great value in the innovative cross-sector partnership approach developed in this study. The business opportunity now needs to be met by private sector co-investment to bear fruit.

”

Heikki Holmås Minister of International Development of Norway



“

Through our Mobile Enabled Community Services projects we are sharing the interest for new and innovative business models to provide energy and water access to rural populations. The telecom sector plays a key role for new business models, using off-grid energy and providing mobile payment and communication services.

”

Chris Locke Managing Director, GSMA Development Fund



“

Placing the end-user at the centre of the energy access strategy will unlock opportunities for efficiency, technological and business innovation. This demand-led focus and a cross-sectoral consortia approach are the key to achieving energy access at the scale required for measurable developmental outcomes.

”

Sam Bickersteth Chief Executive Officer, Climate and Development Knowledge Network



Executive Summary

The Energy Access Challenge

Globally, some 1.3 billion people or 274 million households do not currently have access to modern energy such as electricity and lighting. Access to affordable modern forms of energy is not only a prerequisite for economic prosperity, but also for local growth and sustainable development. Some 95% of the people without electricity live in Sub-Saharan Africa (590 million) and developing Asia (628 million); 84% of these people live in rural areas. A world in which nearly one-fifth of the population remains without access to any form of electricity represents not only a developmental, but also economic growth issue on a global scale. While the lack of access persists in more than 60 countries worldwide, clearly Sub-Saharan Africa is a priority, followed by developing countries in Asia.

A Market Opportunity

Millions of households in tens of thousands of villages in dozens of countries represent a new market with huge growth potential. The majority of this unelectrified population is considered part of the “base of the pyramid” (BoP) market, as 80% of this population have incomes of less than US\$ 3 per day. Despite low incomes, US\$ 37 billion per year is already being spent by low-income populations on meeting basic energy needs. Half of this amount is spent on inefficient cooking solutions (e.g. wood, charcoal), while the other half is used for charging (e.g. mobile phones, flashlights) and lighting (e.g. kerosene lamps) needs. In many cases, spending on energy represents more than 10% of the monthly outlay of households. Energy costs are often substantially higher in rural areas, e.g. diesel costs are often 30% higher in rural areas in Sub-Saharan Africa. Providing modern energy services can often reduce the absolute costs for energy consumed and free up money for further energy consumption, electronic devices or for health and transportation services. Energy has a clear role as a catalyst for local economic growth and increased household income, through productive energy use. This creates further demand for energy or energy-based services. This represents a big opportunity for the private sector to tap into.

Growing Momentum for Scaling Up Energy Access

The decision by the United Nations (UN) to make 2012 the year of “Sustainable Energy for All” has increased understanding of the issues and barriers, and also served to create more awareness of challenges and opportunities. Governments and the private sector have responded well to all of these developments, recognizing their role in contributing to energy access. Several organizations contributed to the debate at hand through key analysis, commitments and programmes. A few examples include, the International Energy Agency (IEA)’s in-depth analysis of the global energy access market and its scenarios; the International Finance Corporation’s (IFC) report on energy access business models and taking them to scale; Lighting Africa and Lighting India, a joint World Bank-IFC programme, focused on access to clean and affordable lighting; the “Energy+” initiative from the Norwegian Ministry of Foreign Affairs, which pledged to scale up financing and deployment of modern energy sources; the “Green Power for Mobile” and “Community Power from Mobile” programmes from the GSMA Development Fund that test and showcase projects providing excess energy from telecom base stations to nearby communities through renewable mini-grids, or energy hubs.

Contribution of the World Economic Forum and PwC

To ensure that the World Economic Forum complements these activities and avoids the replication of efforts, the Forum decided to focus on a research study to find answers to the key question: how can multiple, new, cross-sector business models be developed to scale up energy access? The telecom sector provides an effective example of the business case and shows that successful access to the BoP market in developing countries is both possible and profitable. In a period of just over 10 years, between 2000 and 2012, mobile phone connections in Africa increased from 12 million to over 700 million per year. The cross-sector approaches described in this report represent one such entry point for business. A key question remains, however: How can the energy sector replicate the success of the telecom sector?

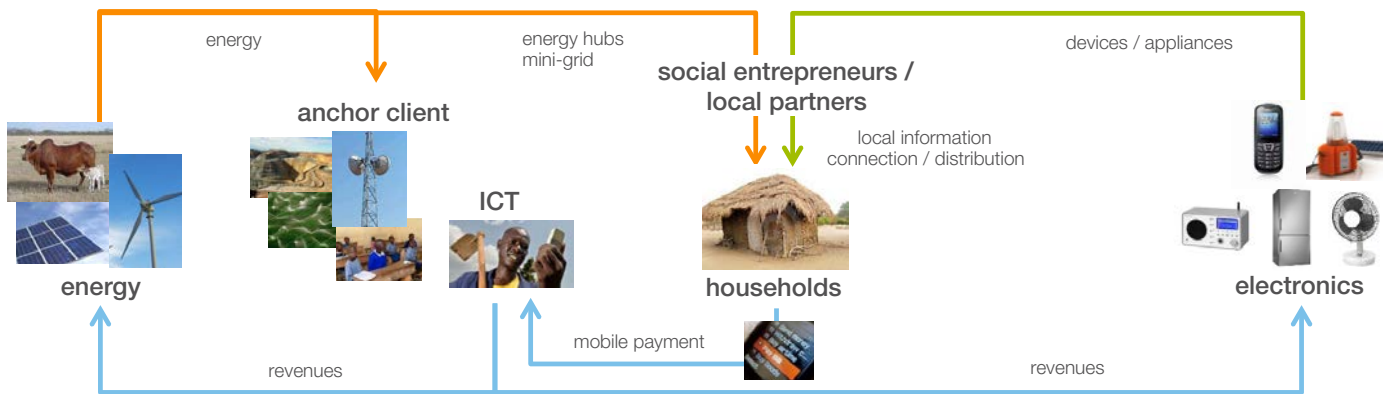
Cross-sector Collaboration Framework: A Possible Solution for Scaling Up

The primary outcome of the research is the cross-sector partnership framework which addresses many of the market barriers through alignment of the interests and competencies of global and local actors along a cross-sector value chain. This partnership framework brings together energy providers such as utilities, technology and energy service providers, with industries that need reliable and cost-efficient energy for their operations. These might include anchor customers with a base load demand for energy such as telecoms (tower base stations), agriculture (water pumping), mining and metals (extraction, operations), fast moving consumer goods (cooling), food industry (processing, cooling), or local small and medium-sized enterprises (productive use). Partners that benefit from available access to electricity are a further part of the cross-sector value chain, such as electronics (appliances, lighting), health (vaccine cooling, health services, clean water), telecoms (mobile charging), tourism (lighting, operations, cooling), or local infrastructure (street lighting, schools, community installations). Local households are connected through collaboration with local (social) entrepreneurs who provide energy access through locally tailored and feasible business models such as energy kiosks or mini-grids. The local community is not only expected to benefit from direct access to energy but also from the wider impacts of enabled economic activity, reduced health impacts, or reduced environmental damage. Energy provision is not seen as a matter of aid and charity, but as a catalyst to enable productive energy use and create wider economic, social and environmental impact.

To effectively bring the various partners together using energy as a catalyst for growth, the framework focuses on the following key elements:

- Bringing together private sector companies (with operations of significant size, and multi-country presence) with local partners to ensure investment power is combined with local market knowledge and BoP-ready solutions
- Aligning interests and competencies of different private sector partners to leverage synergies
- Building on an anchor load demand as a primary market for energy and securing energy beneficiary co-investment in the business model
- Focusing on decentralized, renewable or hybrid solutions which provide adequate levels of energy for productive energy use
- Providing a scalable and replicable base for business models for country-wide and global impact

Source: World Economic Forum



Economic, Social and Environmental Benefits of Energy Access

Access to energy has an enabling effect by creating economic, social and environmental impacts for the local community. For example, renewable energy based mini-grid solutions can offer the possibility of reducing energy costs by up to 40% versus the costs involved in generating energy through diesel; on-grid electrification in slums can generate up to 17% new commercial activity and new jobs; electrification of areas can increase sales of TVs by 70% and fridges by 50%, and lead to a 10% increase in mobile airtime through more and cheaper phone charging; and finally, they can lead to a reduction of about 40 tons of GHG emissions per year per telecom tower site through replacement of diesel power by renewable energy.

Outlook

The study on cross-sector partnerships seeks to highlight how the private sector might start this journey. Additional research, analysis and ground-level testing will be needed to further develop and refine the cross-sector and holistic impact measurement approach proposed in this report. The hope is that it will trigger a wider discussion on new ways of addressing the energy access issue and developing market-based solutions. Positive signs are emerging that the proposed framework and impact measurement provide value. The framework is being tested in Kenya through a pilot where it is receiving positive feedback from experts and practitioners, while private sector executives are expressing an interest in forming cross-sector coalitions. This report is an invitation to business actors to try out the ideas described here in their own businesses to explore the true potential behind cross-sector partnering and business models. In the meantime, the authors remain committed to keeping the energy access issue firmly on the global agenda.



“
We need partnerships with the private sector, the global engine of growth and the primary source of new investments.
 ”

Ban Ki-moon Secretary-General, United Nations

How to Read this Report

Objective: This report aims to promote awareness and inform decision-makers about the increasing opportunities associated with energy access. It recommends market-based business models to unlock the potential in this area, and proposes new forms of private-to-private and multistakeholder partnerships as an alternative approach. With these models, the report seeks to stimulate further private sector interest in energy access supporting greater co-investment that will then enable a significant scaling up of both solutions and outcomes.

Audience: The energy access discussion has long been dominated by an aid or CSR perspective. This has often meant that solutions to electrify the base of the pyramid have been limited in scope and small in scale. To provide universal access to energy within the medium term, it is clear that strong private sector investment and market-based business models are needed with the potential to transform current approaches to rural electrification in developing countries. As a result, this report mainly addresses those decision-makers and experts from the private sector that can help to deliver this scale of transformation, although it also highlights the roles that others can play.

Scope: The report is designed to provide key information on the issue and market opportunity of energy access for the private sector, with a particular focus on how this information can then be successfully used to develop new and innovative business models. Although reference is made to all market segments (on-grid, off-grid) and respective technological solutions (cook stoves, lighting, electricity), the report focuses in particular on rural and off-grid solutions that are able to provide high levels of electricity for anchor clients, local households and community infrastructure. “Energy access” and “energy” as such are thus used as synonymous for electricity if not otherwise stated.

The Challenge

Source: US National Oceanic and Atmospheric Administration, National Geophysical Data Center, NASA Earth Observatory, 2000



Who | **1.3 billion** people globally have no access to electricity and lighting
95% of them live in Sub-Saharan Africa and developing Asia
84% live in rural areas

What | **2 million** premature global deaths occur annually as a result of indoor air pollution
1 million deaths are from fires caused by kerosene lamps
80% of rural households still use kerosene lamps for lighting
50% of care facilities in developing countries have no or unreliable access to electricity

The Opportunity

Energy | **US\$ 37 billion** is already spent annually on energy services by the base of the pyramid segment
This represents more than **10%** of the monthly household income
40% of household energy expenditure savings is expected through cheaper off-grid energy services

Telecom | More than **500 million** people have access to mobile phones but not to electricity
Up to **50%** of costs of airtime are spent on expensive phone charging

Investments | **220 GW** additional installed power capacity is needed to electrify all impacted people by 2030
This is less than **25%** of installed capacity in the USA
Investments totalling **US\$ 979 billion** will be needed from 2011 to 2030 to close this gap
50% of additional investment is expected from the private sector



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Growing Momentum in the Energy Access Space

The past year has seen the issue of “energy access” move to the top of the agenda for public and private sector decision-makers. The decision by the UN to make 2012 the year of “Sustainable Energy for All” has increased understanding of the issues and barriers, and also served to create more awareness of the challenges and opportunities. The World Economic Forum recognizes that numerous initiatives and activities are already under way in the global energy access area and has looked to connect with many of these. The goal of the Forum’s work on energy access is to both showcase the progress which has already been made and complement activities where possible.

The Sustainable Energy for All (SE4All) initiative led by UN Secretary-General Ban Ki-moon, declared as one of its three objectives “universal access to modern energy services”. The private sector has been identified as key to the delivery of these services. Following the events of 2012 and given the importance of the energy issue for sustainable development, the UN General Assembly more recently declared the period 2014 to 2024 to be the “decade of sustainable energy for all”. Governments and the private sector have responded well to all of these developments, recognizing their role in contributing to energy access, with commitments made at the Rio+20 summit in June 2012 and further commitments since then to contribute to the longer term UN goals.

Several organizations supported discussions during 2012 by publishing reports and analysis on the energy access issue. The International Energy Agency (IEA) provided an update of its in-depth analysis of the global energy access market and proposed different scenarios showing how universal access to energy could be delivered by 2030. The International Finance Corporation (IFC) published a report on energy access business models, how to best address the market, and how to scale up solutions. Lighting Africa and Lighting India, a joint World Bank-IFC programme, focused on access to clean and affordable lighting, working with governments on reducing policy barriers and with the private sector to develop standards, enabling access to finance or market information.

But it was not only the multilateral organizations that were engaged in the energy access issue. The “Energy+” initiative from the Norwegian Ministry of Foreign Affairs pledged to scale up financing and deployment of modern energy sources, while avoiding increased greenhouse gas (GHG) emissions. In its new initiative the World Business Council for Sustainable Development (WBCSD) singles out the private sector as the primary solution provider for energy access. The “Green Power for Mobile” and “Community Power from Mobile” are programmes arising from the GSMA Development Fund that test and showcase projects providing excess energy from telecom base stations to nearby communities through renewable mini-grids, or energy hubs.

Many other initiatives, programmes and hundreds of individual projects exist, all focusing on addressing access and barriers at the BoP (bottom of the pyramid) market. For a more detailed overview of these and other related initiatives please see the “Initiatives and Programmes” section of this report.

To ensure the World Economic Forum complements these activities and avoids replication of efforts, it was decided to focus on a research study that would help find answers to the key question: how can multiple new business models be developed to scale up energy access?



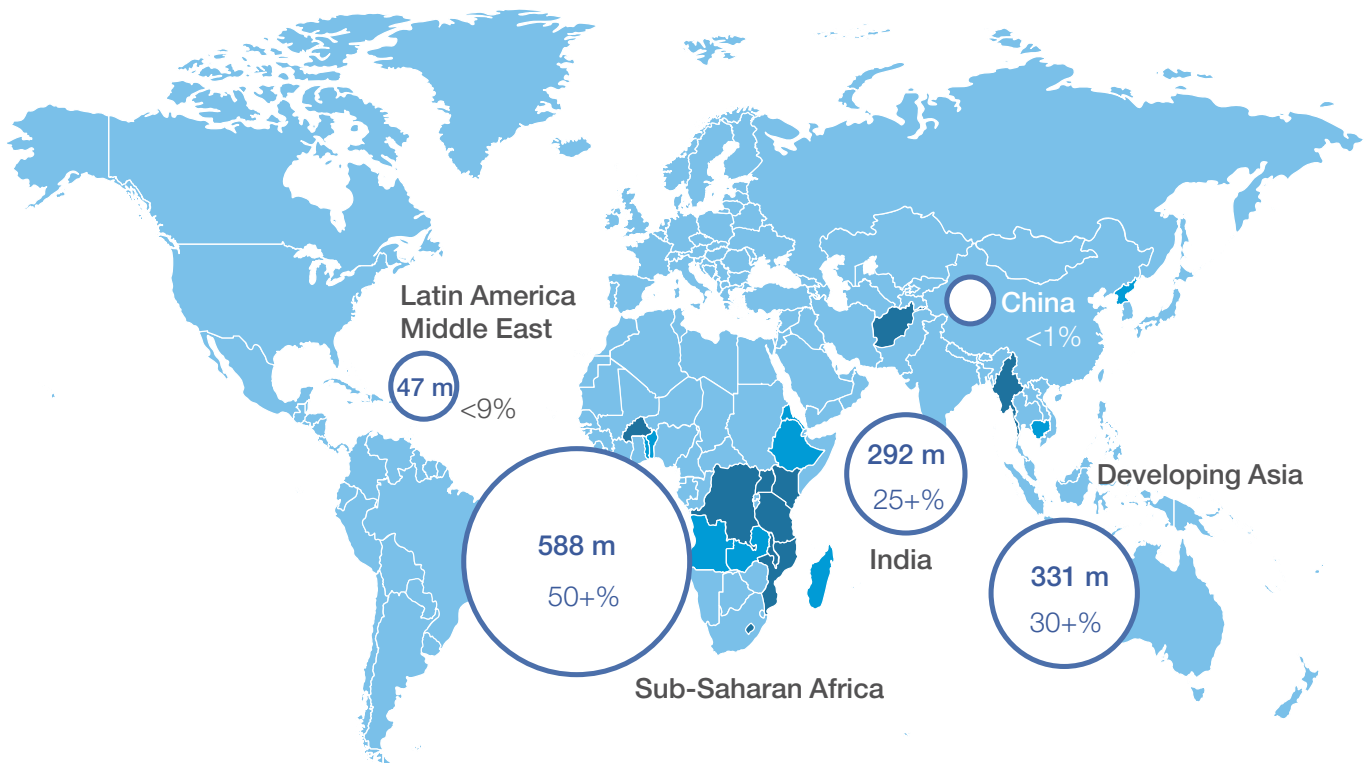
The Challenge: Providing Energy Access at Scale

Globally, some 1.3 billion people or 274 million households do not currently have access to modern energy such as electricity and lighting. Access to affordable modern forms of energy is not only a prerequisite for economic prosperity, but also for local growth and sustainable development. Some 95% of the people without electricity live in Sub-Saharan Africa (590 million), developing Asia (628 million); and 84% of these people live in rural areas. According to the latest progress report (on achieving universal energy access)

by the IEA, with current rates of investment and commitments, by 2030 the number of people without access will halve in Asia (from 628 million to 334 million) but increase by more than 100 million in Africa (from 590 million to 655 million). China, Latin America and the Middle East are expected to achieve full access to energy. A world in which one-fifth of the population remains without access to any form of electricity is not only a developmental issue, but also one that has a significant impact on economic growth.

World Map

Source: Based on data from the International Energy Agency, "World energy outlook 2012"



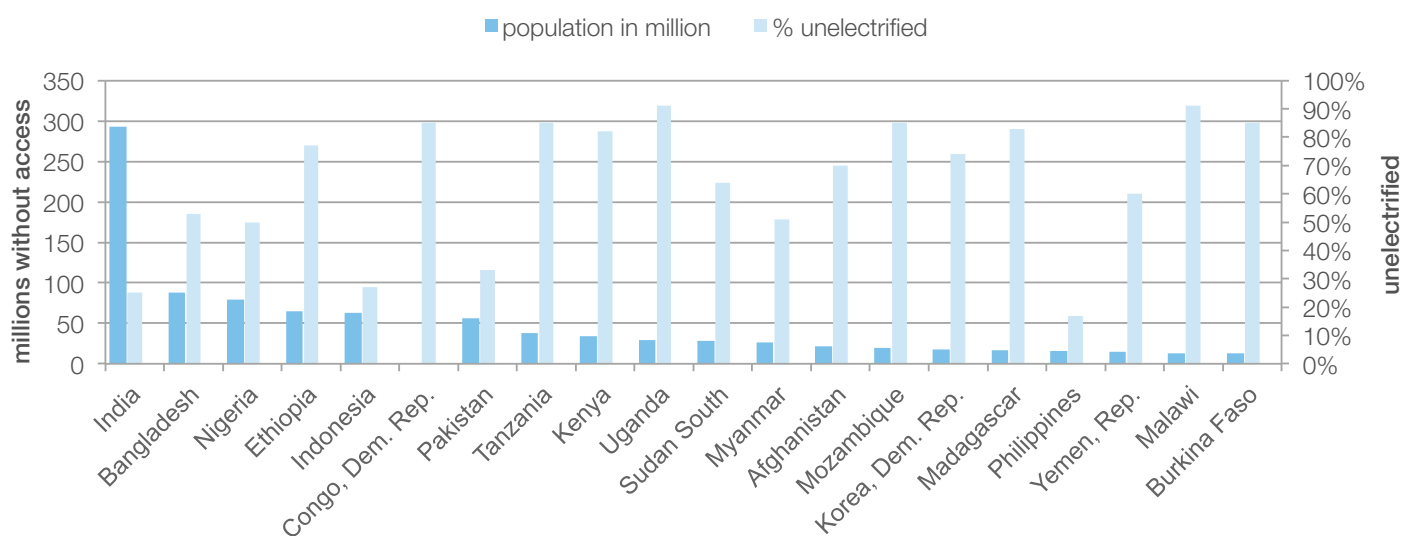
At the same time, these millions of households in tens of thousands of villages in dozens of countries represent a new market with huge growth potential. The majority of this unelectrified population is considered part of the BoP market, as 80% of this population have incomes of less than US\$ 3 per day. According to current IEA comparisons between a “base-case” scenario and an “energy for all” scenario, access to electricity will not compound the problem of energy security or of global greenhouse gas emissions. Only a 1% increase (or 167 million tons of oil equivalent) of total primary energy demand versus the base-case scenario is expected, as a level of 800 kWh per year is factored in for newly connected households. Likewise, no burden on climate change is expected due to an increase of CO₂ emissions of only 0.6% (or 199 million tons of CO₂), as more than half of the additional energy capacity is expected to come from renewable energy sources and low levels of energy are

needed to provide basic electricity and energy access. Conversely, the energy provided is expected to lead to an increase in economic growth, a reduction in negative health and environmental impacts, and will improve the well-being and opportunities of rural communities. While the lack of access persists in more than 60 countries worldwide, clearly Sub-Saharan Africa is a priority, followed by developing countries in Asia, due to the remaining need for access by 2030.

The following graph shows the top 20 countries globally with the largest unelectrified population in terms of absolute size and percentage. The first 10 countries represent close to 60% and all 20 countries shown represent close to 80% of the global unelectrified population of 1,267 million people.

Population Without Energy Access

Source: Based on data from the International Energy Agency, “World energy outlook 2012”

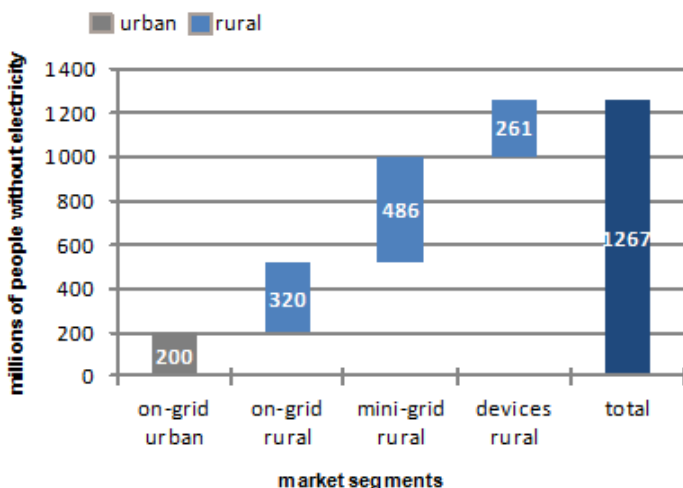


The Opportunity: Innovative Off-grid and Mini-grid Business Models

The needs of the different markets can only be successfully addressed through a mix of energy sources, technologies and new business models. According to the IEA analysis, of the total 1,267 million people without access to electricity in 2010, the needs of 184 million (17% of total) members of the urban population and 325 million (25% of total) members of the rural population would be best addressed through on-grid solutions, as high population densities mean that there is no need for costly transmission systems. Meanwhile, the needs of some 265 million people (20% of total) would be best addressed through devices and solar home systems designed to reach sparsely populated rural regions. The needs of the largest share of the population, 38% (493 million), and people in rural areas would be best addressed through mini-grid systems, thereby saving on the costs of long distance transmission lines and transmission losses. Comparing the IEA base-case scenario with the energy for all case, the provision of an additional 838 TWh of energy is needed to achieve the goal of universal access by 2030. The 220 GW installed generation capacity needed to achieve this only represents about one-fifth of today's US generation capacity of 1,025 GW in 2010.

Market Segments

Source: Based on data from the International Energy Agency "World energy outlook 2011"



When the level of energy provided by different technologies and the potential impacts are considered, the importance of mini-grid solutions for enabling access to electricity becomes clear. While devices can provide immediate energy for lighting, charging and running small appliances (e.g. radio, TV), the level and type of energy is too low for productive energy use, e.g. for running machinery or water pumps. The grid provides the highest form of energy, usable for all purposes, but is often not feasible in remote areas, where grid extensions are too costly to be justified within

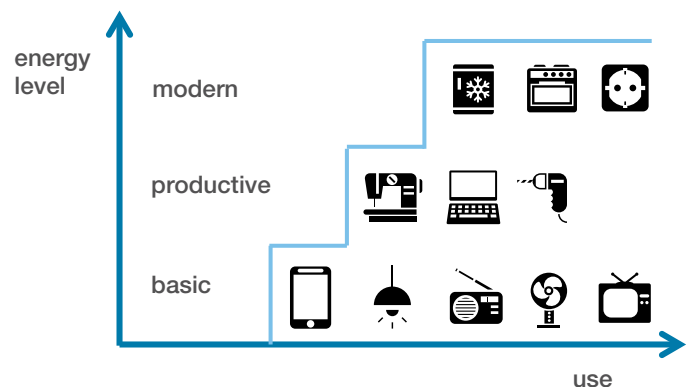
the foreseeable future. Decentralized mini-grid systems offer a significant jump up the energy ladder, complementing or replacing household-level devices and allowing the use of energy in many ways, such as power and lighting at household level, productive use (e.g. water pumping, running machinery, cooling and heating) or for infrastructure purposes (e.g. street lighting).

The Energy Ladder

- Level 1 – basic human needs:
 - Energy demand: 50 – 100 kWh per person/year (ca. 250 – 500 kWh per household/year)
 - Energy use: lighting, health services, education purposes, communication and community services, etc.
- Level 2 – productive uses:
 - Energy demand: 250+ kWh per installation/year
 - Energy use: water pumping for irrigation, mechanized tilling, agricultural and food processing, running small machinery, health services, etc.
- Level 3 – modern society needs:
 - Energy demand: 2,000+ kWh per person/year
 - Energy use: domestic appliances and devices, cooling and heating, etc.

Levels of Energy

Source: Based on data from UNIDO, "Energy for a Sustainable Future – summary reports and recommendations", 2010



Despite their limited incomes, low-income populations currently spend US\$ 37 billion per year on meeting basic energy needs. Half of this amount is spent on inefficient cooking solutions (e.g. wood, charcoal), while the other half is used for charging (e.g. mobile phones, flashlights) and lighting (e.g. kerosene lamps). In many cases, spending on energy represents more than 10% of a

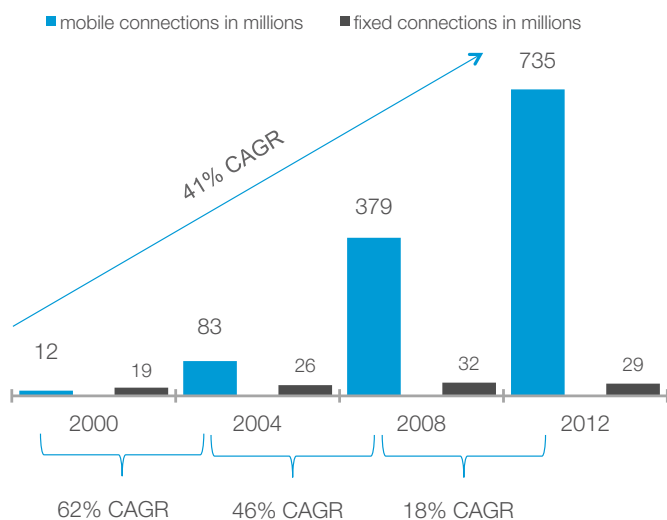
household's monthly outlay. Energy costs are often substantially higher in rural areas, e.g. diesel costs are often 30% higher in Sub-Saharan Africa. Providing modern energy services can often reduce the absolute costs for energy consumed and free up money for further energy consumption, electronic devices or for other services such as health, education and transportation. Energy also has a clear role as a catalyst for local economic growth and increased household income, both by improved productivity (for example, electrified rather than manual water pumps) and extending the effective working day (for example, by providing lighting after dusk). This increased demand and spending power represents a big opportunity for the private sector.

The IEA has calculated that US\$ 979 billion is the cumulative global investment needed between 2011 and 2030 to ensure universal access to lighting, electricity and cooking services. Investments of US\$ 49 billion per year alone are needed to provide full access to electricity and lighting. Half of this is expected to come from a range of private sector actors, highlighting the need and the opportunity for stepped-up private sector investment. Signs indicate that the private sector is seizing the opportunity, as demonstrated by the 50+ commitments for action by country governments and hundreds of private sector commitments worth US\$ 50 billion to the UN Sustainable Energy for All Initiative in 2012. Commitments range from specific small-scale projects to more ambitious goals to electrify millions of people over the coming years. Representing the third largest group of energy access investment commitments after development banks and governments, the private sector clearly is still only just beginning to enter and tap into the full potential of this area.

The success of the telecom sector in entering the BoP market offers an effective example the business case for focusing on this segment and demonstrates that it is both possible and profitable. In a period of just over 10 years the telecom sector managed to overcome the limitations of the landline-based business model, which was not appropriate for the rural African market. Between 2000 and 2012, mobile phone connections in Africa increased from 12 million to over 700 million per year. In the same period, fixed line connections only increased from 19 million to 29 million.

Success of Telecom in Africa

Source: Based on data from Wireless Intelligence in GSMA, "African mobile observatory 2011", 2011; PwC, "Communications review 2012", 2012; GSMA Green & Community Power at www.gsma.com/mobilefordevelopment



41% of compound annual growth (CAGR) within 12 years

Reasons for the success of this development include leapfrogging technology (from fixed line to decentralized telecom towers), innovative payment solutions (mobile payment, prepaid), cost reductions (shared infrastructure), increased mobile use (cheaper handsets, expanded mobile services, better tariffs), cooperation and partnerships (energy suppliers working with tower operators), improved regulation (competitive market) or recent energy hub development (community and green power). A look at the daily impact of mobile communication and related services on the lives of millions of people in rural Africa and Asia clearly reveals the benefits both for the economy and the quality of life.

The cross-sector approach described in this report represents one possible entry point for business. However, a key question remains: Can the energy sector replicate the success of the telecom sector?



A Proposed Way Forward: Cross-sector Collaboration

The Cross-sector Collaboration Framework

The wealth of opportunities offered by investment in energy access is becoming ever more apparent with the emergence of successful show-cases and business models. However, many private sector actors still find it difficult to overcome existing barriers, such as high upfront investment costs and risks, and market fragmentation, or simply lack experience in new markets. Today, most actors are still using traditional approaches when developing business models and projects including:

- Single actor approach, versus cross-sector partnering
- CSR or philanthropic-oriented business models, versus market-based solutions
- Focus on one or few projects with limited scope, rather than a highly replicable and scalable model
- Lack of understanding of the needs, wants and specifics of consumer behaviour in the BoP market, versus services and products tailored to the specific features and conditions of this market

New and innovative business models are needed that address these barriers and enable businesses to successfully unlock the market potential at scale.

The primary output of this report is the cross-sector partnership framework which addresses many of the market barriers through alignment of the interests and competencies of global and local actors along a cross-sector value chain. This partnership framework brings together energy providers such as utilities, technology and energy service providers, with industries that need reliable and cost-efficient energy for their operations. These include anchor customers with a base load demand for energy such as telecommunication infrastructure (tower base stations), agriculture (water pumping), mining and metals (extraction, operations), fast moving consumer goods (cooling), food industry (processing, cooling), or local small and medium-sized enterprises (productive use). Partners that benefit from available access to electricity are a further part of the cross-sector value chain, such as electronics (appliances, lighting), health (vaccine cooling, health services, clean water), telecommunications service providers (mobile charging), tourism (lighting, operations, cooling), or local infrastructure (street lighting, schools, community installations). Local households are connected through collaboration with local (social) entrepreneurs who provide energy access through locally tailored and feasible business models like energy kiosks or mini-grids. The local community is not only expected to benefit from direct access to energy but also from the wider impacts of enabled economic activity, reduced health impacts, or reduced environmental damage. Energy provision is not seen in terms of aid and charity, but as a catalyst to enable productive energy use and create wider economic, social and environmental impact.

To effectively bring the various partners together using energy as a catalyst for growth, the framework focuses on the following:

- Bringing together private sector companies (with operations of significant size, and multi-country presence) with local partners to ensure investment power is combined with local market knowledge and BoP-ready solutions
- Aligning interests and competencies of different private sector partners to leverage synergies
- Building on an anchor load demand as a primary market for energy and securing energy beneficiary co-investment in the business model
- Focusing on decentralized, renewable or hybrid solutions which provide levels of energy for productive energy use
- Providing a scalable and replicable base for business models to have impact at country-wide and global levels



The Mechanics of the Framework

The following steps describe the high-level process that would be needed to build the cross-sector value chain.

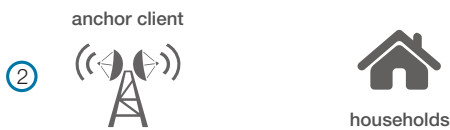
- Precondition for framework to work: areas with anchor energy demand and population density high enough to provide energy for secondary household demand are chosen for the deployment of the model

Success of Telecom in Africa



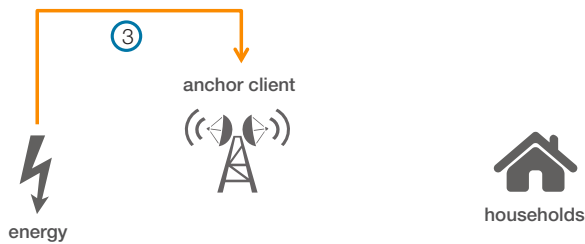
- An anchor demand is identified and the entire model is built on the anchor demand, e.g. replacing diesel power at telecom base stations, electrifying agricultural processes, the mining sector, public infrastructure (schools, hospitals) or for cooling in the consumer industry

System of Cross-sector Partnership



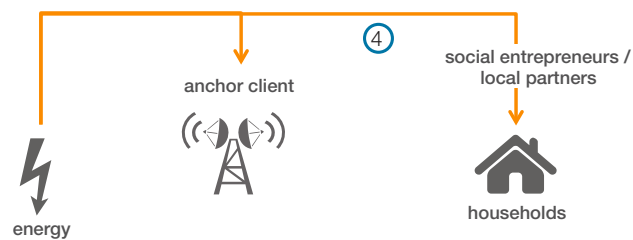
- An energy provider (e.g. utility, energy service company, other third-party service provider) electrifies the anchor client through an off-take agreement, which is applied not only to a single project, but also to a whole region or country

System of Cross-sector Partnership



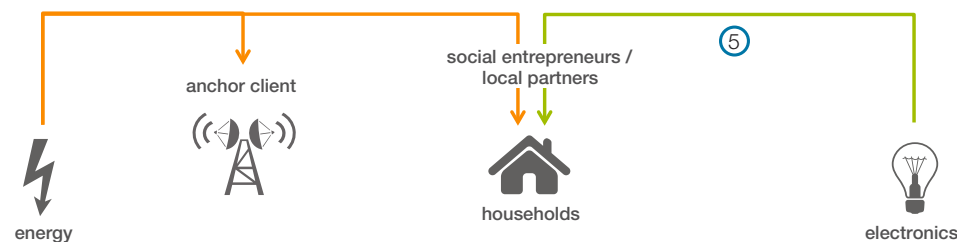
- The energy service provider, in collaboration with a local partner, e.g. a local entrepreneur, a social entrepreneur or a non-governmental organization (NGO), electrifies the local households and the community through energy kiosks that people can walk to or mini-grids which are directly connected to households

System of Cross-sector Partnership



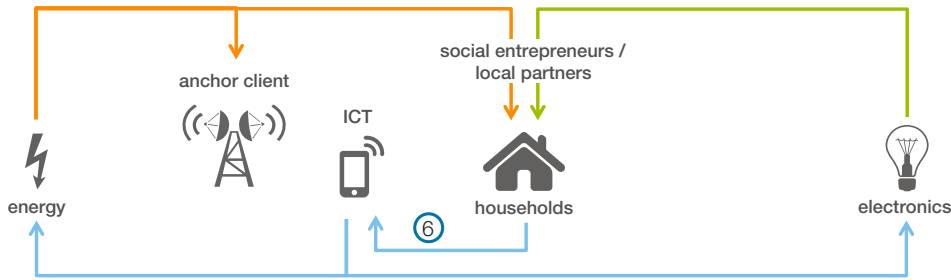
- Beneficiaries of local household and community electrification (e.g. consumer goods and electronic appliance companies) co-invest in a local energy system. Energy-dependent services and products are offered by an electronics company, such as lighting, electronic appliances (TV, radio and fridge), water and health services. Household energy demand is expected to increase once affordable energy is provided and need increases with the use of new products

System of Cross-sector Partnership



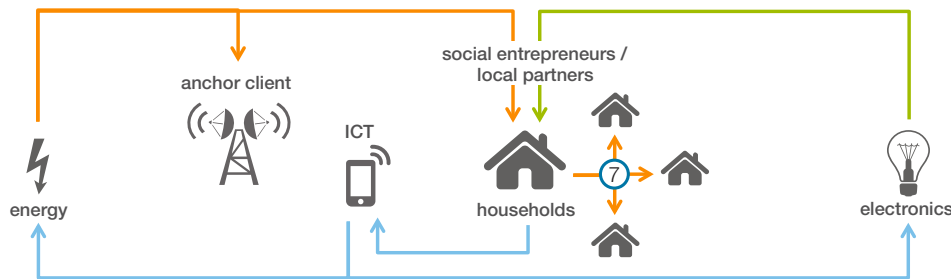
- The Information and Communication Technology (ICT) sector provides mobile payment, billing and banking solutions to the rural population. Mobile airtime is expected to increase thanks to cheaper and more frequent charging of mobile devices

System of Cross-sector Partnership



- Over time, energy services are expanded to more clients such as local companies, community infrastructure and remote households

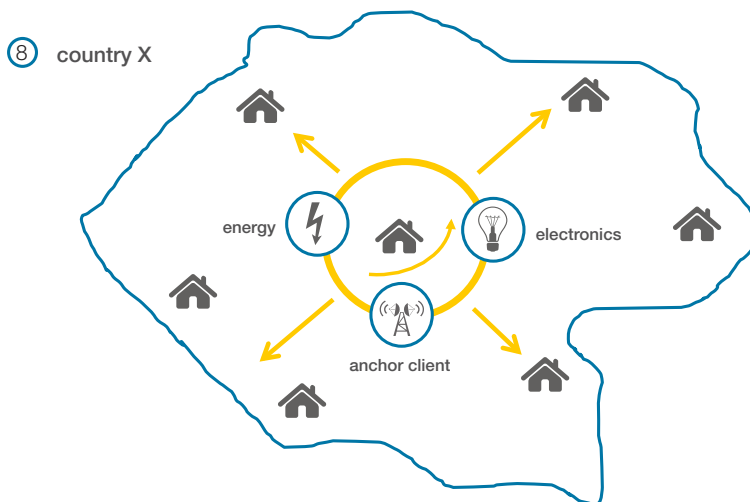
System of Cross-sector Partnership



- Scale is supported through the replicability of the approach, such as the initial anchor client, co-investment by beneficiaries and synergies partnering across sectors and with local actors

System of Cross-sector Partnership

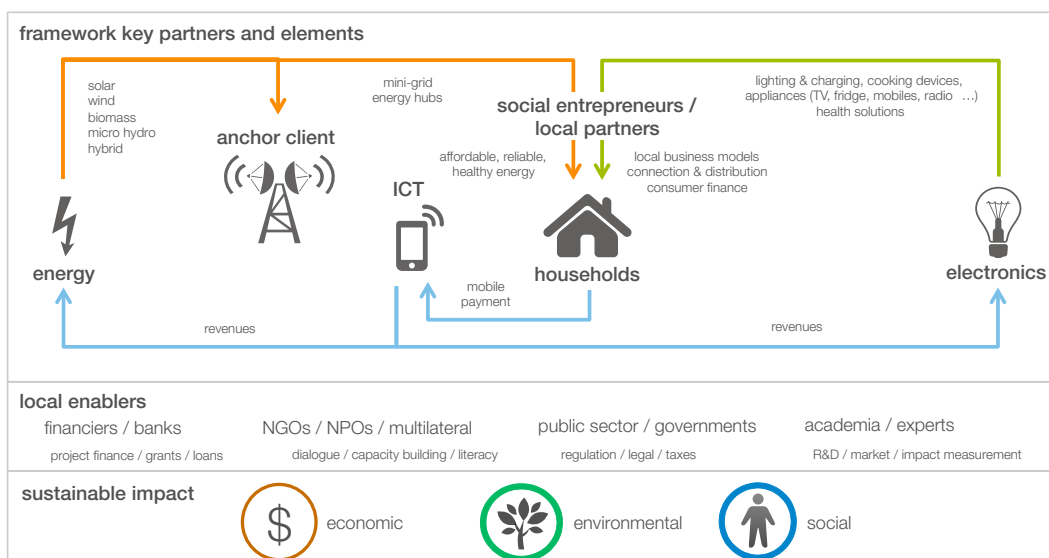
Source: Developed by the World Economic Forum



The envisioned result is that projects create a sustainable impact through collaboration of cross-sector partners (energy, telecom, mining, agriculture, public infrastructure, electronics, etc.) with local partners (social entrepreneurs, small businesses, etc.), supported by local enablers (NGOs, multilateral organizations, banks, financiers, academia, etc.).

Building a Cross-sector Energy Access Value Chain

Source: Developed by the World Economic Forum



Value of Partnering along the Framework

The key concept behind the cross-sector partnership framework is to build on the interests and leverage the competencies, knowledge and experience of various partners to enter the energy access market. It could be argued that in many cases the costs of the process of forming cross-sector partnerships, agreeing and selecting a market to enter, the technology used, clarifying interests, etc., can outweigh the gains of partnering. Nevertheless more and more cases of partnerships in the field of energy access have appeared and have proven successful in other sectors that have looked to enter the BoP market. As a result of in-depth research, expert consultations and various workshops, as well as practical experience gained through the involvement with a Kenyan business consortium, it is apparent that partnerships across the sectors represent a new and promising approach towards developing successful business models.

The following provides an overview of the anticipated value and roles of the different partners within such a partnership framework:

- **Energy sector:** The sale of energy products and solutions is the core business of energy technology manufacturers and utilities. Value is provided by a reliable and large-scale anchor client, representing a stable initial market. Further value is expected in extending the service offering to households, enterprises, infrastructure and other energy clients through a mini-grid. Energy demand is expected to rise over time once basic needs have been fulfilled (from lighting to powering appliances).
- **Telecom and ICT sector:** The sale of airtime represents the core business of telecom providers. Stable energy is needed to keep tower operations going. Value is added through the receipt of energy services from an external energy provider, thus securing energy supply and freeing up tied-up capital for the core business. Additional value is added by reducing the carbon footprint if renewable energy is used. Further synergies in business are achieved for the ICT sector by offering billing, payment and banking services. Mobile airtime is expected to increase with cheaper and more frequent charging of mobile devices.

- **Other anchor demand:** Agriculture, mining, fast-moving consumer goods, food processing, tourism infrastructure and community infrastructure need energy for their core business activities and the use of products. Value is added by supplying these anchor clients with reliable energy in off-grid areas.
- **Electronics and devices sector:** The sale of devices and appliances, many of them energy dependent, represents the core business of this sector. Value is added by stimulating demand through electrification for lighting appliances, electronic devices or healthcare solutions. Collaboration with local partners can offer new distribution channels.
- **Local enterprises and social entrepreneurs:** The core business among this sector is the provision of products and services fulfilling local energy needs and creating a wider economic, social and environmental impact. Local partners offer valuable insights into household needs and consumer behaviour and offer services such as metering, payment, maintenance, distribution and marketing, or capacity building.

The following partners are key to local enabling and implementation:

- **Local and international finance and investment sector:** Provision of financing and banking services in return for interest and fees, represents the core business of this sector. The value provided by the framework lies in substantial investment opportunities generated by the volume of partnership projects, credibility of consortia partners (e.g. multinationals) and reduced financing risks.
- **Governments:** Regional and national governments have an interest in economic growth and positive social and environmental development. The framework provides value through direct and enabled impacts from electrifying rural communities. Anticipated benefits include lowered health costs (e.g. improved indoor air quality, health services), improved education (e.g. available lighting to study at home), lower dependency on fuel imports (e.g. kerosene, diesel), or increased economic activity and job creation.

- **Multilateral organizations/initiatives:** The core activity of most multilateral organizations is to make a contribution to economic, social and environmental development in specific countries. These organizations can offer financial and technical assistance, capacity building, project implementation support or help in minimizing risks of transaction costs.
- **Non-Governmental Organizations (NGOs):** The key focus of NGOs is to support access to energy and to create a positive, long-term economic, social and environmental impact. The framework seeks to create a sustainable impact which aligns with the interests of NGOs.
- **Knowledge partners/academia/experts:** Interest of these partners is in analysing and further developing solutions that support energy access. Experts see value in information sharing and cross-sector learning and offer real life expertise and project experience.

Barriers Addressed by the Framework

Experts and practitioners have confirmed that they see potential in cross-sector partnerships to address key barriers that currently prevent the private sector from entering the energy access market and co-investing at scale. Business models based on the proposed framework are expected to be market-based, have financially sustainable business cases, and offer shared and reduced investment and transaction costs and risks, as well as value for partners and impact for communities through scale and replicability.

Several factors are advanced to explain why the private sector is currently not yet investing in the energy access market at scale:

- lack of information about market opportunity
- limited availability of proven and innovative business models
- high expectations for short-term returns

Another factor frequently mentioned by experts is that most projects from multinational companies (other than projects from social entrepreneurs) are designed purely from a CSR or philanthropic perspective. In many cases this non-market based approach leads to limited scope and lack of any long-term impact as there is no strategic investment involved.

The following provides a brief explanation of how the framework seeks to address these key barriers.

For most energy access projects (especially mini-grid and devices), the most critical aspects of the value chain include overcoming market fragmentation, investment costs and risks, viability of the business case and access to the different types of financing required.

Developing a Sustainable Business Case that Meets Expectations for Returns

The traditional CSR or aid-based approach, or development of projects funded by grants or sponsorship funds represents a key challenge to the development of a feasible business case for energy access. On the other hand, expectations of returns, based on experience with large-scale energy projects in developing countries, are often simply not realistic in small-scale, off-grid projects and require a more long-term perspective. The current framework supports the business case by leveraging synergies, best practice sharing, focusing on core competencies of partners involved, recognizing the existence of local solutions that need to be built into the business model and scaled up, and supporting the wider business case through measuring economic, social and environmental impact.

High Up-front and Transaction Costs

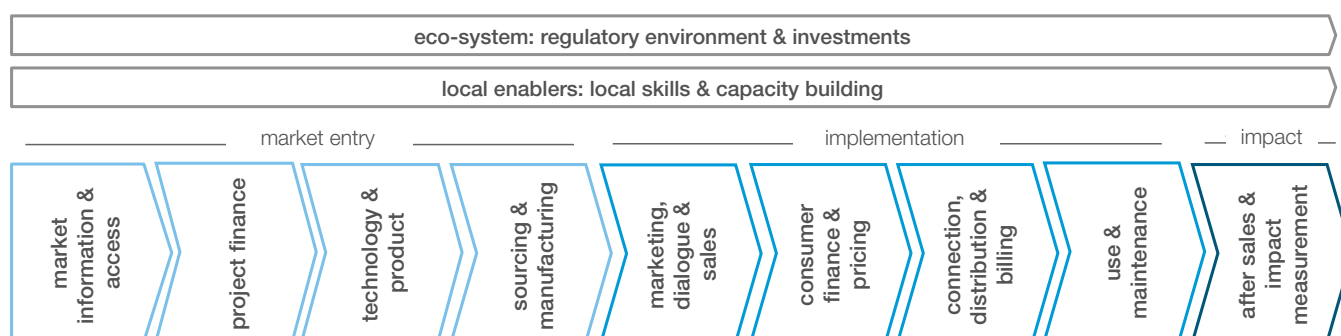
Often the largest barriers to private sector investment are the high up-front investment and transaction costs needed to provide renewable, off-grid energy solutions for a small village or anchor customer such as a telecom base station. In many cases too, costs for market information and lengthy regulatory procedures are prohibitive. The framework proposes solutions to reduce these costs, through co-investment in needed infrastructure by various partners (e.g. energy, electronics, local entrepreneurs), enabling information and best practice sharing by forming partnerships, or reducing transaction costs of dealing with policy-makers, local actors, suppliers and other stakeholders.

High Investment Risks and Difficulties in Accessing Financing

Often, low investment in a project coupled with high investment risks due to a lack of available track record or well-proven business models, make access to financing difficult. Through a cross-sector consortium the overall investment volume can be increased through the replication of the business model in several locations and the intended scaling up of the solution. Also, for consortia which include multinational partners, it is expected to be easier to attract the interest of investors and financiers. The impact measurement tool also provides information to strengthen the business case and can help to attract investors thanks to the promise of wider social and environmental impacts.

Energy Access Business Value Chain

Source: World Economic Forum on the basis of IFC, Endeava data and expert input

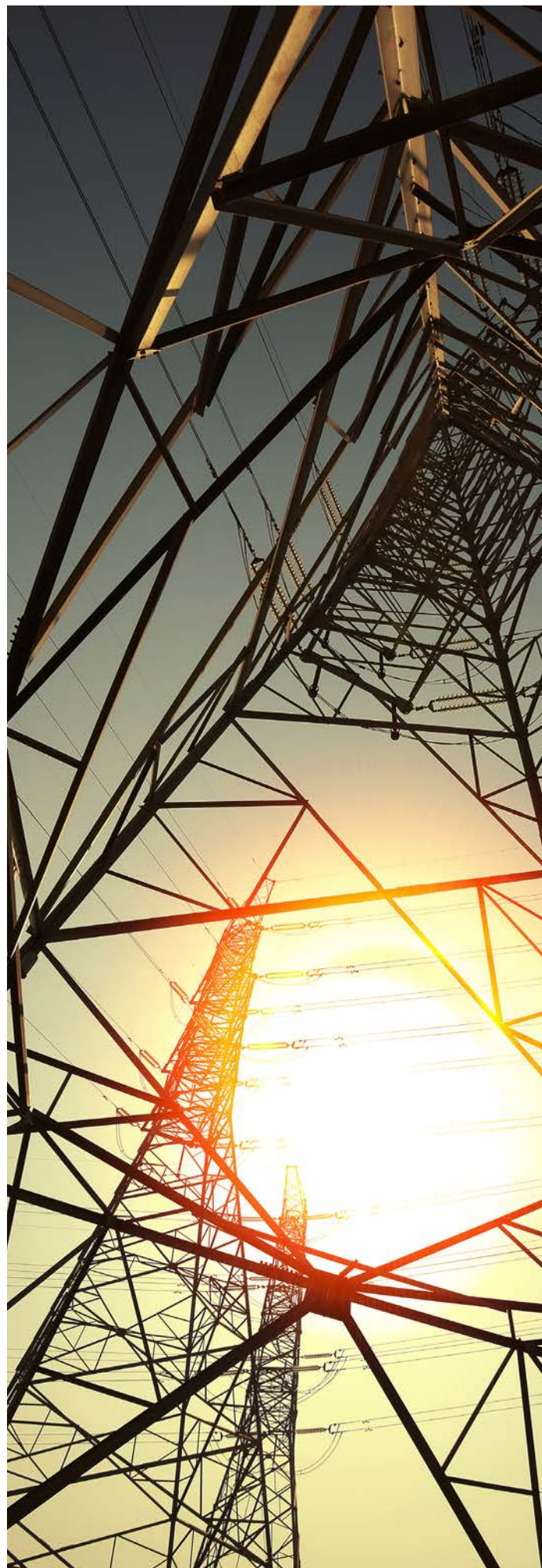


High Market Fragmentation and Low Spending Power

In rural markets in developing countries, households often have relatively low spending power as compared to developed countries; similarly, low-density markets are often hard to reach. The approach developed as part of the current framework expects to lower these barriers through collaboration with local entrepreneurs and partners, who already have access to or the knowledge necessary to develop local distribution models for low-cost energy services. Working with primary anchor clients and partners that co-invest in the infrastructure is expected to lower the costs of energy for the end customer. Mobile payment mechanisms provide a solution for revenue collection.

Scale and Replicability of Projects

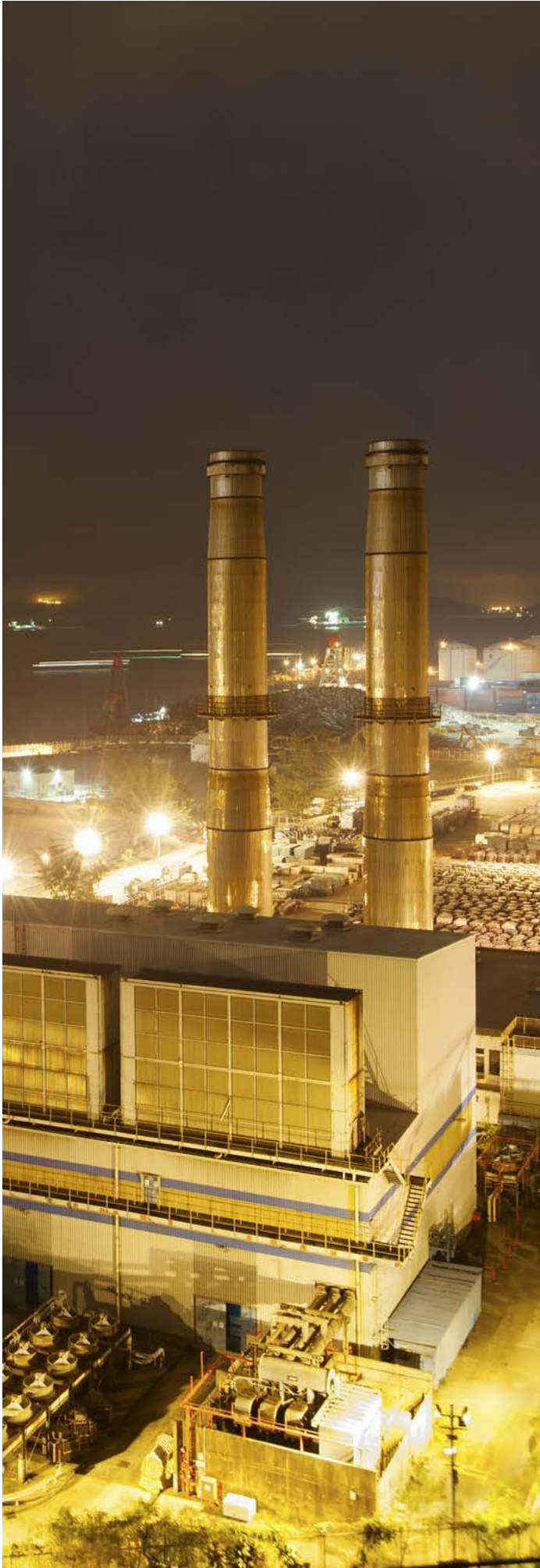
Looking at today's successful business models in off-grid energy access, a key challenge is to replicate the solutions developed in different areas and under different market and regulatory conditions, as well as to scale up and improve the business case. The framework acknowledges this challenge by supporting the development of replicable and scalable business models, through the involvement of multinational partners and by agreeing a region or country-wide scope when setting up cross-sector consortia. Working with anchor customers with an interest in large-scale solutions and the expected growth of energy demand once basic electrification is provided, should also support scaling up.



The Value and Impact of Cross-sector Partnerships

Partnership	Market	Product/Service	Value for Partners	Impact/Scale
Grameenphone – Telenor and Grameen Telecom Corporation (related to Grameen Bank)	Rural mobile services	Mobile communication, information and payment services for BoP populations	Combining best skills and experience from telecom and development sectors and a positive business case represented by a US\$ 900 million revenue (2012)	Access to mobile services by 37 million subscribers within 15 years
Green tower sites – Bharti Infratel and OMC Power	Rural mini-grid energy	Renewable, reliable and cost-effective energy, replacing diesel generators at telecom base stations and providing electricity access for rural communities	Aligning interests of Bharti in reducing carbon footprints and outsourcing energy supply with the expertise and capabilities of the renewable and off-grid energy from OMC	Electrification with renewable energy of 22,000 sites through a 10-year take-off agreement and provision of electricity to local communities near the micro power sites
Access to energy programme – ABB, local authorities and NGOs	Rural mini-grid energy	Replacing expensive and unhealthy kerosene lighting in rural households with renewable energy supply	Bringing together technical energy expertise from ABB, with knowledge of local needs from authorities and NGOs experienced in capacity building	Electrification and improvement of life quality (healthcare, education, productivity) for thousands of people in several projects
ReadySet solar charging devices – Fenix International and MTN Group	Rural energy devices	Solar powered energy devices for charging mobile phones, lighting and electronic devices	Combining the technical expertise and charging solutions of Fenix with the delivery channels and market interests of MTN	2,000 charging devices sold across Africa, powering in turn 100,000 off-grid mobile subscribers, providing 5.2 million phone charges, creating yearly savings for subscribers of US\$ 2 million
WE!Hub – OSRAM, Global Nature Fund, Thames Electricals, European Union and Siemens Stiftung	Rural energy services and devices	Provision and sales of affordable and environmentally friendly off-grid energy, lighting products, electronic products, drinking water, mobile charging and Internet access to the rural population	Alignment of interests from energy and lighting devices providers, with social impact focus of funds	Several projects each serving thousands of households
Nuru Energy – social enterprise working with local organizations and entrepreneurs	Rural energy devices	Provision of an off-grid and clean electricity recharging platform and complementing portable LED lights	The need for affordable, clean and reliable lighting is met by providing lighting devices and recharging solutions from Nuru by village entrepreneurs	Thousands of village-level entrepreneurs make their living in Africa and India out of charging services, while more than 10,000 people reduce their lighting costs by 80% and increase income by 30% thanks to better lighting
Codensa slum electricity – on-grid electricity provider working with retailers, electric appliance manufacturers and insurance providers	On-grid energy services and devices	Providing microcredit services to enable purchase of electric appliances and insurance services, thus raising electricity sales	Bringing together the interests of Codensa to increase electricity sales, with energy demanding devices provided, financing and insurance solutions	Providing access to microcredit services for millions of people at the base of the pyramid
Slum grid connection – Lydec on-grid energy provider, local authorities, national initiative for human development, NGO and local micro entrepreneurs	On-grid energy services	Providing access to electricity and water services to households in slums in the greater Casablanca area	Reducing electricity theft and power shortages for Lydec, creating business opportunities for community intermediaries and providing affordable energy and water services to slum inhabitants	Connection to on-grid energy through micro entrepreneurs (distributors) of 30,000 households and 10,000 households connected to drinking water and planned access to services for many more tens of thousands

Many more cross-sector partnerships are working successfully in the BoP market, including in the telecom, fast moving consumer goods and finance sectors. See the Appendix for a list of such partnerships.



Use and Limitations of the Framework

The framework described above is the product of an extensive analysis of relevant literature, case studies and a year-long consultation process with energy access experts from various sectors including: energy (generation, distribution, on-grid, off-grid), telecom, electronics, finance (impact investors, banks), agriculture, mining, multilateral organizations, NGOs, academia, professional services and business associations. It describes a conceptual framework for how a cross-sector energy access value chain and respective multistakeholder consortia could be developed and helps to overcome known barriers for co-investment and scaling up. Testing and implementation of business models based on the framework is the next step to further evolve, refine and complete it. A first cross-sector consortium is in formation in Kenya; it will test the framework in a few pilot projects and then scale it up to a country-wide level. The proposed combination of energy access stakeholders is only one of many different partnership variations.

The proposed framework is intended as an example of a catalyst for creating new business models and hopefully highlights the opportunities and benefits offered by partnerships. It should serve as a starting point for the development of further and new market-based business models and for suggestions on how to improve the framework and its implementation.

The Framework in Testing: The Kenya Consortium

The Case for a Pilot Project in Kenya

Kenya was selected as an ideal country to test off-grid energy access projects because of the high need for energy access solutions: 84% or 33.4 million of the 41.6 million inhabitants are without access to energy and the majority of the population (78%) lives in rural areas. At the same time, Kenya offers vast opportunities for off-grid renewable power (such as wind, solar PV, mini-hydro, etc.), a favourable and stable policy environment, a large presence of anchor customers such as telecom base stations and potential partners from the energy, electronics, social entrepreneur sectors, as well as a high penetration of mobile phones and mobile payment solutions.

Large sections of the population living in rural areas in Kenya already spend a significant portion of their monthly income on energy, including power from diesel generators and lighting sources from kerosene lamps and candles. Health impacts of indoor air pollution and fires caused by kerosene lamps and candles are severe. Firewood is mainly used as cooking fuel with primarily women and children spending several hours per day collecting wood over distances of up to 10 kilometres.

While rural access to mostly unhealthy and unclean energy is widespread, the business case for providing off-grid electricity is clear when looking at today's energy costs among the rural population. Kerosene is on average 46% more expensive than in urban areas (cost per litre of kerosene in rural areas of US\$ 1.2 compared to US\$ 0.9 in urban areas as of June 2011). Some 67% of rural households have a mobile phone connection but costs of charging are significantly higher than in urban areas. An average charge costs US\$ 0.25 to 0.30 in addition to the travel costs involved in accessing charging services. Often up to 50% of airtime costs are spent on mobile charging alone. If the need for several litres of kerosene for lighting and mobile charges per month is taken into account, this opens up a significant market of several million unelectrified households.

From Workshop to Consortium

The team held a workshop on energy access in Nairobi, Kenya on 3 October 2012 and used the event as an opportunity to present and discuss the cross-sector partnership framework in Africa for the first time.

Participants from various backgrounds and sectors met to discuss new ways of collaborating on energy access, including: energy, telecom, electronics, banking, social entrepreneurship, impact investing, energy consultancy, non government, public sector, carbon management, development aid and others.

A key outcome of the workshop was the formation of a group of interested partners to design, test and implement a cross-sector partnership business model based on the framework. The consortium is currently in the process of agreeing the technical details and searching for locations (starting with telecom towers) to test the business model. The model will be tested at five different locations with the aim of scaling it up and improving it after testing.

The consortium which was formed in October 2012, brings together partners from the telecom company Safaricom (as the anchor client with its base transmission stations), the energy and technology company General Electric (providing energy and energy-dependent services), the social entrepreneur HabiHut (shelter and site design solutions), the organization Kenya Climate Innovation Centre (supporting capacity building), as well as the development company GIZ (local facilitation).

Interests Addressed and Value Provided

The main objectives of the consortium project are to:

- Address the local need for affordable, reliable and healthy access to energy
- Offer energy-dependent services in addition to addressing water and health needs
- Enable the private sector to unlock the business case for energy access
- Provide value to participating companies and organizations to encourage co-investment over the long term
- Create sustainable economic, social and environmental impacts

All partners involved benefit from shared access to market information and key stakeholders; in addition, negotiating power with the public sector and financing partners is expected to increase. To further demonstrate the value of collaboration, members of the consortium have together identified the benefits to each sector of collaboration:

Telecom:

- Fully or partly replacing the diesel supply for base stations by renewable energy, providing a cost-effective and reliable power source, freeing up resources for the telecom core business
- Using renewable energy contributes to the climate mitigation goals of the company
- Transforming base stations from expenditure centres to revenue generators, by offering ICT-based services and mobile payment solutions through energy kiosks
- Increasing the security of tower installations and reducing the threat of theft, by increasing the sense of ownership among the local community
- Increasing phone use through improved access to phone charging services and airtime scratch cards

Energy and energy-based services/devices:

- Create and expand the customer base (anchor customer and local community) for off-grid energy solutions
- Deliver lighting, health and water solutions for the local community using a feasible business model
- Learn to develop business and financing solutions for the BoP market

Local social entrepreneurs:

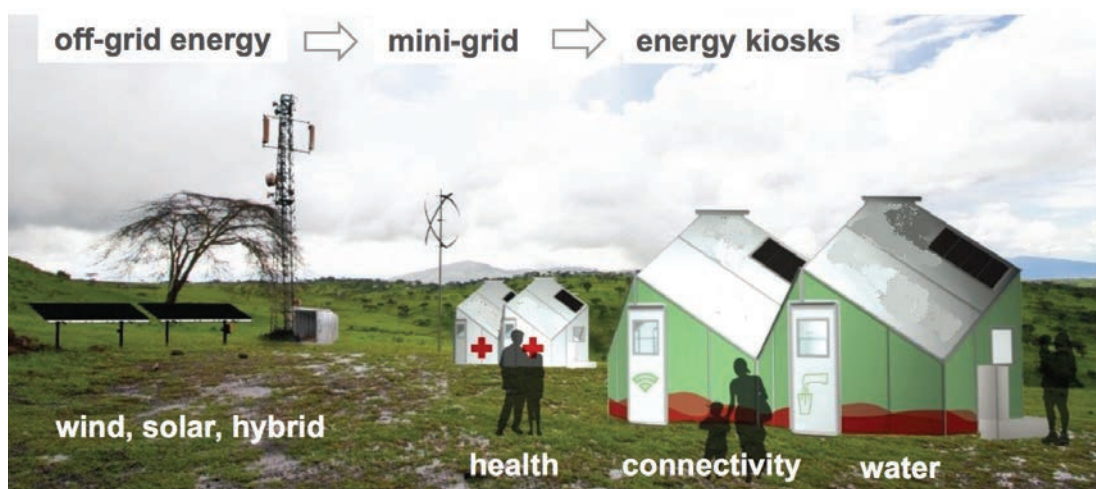
- Develop and provide shelter for energy-based services through kiosks
- Learn to design and develop innovative business and community delivery systems for critical services for the underserved

Non-governmental organizations:

- Make off-grid and small-scale energy access projects bankable and support risk reduction
- Support local capacity building, financing, legal and technical assistance
- Support sustainable long-term impact and the improvement of livelihoods

Kenya Consortium

Source: HabilHut project manager, www.thehabihut.com



Next Steps

The consortium is expected to be fully operational and testing the cross-sector model in 2013. Further, it is in discussions to assess the anticipated economic, social and environmental impacts before implementation and to measure the real impacts during implementation to better understand the wider value to local economic growth, health and well-being, as well as environmental aspects of providing access to energy.

Quantifying the Wider Business Case: Total Impact Measurement and Management (TIMM)

Bringing cross-sector energy access partnerships and respective market-based business models up to scale is a viable business development opportunity for the private sector. Energy also has an enabling effect creating economic, social and environmental impacts for the local community. Looking at the energy access landscape today, the supply-side of inputs to projects (e.g. energy generated) and direct outcomes (e.g. devices sold, households connected) tends to be measured and reported, however the demand-side of impacts and value catalysed through energy access are not measured and reported. A clear need exists for measuring local economic development, social, health and environmental impacts, which can then strongly support the development of the initial business case.

Impact Case: “Luz para Todos”, Government of Brazil

The following example from Brazil provides a compelling illustration of impacts of energy access.

“Luz para Todos” – Government of Brazil

- **What:** State sponsored programme to electrify 10 million rural people (recently extended)
- **Who:** Ministry of Mines and Energy of Brazil, Comitê Gestor Nacional (CGN), Comitê Gestor Estadual (CGE), Eletrobras, Agência Nacional de Energia Elétrica (Anee), local energy distributors and cooperatives
- **When:** Ongoing since 2003 (until 2014)
- **How:** Electrified Brazil’s rural population through a mix of solutions, aiming to provide at least one light bulb per household, at special social tariffs (providing discount rates for use of kWh/month)
- **Market:** Mainly off-grid, rural and on-grid where possible
- **Technology:** Renewable energy
- **Investments:** US\$ 10 million (75% from public financing); 85% of costs for renewable energy are paid by public funds
- **Impact:** (From 2003 to 2010) 11 million people electrified, 2.2 million TV sets sold (80% of households), 2.1 million fridges sold (73% of households), 24% of households bought water pumps, 1.3 million sound systems sold, 1.9 million blenders sold, 840,000 fans sold, 770,000 irons sold, thousands of job opportunities created
- **Success factors:** Strong political will and funding, collaboration between public, private and local partners

Link: http://luzparatodos.mme.gov.br/luzparatodos/Asp/o_programa.asp

The case for energy access projects and their large scale implementation can be greatly supported by understanding their full financial and non-financial impacts. The following aspects are also of importance:

- Establishing an informed energy access strategy and developing policy
- Understanding the interconnection of local development and energy
- Scoping projects and managing risks
- Providing data to engage policy-makers and public sector partners
- Attracting impact investors and multilateral organizations
- Improving the transparency and information quality of projects

A quantitative impact measurement through a profit and loss view of the benefits, linking financial values to environmental and social impacts is one way to assess the business case in the planning phase and to track the value created during implementation. It can also serve as an effective management tool.

Stakeholders naturally interested in this sort of information include: project managers, decision-makers within partnering organizations, stakeholders interested in the wider social, economic and environmental impacts, impact investors, government partners and the affected community. The wider public and clients of partnering companies can also be better informed about the projects.

Impact Areas

Depending on the source, market and technology of energy provided there are different areas to consider when measuring the impact of energy access. Projects focusing on the distribution of lighting and charging devices will have an impact in the areas of household access to light, reduced costs for mobile charging, and reduced indoor pollution as a result of replacing kerosene lamps. Renewable mini-grid projects could in addition create an impact by replacing diesel generators powering telecom base stations, improving street lighting and the sense of security, or increasing economic activity and sales of appliances thanks to higher levels of available power. On-grid projects have an impact in all areas as they offer the highest volumes and levels of energy.

The following describes the different categories and provides examples of impacts derived from various energy access projects.

Economic Impacts:

- **Costs:** Reduction of costs for energy and lighting at household level through replacing expensive kerosene lighting; reduced operating costs for telecom towers versus conventional energy supply
- **Economic activity:** Improved business development and productive activities, through availability of high levels of electricity, e.g. running machinery and devices; jobs created through freed up time for productive activity
- **Sales:** Increased sales of energy-dependent devices such as TVs, fridges, radios, blenders, water pumps, fans, irons, mobile phones, healthcare devices, sanitation devices and communication devices

Social Impacts:

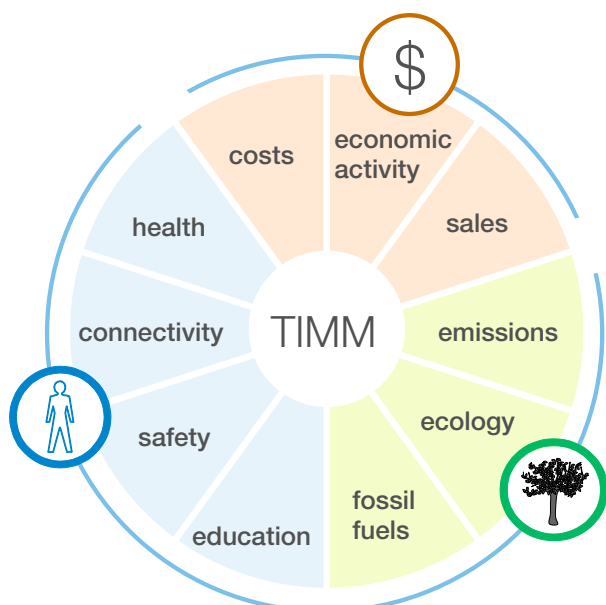
- **Health:** Improved health through replacement of kerosene lighting and better quality of light, powering medical devices, cooling vaccines, provision of clean water, improved sanitation
- **Safety:** Improved sense of safety due to better home and street lighting; increased social cohesion through community lighting
- **Connectivity:** Improved access to information, communication and entertainment services, through powering mobile phones, Internet services, radio or TV
- **Education:** Ability to pursue education and improved quality school work, through available lighting at night; ability to access information for education purposes, through increased connectivity

Environmental Impacts:

- **Emissions:** Reduction in use of fossil fuels and respective GHG emissions, due to replacement with renewable, clean and healthy energy sources (e.g. solar, wind, hydro); reduction of transport emissions (diesel supply)
- **Ecology:** Limited deforestation due to reduced need for wood collection; reduction of environmental pollution (e.g. diesel leakages, spills)
- **Fossil fuels:** Reduced dependency on fossil fuels, increasing energy resilience due to replacement with renewable energy

Categories of Typical Energy Access Impacts

Source: World Economic Forum on the basis of PwC Total Impact Measurement and Management



Example of Energy Access Impacts

The following examples highlight the wider impact of energy access projects:

- **Costs:** 40% absolute cost reduction from biogas versus diesel in mini-grids; US\$ 50 monthly savings for households replacing kerosene with solar lighting
- **Economic activity:** 17% increase in commercial activity and new jobs created through on-grid electrification in slums
- **Sales:** Increase in sales of TVs by 70% and of fridges by 50% in electrified slums; +10% in mobile airtime increases through more and cheaper phone charging
- **Emissions:** Reduction of 40 tons of GHG emissions per year per telecom tower site through replacing diesel power by renewable energy (equals 1.3 million tons of CO2 emissions per year for all 30,000 global green power sites)
- **Ecology:** 20 to 27% reduction of wood foraging for cooking purposes by offering electric and more energy-efficient cooking solutions
- **Fossil fuels:** Fossil fuel reduction of 21.45 million litres of diesel per year, by replacing base station diesel consumption at 2,000 telecom sites with renewable energy
- **Education:** Significant improvements in school work thanks to LED lighting
- **Safety:** Increase of 100% of personal sense of safety through street and mobile lighting
- **Connectivity:** Substantial increase in connectivity (TV, radio, Internet) through rural electrification
- **Health:** Reduction by 80% in burn injuries and by 70% of household fires through replacing kerosene lamps with safe LED lighting; increase of 47% in child vaccination, due to enabled or better vaccine cooling

Source: Publications and websites from Desipower, Philips, GDF Suez, MTN and Fenix International, GSMA Development Fund, Asian Development Bank, Bharti Infratel, The World Bank Group, Chisio Furukawa, UNDP.

Use and Limitations of Impact Measurement

Depending on the type of project, business model applied, technology used, market addressed and products or services provided, the impact pathway and respective impact areas can vary. Thus the pathway and impact areas described above have been used to highlight the possible value that could be achieved, and trigger measurement beyond the short-term indicators often used. While this type of holistic total impact measurement and management approach has not been implemented as yet for energy access projects, there are already case studies that show results and value in other activity areas, such as Puma's environmental profit and loss account, highlighting value impacts of US\$ 191 million in the global value chain. For large-scale projects with expected impacts in many of the above mentioned areas, an impact evaluation at the beginning of the project and measuring the real impacts in comparison to a base case, adds value by better informing the scaling and replication of projects, and engaging investors, policy-makers and other relevant stakeholders. The availability of this information will provide further incentives for project partners interested in creating measurable impact. It will also create the economic and political case for enabling policies and for securing support from governments and multilateral development agencies. While there is a clear need to test and further refine this methodology to prove the potential and value of impact measurement, need for the inclusion of this thinking is clear.

Outlook

A huge global market opportunity exists for the private sector and business in the energy access area, with a market of hundreds of millions of people in over 60 countries. Looking at current market barriers it is clear that new approaches and business models are needed to provide viable investment opportunities for the private sector. It is encouraging to see that the momentum around energy access and competition in respective markets is increasing, revealing parallels with the early days of the telecom industry's success in entering the BoP market. Recent developments such as the UN's proposal to designate a decade (2014 to 2024) to "energy for all", the early impacts and results of numerous global and local initiatives on energy access, and most of all a growing awareness, interest and commitment to energy access from decision-makers in the private and public sectors, positions this area well for strong progress over the coming years.

This work seeks to highlight how business might start this journey. Additional research, analysis and ground-level testing will be needed to further develop and refine the cross-sector partnership framework and the holistic impact measurement and management approach proposed in this report. The hope is that it will trigger a wider discussion on new ways to address the energy access issue and develop market-based solutions. Positive signs are emerging that the proposed framework and impact measurement provide value, thanks to the framework testing being implemented in Kenya, which has received positive feedback from experts and practitioners and expressions of interest by private sector executives in forming cross-sector coalitions.

This document is an invitation to business actors try out the ideas described here their own businesses and to explore the true potential behind cross-sector partnering and business models.

In the meantime, every effort will be made to maintain the Energy Access issue on the global agenda.





Appendix

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Acronyms

ADB: Asia Development Bank
BoP: Base of the Pyramid/Bottom of the Pyramid
CAGR: Compound Annual Growth Rate
CAPEX: Capital Expenditure
CDKN: Climate and Development Knowledge Network
CSR: Corporate Social Responsibility
ESMAP: Energy Sector Management Assistance Programme
GDP: Gross Domestic Product
GHG: Greenhouse Gases
GSEP: Global Sustainable Energy Partnership
GSMA: GSM Association
GW: Gigawatt
ICT: Information and Communications Technology
IEA: International Energy Agency
IFC: International Finance Corporation
IRENA: International Renewable Energy Agency
JV: Joint Venture
kWh/d: kilowatt hours per day
kWh/m: kilowatt hours per month
kWh/y: kilowatt hours per year
kWh: kilowatt hour
LED: Light Emitting Diode
MTN: MTN Group
Nda: No Data Available
NGO: Non-Governmental Organization
OPEX: Operational Expenditure
P&L: Profit and Loss
PPP: Public Private Partnerships
PV: Photovoltaic
SE4All: United Nations Sustainable Energy for All
SHS: Solar Home System
SME: Small and Medium Enterprise
TERI: The Energy and Resources Institute
TIMM: Total Impact Measurement and Management (PwC methodology)
TV: Television
TWh: Terawatt hour
UN: United Nations
UN-DESA: United Nations Department of Economic and Social Affairs
UNDP: United Nations Development Programme
UNIDO: United Nations Industrial Development Organization
US\$: US dollar
WB: The World Bank Group
WBCSD: World Business Council for Sustainable Development
WHO: World Health Organization
WWF: World Wide Fund for Nature

Glossary

Base-case scenario, referred to as the “New Policies Scenario”, takes existing government policies and the implementation of declared policy intentions into account; the “Energy for All” scenario aims to achieve the goal of universal access to electricity and clean cooking facilities by 2030.

Base of the Pyramid or “Bottom of the Pyramid” describes the group of about 4 billion people globally who live on less than US\$ 2.50 per day.

Corporate Social Responsibility describes business’ approach to voluntarily recognize and integrate public social responsibility into the business model and corporate activities, with the aim of making a positive impact on society, employees and the environment.

Energy hub or energy kiosk is physical infrastructure that is connected to an energy source and that provides energy-based services to customers that walk to this kiosk. One example is a solar powered kiosk that offers mobile phone charging services.

Gigawatt is equal to 1 billion watts; a watt (W) is a unit of power.

Greenhouse gases are atmospheric gases that absorb and emit radiation causing the greenhouse gas effect. Other than CO₂, they include methane, nitrous oxides and ozone.

Mini-grid or micro-grid is the infrastructure of an often renewable power generator and its respective local distribution network that provide low voltage electricity to the surrounding area.

Peri-urban landscapes, surrounding cities, encompass both urban and rural aspects of human settlements.

Puma’s profit and loss calculates the financial value of impacts on greenhouse gas emissions, water consumption, air pollution, land use or waste produced in the global value chain.

PwC is the world’s largest professional services firm and “big four” accountancy firm.

Terawatt hour is equal to 1 quadrillion (10¹⁵) watts per hour; a watt hour (Wh) is a unit of energy.



Resource Repository

This list includes a collection of useful links to information sources and organizations running initiatives and projects around energy access. It is by no means exhaustive but serves as a base for further research, reaching out to partners and engaging in the energy access discussion.

Acumen Fund Publications: tools, best practice, projects
African Development Bank Group documents: projects, policy, publications
Ashden Knowledge Centre: projects, technology, reports
Asian Development Bank statistics: country statistics
EBRD: reports, policies, project database, project financing, economic data
Energypedia: renewable energy, development aid
Inter American Development Bank: country statistics, research data, capacity building, projects, project financing
IEA statistics: statistics, balances, country information
IFC publications: reports, research, data
IRENA reports and papers: reports, country profiles, technical data
Lighting Africa market research: rural lighting market and solutions, market research, technical research, policy documents
Practical Action document library: reports, policy advice, projects, technology information, case studies
REEEP Resource Centre: clean energy, cases/projects, project call facility, tools, publications, online working platform £
reegle: renewable energy, energy efficiency, country profiles, stakeholders, statistics
REN21: energy policy, stakeholders, country data, platform for exchange
REToolkit: renewable energy, best practice, cases
TERI publications: case studies, policy briefs, research papers
UN data: country statistics
UN-Energy knowledge network: energy access, renewable energy, energy efficiency
UN SE4All practitioner network: access to 500+ practitioners, reports, tariff database
World Economic Forum energy access: detailed project information

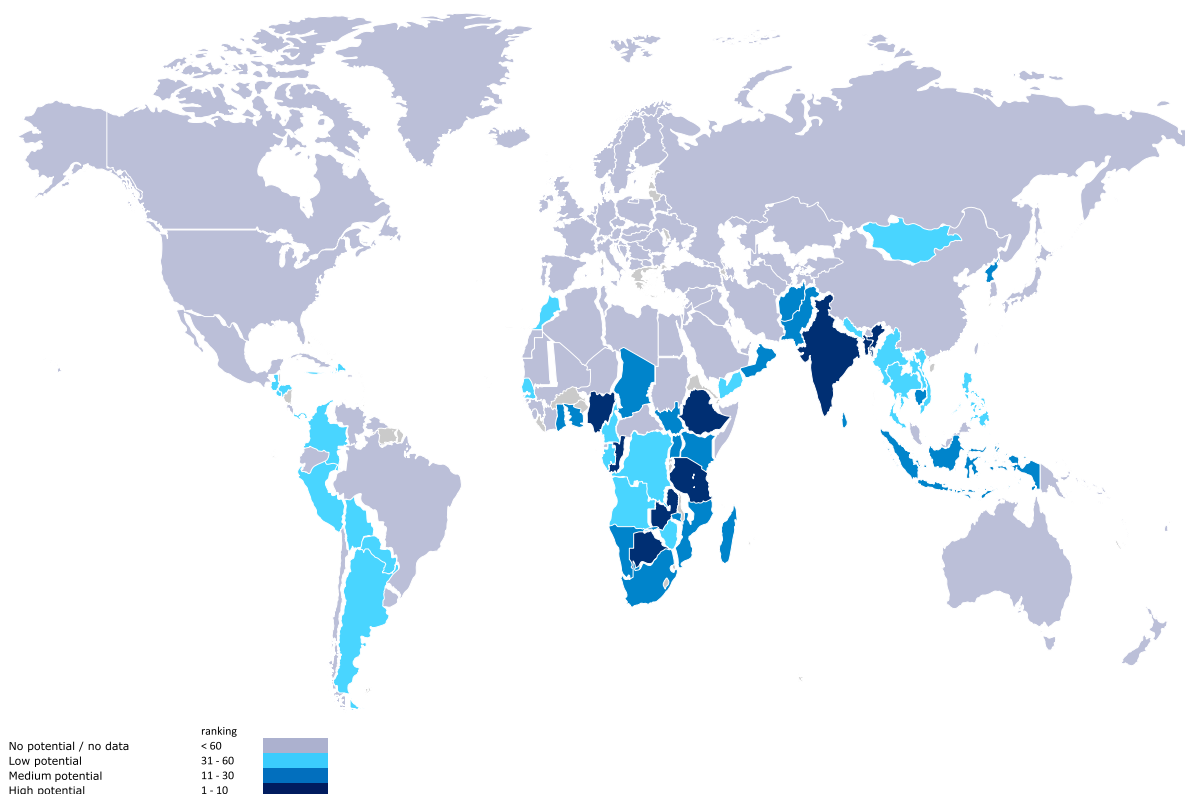
Country Potential

Part of the project involved a country selection analysis to assess the potential for energy access projects. The index developed and heat map created by weighting indicators are intended to highlight the initial potential for cross-sector energy access projects as described.

The following map shows the aggregated assessment of all key selection criteria per country globally. An index value has been attributed for each of the seven criteria, based on absolute and relative values per country. The average of all index values per country corresponds to the heat map shown. Only countries with complete data sets across all indicators, excluding countries with full or near full access, have been assessed.

World Map –Market Potential Index

Source: World Economic Forum on the basis of World Bank, IEA, UN data



Indicators and their relative weighting, highlighting the initial potential for energy access projects in rural areas, have been selected on the basis of expert perspectives derived throughout the project and from quality data available from credible data sources. The indicators were gathered from the following sources:

- International Energy Agency country statistics: % of population without access to electricity (data from year 2010)
- International Energy Agency energy development index: population without electricity in millions (2012)

- UNdata: GDP per capita in current US\$ (2009 data where World Bank data was not available)
- World Bank Group databank: % of rural population (2011), GDP per capita in current US\$ (2011), mobile cell subscriptions per 100 inhabitants (2011), ease of doing business (2012)
- World Bank worldwide governance indicators: political stability and absence of violence (2011)

The rationale for selecting a particular indicator, as well as the relative weighting, is shown in following table:

Indicator	% of population without access to electricity	Population without electricity in millions	% of rural population	GDP per capita in current US\$ absolute	Mobile cell subscriptions per 100 inhabitants absolute	Ease of doing business	Political stability and absence of violence	Total weighted ranking value
Reason for selection	Indicates a relative demand for energy access solutions	Indicates an absolute demand for energy access solutions	Indicates the need for decentralized business models	Indicates the relative ability to pay for services and products	Indicates the potential for mobile payment and charging solutions, and acts as a proxy for telecom infrastructure as anchor customer	Indicates the level of enabling business environment to develop feasible projects	Indicates the enabling political environment for feasible projects	Indicates an aggregated index value and relative country ranking
Relative weighting	10%	55%	5%	10%	5%	5%	10%	= 100 %



Different indicators and weightings are applicable depending on the business model (e.g. green field, brown field, public-private partnership, business-to-business partnership), technology used (e.g. diesel-only, hybrid, solar, wind) and geographic reach for each business entering the energy access market.

Countries	% of population without access to electricity	Population without electricity in millions	% of rural population	GDP per capita in current US\$ absolute	Mobile cell subscriptions per 100 inhabitants absolute	Ease of doing business	Political stability and absence of violence	Total weighted ranking
India	25%	293.00	69%	1,489	72	132	12.7	1
Bangladesh	53%	88.00	72%	743	56	129	7.1	2
Tanzania	85%	38.00	73%	532	56	134	46.7	3
Ethiopia	77%	65.00	83%	357	17	127	5.7	4
Nigeria	50%	79.00	50%	1,502	59	131	4.2	5
Botswana	55%	1.10	38%	8,533	143	59	84.9	6
Congo, Dem. Rep.	85%	58.00	66%	231	23	181	2.4	7
Zambia	81%	11.00	61%	1,425	61	94	61.8	8
Uganda	91%	29.00	84%	487	48	120	15.1	9
Mozambique	85%	20.00	69%	535	33	146	57.1	10
Indonesia	27%	63.00	49%	3,495	98	128	21.2	11
Kenya	82%	34.00	76%	808	65	121	9.9	12
Rwanda	94%	nda	81%	583	41	52	45.8	13
Namibia	56%	1.20	62%	5,293	105	87	75.9	14
Malawi	91%	13.00	84%	365	25	157	44.3	15
Pakistan	33%	56.00	64%	1,189	62	107	0.5	16
Lesotho	83%	1.70	72%	1,106	48	136	55.7	17
Burkina Faso	85%	13.00	73%	600	45	153	28.8	18
Cambodia	69%	10.00	80%	897	70	133	33.0	19
Benin	72%	7.00	55%	802	85	175	56.1	20
Madagascar	83%	17.00	67%	465	38	142	19.8	21
South Africa	24%	12.00	38%	8,070	127	39	48.1	22
Ghana	39%	10.00	48%	1,570	85	64	51.4	23
Oman	2%	0.06	27%	25,221	169	47	67.9	24
Sri Lanka	23%	5.00	85%	2,835	87	81	50.9	25
Sudan South	64%	28.00	67%	1,859	56	143	0.9	26
Togo	72%	5.00	62%	588	50	156	38.7	27
Afghanistan	70%	22.00	76%	543	54	168	1.4	28
Korea, Dem. Rep.	74%	18.00	40%	499	4	nda	32.5	29
Chad	98%	nda	78%	823	32	184	11.3	30

The results of the ranking can also be highlighted by showing the combination of several factors relevant to each other by country. Considering the proposed cross-sector partnership framework and its market requirements such as high demand for energy access solutions, relatively high purchasing power for energy services or presence of telecoms as an anchor client, and ability to build in mobile payment infrastructure, a correlation of the following country selection criteria has been done:

- Example A: GDP per capita in US\$ versus percentage of population without energy access
- Example B: Mobile phone subscriptions per 100 inhabitants versus percentage of population without energy access

The relation of these values is shown by the position on the X and Y axis in the following graphs while the size of the potential market of millions of people without energy access is indicated by the size of the bubble.

Correlating cell phone penetration, as a proxy for telecom infrastructure, with the size and percentage of the unelectrified population per country, shows that countries such as Tanzania, Uganda, Kenya, South Sudan, Bangladesh, Nigeria, Pakistan, India and Indonesia all have an unelectrified population that is larger than 25 million people and a mobile penetration rate that is higher than 40 mobile phone subscriptions per 100 inhabitants. Countries such as Ethiopia, Democratic Republic of Congo, Myanmar, or Mozambique have a relatively high demand and large unelectrified population, but a low mobile phone penetration rate, which indicates possible difficulties building models around telecom anchor clients, or using mobile payment infrastructure.

The purpose of the analysis for countries with a need for energy access solutions is to highlight the market potential for energy access projects and support companies and multistakeholder consortia to test, implement and scale up cross-sector partnerships. While the data used for the country index are up to

date, it is clear that the selection and weighting of indicators used greatly influence the potential attributed to each country. Feedback from experts and practitioners is needed to develop the energy access market potential index further and refine the database.

Initiatives and Programmes

This list provides an overview of some of the initiatives and programmes focusing specifically on the energy access issue. Numerous feasibility, test, pilot and stand alone projects have not been included due to their vast numbers and fast changing status. The overview is intended to provide information about the different approaches to tackling the energy access issue and to act as a starting point for interaction and collaboration with large initiatives and programmes, to make use of the tremendous volume of work completed to date and to avoid replication. Given rapid developments in energy access the information is by no means exhaustive.

Name	Organization type	Market	Technology	Mission	Offering in respect to energy access	Members/ partners	Focus regions
Sustainable Energy for All initiative (United Nations)	Intergovernmental organization	All	Energy access (all), renewable energy, energy efficiency	“UN Secretary-General Ban Ki-moon is leading a global initiative on Sustainable Energy for All to mobilize action from all sectors of society in support of three interlinked objectives to be achieved by 2030: providing universal access to modern energy services; doubling the global rate of improvement in energy efficiency; and doubling the share of renewable energy in the global energy mix.”	Establish national coordinating committees driving country programmes; running the energy access practitioner network, bringing practitioners together for information sharing; securing commitments from all kinds of organizations for actions in high impact areas; tracking progress against initiative objectives; hosting events, workshops, conferences on energy access	Partners and supporters from various sectors	Global
Energy for All initiative (Asian Development Bank)	Development bank	n.a.	Renewable energy (micro-hydro, solar, biomass, small wind power), clean cooking fuel (LPG, biogas)	“The initiative develops and mainstreams approaches for scaling up access to affordable, modern and clean energy among the region’s poor.”	Increasing investments in energy access through: developing new methodologies and approaches to support ADB’s operations departments to identify, design, implement, and monitor access to energy projects; engaging in policy dialogues with governments; building capacity and sharing knowledge Knowledge sharing through Energy for All Partnership platform	25+ multi- and bilateral, UN, civil society organizations	Asia

Name	Organization type	Market	Technology	Mission	Offering in respect to energy access	Members/partners	Focus regions
International Renewable Energy Agency (IRENA)	Intergovernmental organization	n.a.	Renewable energy, energy efficiency	"IRENA 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 gathering existing, but scattered, activities around a central hub."	Practical advice and support to developed and developing countries; facilitation of access to information best practices, financial mechanisms and technological expertise; workshops; readiness assessments; analysis; policy recommendations	100+ states and the EU	Global, developed and developing countries
The International Climate and Energy Partnership Energy+ (Government of Norway)	State government	n.a.	Renewable energy (focus on reducing greenhouse gas emissions), energy efficiency	"The overarching purpose of the Energy+ Initiative is to contribute to providing access to efficient energy services for all by increased development of renewable energy and energy efficiency, and to mitigate energy's impacts on climate."	Development of an international partnership; testing approaches in pilot countries; drawing lessons and inputs to inform climate negotiations; support in creating in-country technical, policy and institutional frameworks; incentives for the private sector to increase investments; mobilize support to implement energy sector mitigation actions	Governments of developing countries	Global, developing countries
Global Lighting and Energy Access Partnership (LEAP), (Clean Energy Ministerial)	Non-profit organization	Off-grid	Clean solar LED lighting	"Facilitate access to improved lighting services for 10 million people by 2015."	Support quality assurance efforts and the development of standards for LED lanterns; launch awards competition for efficient, affordable lights and flat-panel televisions; launch Lighting Asia programme in India; build tariffs database to provide transparency; convene an energy access donor collaborative platform to advance a shared understanding of programmes under way around the world	10 partners and 100+ supporters	Global
Lighting India program (IFC, World Bank Group)	Intergovernmental organization	Off-grid	Solar/clean lighting	"The partnership will bring modern, clean lighting services to two million people by the end of 2015, as a key next step to bolster regional market development, and will have a strong focus on quality assurance for off-grid lighting systems."	Funding to help address market barriers to scaling up clean energy access	Governments of Italy and United States	India

Name	Organization type	Market	Technology	Mission	Offering in respect to energy access	Members/partners	Focus regions
Smart Power for Environmentally-sound Economic Development (SPEED), (Rockefeller Foundation)	Philanthropic organization	Off-grid	Renewable energy (biomass, wind, solar, micro-hydro), diesel	“Foster an approach to power delivery in rural areas that relies on a decentralized renewable energy system to provide clean energy to communities by leveraging an anchor load such as cell towers to ensure business viability while creating economic opportunity and mitigating poverty. The long-term goal of SPEED is to create a positive impact on the lives of poor rural communities in India through delivery of more affordable, reliable and clean energy services to enhance livelihood security and improve overall quality of life.”	Develop ground-level demonstrations (of rural energy service companies); catalyse an enabling environment consisting of a broad range of stakeholders; mobilize financing for rural energy service companies and enterprise companies; mobilize finance (including grants) to promote capacity building and training programmes	TARA, cKinetics, Pradan, Confederation of Indian Industry (CII), DESI Power, Sambodhi Research &	India (Uttar Pradesh, Bihar, Jharkhand, Madhya Pradesh, Chhattisgarh)
The Global Alliance for Clean Cookstoves	Non-profit organization	Off-grid	Cookstoves	“The Global Alliance for Clean Cookstoves seeks to mobilize high-level national and donor commitments toward the goal of universal adoption of clean cookstoves and fuels. Its ambitious but achievable goal is to foster the adoption of clean cookstoves and fuels in 100 million households by 2020. The Alliance is mobilizing support from a wide range of private, public, and non-profit stakeholders.”	Act as a knowledge hub for the sector; coordinate and catalyse technical information to enable stakeholders to be well informed and succeed in implementing clean cookstoves; mobilization of resources; promotion of standards; enabling markets; championing the issue	Partners from various sectors	Africa, Asia, Latin America
Lighting Africa Program (IFC, World Bank Group)	Intergovernmental organization	Off-grid (devices)	Lighting devices & solutions	“The Lighting Africa Program is working to catalyse and accelerate the development of sustainable markets for affordable, modern off-grid lighting solutions for low-income households and small enterprises.”	Accelerate the development of off-grid lighting markets through: product and quality assurance, market intelligence, consumer education, business development support, public sector engagement, access to finance	Various donor partners from governments, multilateral organizations and not-for-profit organizations	Africa

Name	Organization type	Market	Technology	Mission	Offering in respect to energy access	Members/partners	Focus regions
Alliance for Rural Electrification (ARE)	Business association	Off-grid (hybrid mini-grids)	Renewable energy (small & medium wind, renewable technologies), best practice	"Attract and unite all relevant actors in order to speak with one voice about rural electrification with renewable energies; produce and disseminate information about technical and financial solutions for rural electrification; communicate and advocate for rural electrification using RES to all relevant stakeholders, namely governments, donors, financial institutions, NGOs, international organizations and the broader private sector; support members in the field of CSR projects."	Platform for knowledge and best practice sharing focusing on the promotion and development of off-grid renewable energy solutions for rural electrification in developing countries	70 organizations and private sector member companies	Developing countries
Green Power for Mobile & Community Power from Mobile (GSMA Development Fund)	Business association	Off-grid (mini-grid, energy hubs)	Renewable energy (solar, wind, bio fuels), fuel cells, hybrid, biodiesel, batteries	"The Development Fund exists to accelerate economic, social and environmental development through the use of mobile technology. We believe that providing tangible, accessible mobile services to people in developing countries are invaluable to society and can help improve people's lives."	Information and support to promote use of renewable energies for mobile telecom networks and facilitation of an ecosystem of innovators and trial deployments for community electrification	IFC, leading mobile operators	Global
Renewable Energy Efficiency Partnership (REEEP)	Non-profit organization	Off-grid (mini-grids)	Cookstoves, solar PV, solar pumping, wind, biomass, renewable energy technologies, policy, carbon mechanisms, project finance	"The mission of the Renewable Energy and Energy Efficiency Partnership (REEEP) is to accelerate the global market for sustainable energy with a primary focus on developing countries and emerging markets."	Act as a market catalyst for clean energy in developing countries and emerging markets. In this role, it acts as a funder, information provider and connector for up-scaling clean energy business models. Support for the upscaling of clean energy solutions with a variety of information, data and project management services	385 member organizations	Latin America & Caribbean, Southern Africa, East and South-East Asia & Pacific

Name	Organization type	Market	Technology	Mission	Offering in respect to energy access	Members/partners	Focus regions
MODI Research Group (Columbia University)	Academic organization	Off-grid (mini-grids, devices)	Biofuels, biomass cookstoves, LED lighting, mechanical power, mobile payment, energy planning, information technology	"... one of the world's most important centres of research and at the same time a distinctive and distinguished learning environment for undergraduates and graduate students in many scholarly and professional fields. (...) seeks to link its research and teaching to the vast resources of a great metropolis. (...) to attract a diverse and international faculty and student body, to support research and teaching on global issues, and to create academic relationships with many countries and regions..."	Cross-cutting analysis and insights into energy, rural electrification and development	n.a.	Africa (Ghana, Kenya, Mali, Nigeria, Senegal, Uganda), India
Practical Action – energy access transforms lives	Non-profit organization	Off-grid (mini-grids, devices)	Micro-hydropower, small-scale wind power, improved cooking stoves, smoke hoods, renewable energy village, biogas, solar power, fireless cookers	"Our mission is to build the technical skills of poor people in developing countries enabling them to improve the quality of their lives and that of future generations."	Working alongside communities using technology to find practical solutions to poverty; conducting projects to provide electricity access, efficient cook stoves and job opportunities	Partners: Department for International Development (DfID), European Union, The Big Lottery Fund, Comic Relief, Jersey Overseas Aid Committee	Bangladesh, East Africa, Latin America, Nepal, South Asia, Southern Africa, Sudan
Global Village Energy Partnership – GVEP International	Non-profit organization	Off-grid (small and medium enterprise solutions)	Renewable energy (solar, micro-hydro, small-scale wind, biogas, bio fuels), cookstoves, briquettes	"GVEP International is a non-profit organization that works to increase access to modern energy and reduce poverty in developing countries. To achieve this goal we help small energy businesses to establish and grow."	Various programmes to support accelerating access to energy, including services such as: training and capacity building, technical and financial assistance, loan guarantee funding, grant funding, investment funding, business plan contests, enterprise development	20+ member organizations and partners	Africa, Caribbean
Global Sustainable Electricity Partnership (GSEP)	Non-profit organization	On-grid, off-grid	Renewable energy (wind, solar, hydro, biogas), thermal power, capacity building, education, policy	"The mission of the Global Sustainable Electricity Partnership is to play an active role in addressing global electricity issues and to promote sustainable development worldwide."	Develop joint policy frameworks and implement related initiatives in both domestic and international markets; engage in global debates on electricity-related issues, taking joint positions; provide information and expertise on the efficient generation and use of electricity to assist developing countries in strengthening their human capabilities	American Electric Power, Duke Energy, EDF, Electrobras, Enel, Eskom, Hydro Quebec, RusHydro, Kansai, RWE, State Grid Corporation of China, TEPCO, CFE	South America, Africa, Asia

Name	Organization type	Market	Technology	Mission	Offering in respect to energy access	Members/partners	Focus regions
Access to Energy Initiative (World Business Council for Sustainable Development – WBCSD)	Business association	On-grid, Off-grid (mini-grid, devices)	Cookstoves, geothermal, solar, hydro, wind, biomass	“The Council provides a platform for companies to explore sustainable development, share knowledge, experiences and best practices, and to advocate business positions on these issues in a variety of forums, working with governments, non-governmental and inter-governmental organizations.”	Information on: best practice cases, business models, policy framework, financing mechanisms	Co-chairs: ERM, GDF Suez, Schneider Electric Core group: ABB, American Electric Power, Alstom, Chevron, DNV, eni, e.on, epm, Eskom, GE, novozymes, Philips, Shell, Siemens, Statkraft, Statoil, Vattenfall, Veolia	Global
Energy Sector Management Assistance Program (ESMAP) – Energy Access programme, (World Bank Group)	Inter-governmental organization/trust fund	Urban poor, off-grid/rural electrification	Wood-fuel management, cookstoves, clean fuels	“To assist low- and middle-income countries to increase know-how and institutional capacity to achieve environmentally sustainable energy solutions for poverty reduction and economic growth.”	Analytical work, knowledge clearing-house and operational leveraging through: support for the UN SE4All initiative; virtual consultations and practitioner workshops for multi-sector stakeholders; activities on urban energy access; operational support on household cooking energy and off-grid electricity access; technical assistance for national energy access programmes	Several country donor partners: Global Alliance on Cookstoves; Lighting Africa, Africa Electrification Initiative, United Nations agencies, Output-Based Aid (GPOBA), Public-Private Infrastructure Advisory Facility (PPIAF), Climate Investment Funds (CIF), Energy+	Global, low and middle income developing countries

Partnerships

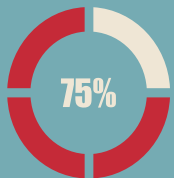
This list provides an overview of some of the private sector initiatives, programmes and project case studies focusing specifically on the energy access issue. The cases described are intended to highlight the power of partnering and the business opportunity offered by energy access projects. This is by no means exhaustive or indicative of the quality and impact of the respective cases. The information provided is derived from public sources.

Organizations	Product/ Service	Market	Business model	Business case/ value	Local impact	Technology	Region	Time	Links
Grameenphone – Telenor and Grameen Telecom Corporation, joint venture	Grameenphone as joint venture entity with Telenor as lead partner Pre-paid and post-paid mobile services, internet, mobile billing, information services and entertainment service for rural population BoP ready handsets	Rural/BoP population in need of mobile phone services	Build on demand for mobile telephony (to enable business activities), falling computer and mobile prices	First to introduce GSM technology in country 1 million subscribers in 2003 10 million subscribers in 2006 37 million subscribers in 2012 98% of coverage in country Largest cellular operator in country 10,000 base stations Investment of US\$ 1.6 billion for network infrastructure Revenue of US\$ 900 million (2012)	Bringing affordable telecom services to rural areas and BoP population Increasing connectivity among population 400,000 village phone operators 500 community information centres	Telecom infrastructure	Bangladesh	Since 1997	http://grameenphone.com/ http://www.telenor.com/ http://www.grameentelecom.net.bd/

Organizations	Product/ Service	Market	Business model	Business case/ value	Local impact	Technology	Region	Time	Links
Green tower sites – Bharti Infratel and OMC Power, partnership	Renewable energy from OMC Power for 1,000 Bharti Infratel telecom tower sites Energy for rural communi-ties Micropower business starter kits	Rural/off-grid telecom sites in need of renewable energy Rural communi-ties	Telecom as anchor client guarantees future and large-scale energy demand through take-off agreement Selling power to rural communi-ties, partnering with local distributors	10-year take-off agreement Replacing expensive diesel with cheaper renewable energy Telecom capex is moved to opex spending 22,000 sites planned in the future	Reduction of carbon footprint for telecom operator Electrification of rural households/ communities Supporting development of local micropower business	Renewable energy services – solar, wind, biogas Diesel generators	India	Since August 2012	www.omcpower.com www.bharti-infratel.com www.gsma.com
Access to energy program – ABB, local authorities and NGOs, public private partnership	Diesel powered energy and respective micro-grid infrastructure for local community Capacity building	Rural households	Replacing expensive kerosene for lighting Leveraging complementary skills of ABB, project partners and stake-holders	Initial CSR project, with aim to become self-sustaining over time (reducing subsidies on electricity price)	Electrifying 1,100 households/ 7,000 people in rural villages in India and 1,200 people in Tanzania Improvement in healthcare (refrigerating medicine) and education (open schools at night) Productivity of local business has risen by 50% (tailor, weaver) Replacement of unhealthy kerosene lamps	Renewable energy services – solar power	India and Tanzania	Since 2002	http://www.abb.com www.wwf.ch
ReadySet solar charging devices – Fenix International and MTN Group, business partnership	Solar powered energy for mobile phone charging through off-grid devices	Rural households and businesses Main focus MTN clients	Sets are sold for US\$ 150 or given for free/ reduced price to MTN clients Increase of distributed cell phone charging, leads to increase in airtime spending Leveraging from co-branding on airtime sales, marketing and after sales services	Sales of thousands of ReadySet energy systems Cheaper power for mobile phones, thereby increasing airtime spending (100,000+ by 2012) Powering lights, radios, tablets, other devices	Empowering local business to become micro-utility entrepreneurs, which power thousands of off-grid mobile subscribers Savings in charging devices of millions of US\$ (US\$ 60 per month per household) Replacing Kerosene lighting	Solar charging and power devices	East Africa	Since 2011	http://fenixintl.com/ www.mtn.com

Organizations	Product/ Service	Market	Business model	Business case/ value	Local impact	Technology	Region	Time	Links
<p>WelHub – OSRAM, Global Nature Fund, Thames Electricals, European Union and Siemens Stiftung</p>	<p>Solar energy for mobile phone charging, Internet access</p> <p>Rechargeable lighting devices</p> <p>Drinking water</p>	Rural households	<p>Solar operated lanterns, batteries and lamps are rented and recharged for a fee</p> <p>A solar powered water purifier can be used for a fee</p> <p>Mobile phone charging and Internet services are sold</p>	<p>Revenues are reinvested in the maintenance and operation of the Water Energy hubs</p>	<p>Reaching poor people in remote communities with affordable energy and clean drinking water</p> <p>Each hub serves 1,000 households (especially fishermen, domestic users, shop keepers)</p> <p>Productive time is freed up due to reduction of time spent for drinking water collection</p> <p>Up to 30% of lighting expenses are reduced by cheaper solar charging</p> <p>To date, 80 permanent jobs in local communities have been created</p>	<p>Solar energy</p> <p>Chargeable devices</p>	Kenya	Since 2011	<p>www.osram.com</p> <p>www.globalnature.org</p> <p>http://europa.eu/</p> <p>www.siemens-stiftung.org</p>
<p>Nuru Energy – social enterprise working with local organizations and entrepreneurs</p>	Energy to charge devices	Rural households	<p>Power cycles are provided to village-level entrepreneurs</p> <p>These are then trained and given a micro loan of 20-50 lights</p> <p>Electricity is generated with the bicycles and the generated energy sold as recharging services</p> <p>Further co-creation of products and services in demand follows customer feedback</p>	<p>Each village entrepreneur can make US\$ 4 per day while charging around 15-20 lights or phones (US\$ 2 average daily income)</p> <p>One entrepreneur serves around 200 returning customers</p> <p>Lights are sold at affordable prices of US\$ 6</p> <p>Break even is expected by 2013 with 160,000 lights sold</p>	<p>Jobs are provided to thousands of entrepreneurs</p> <p>The costs to each customer for energy are reduced by 80%, replacing expensive kerosene lighting</p> <p>30% increase in household income through improved lighting is expected</p> <p>School quality is expected to improve due to longer and better lighting at home</p> <p>Danger of fires due to kerosene is reduced or totally avoided</p>	Renewable energy – bicycle power	Rwanda, Kenya, Tanzania, Uganda, Burundi	Since 2008	<p>www.nuruenergy.com</p>

Organizations	Product/ Service	Market	Business model	Business case/ value	Local impact	Technology	Region	Time	Links
Codensa slum electricity – on-grid electricity provider working with retailers, electric appliance manufacturers and insurance providers	On-grid energy poor population Microcredit services to buy electrical appliance and assurance services	Peri-urban/ urban households	Microcredit services are offered to low-income customers so they can afford electric appliances and insurance services The credit repayment is collected through the monthly electricity bill As a result the revenue of the utility is increased due to higher energy demand	Higher profits in the microcredit business than energy sales Revenue increase at household level thanks to micro credits of 40%	45% of clients gained access to financial credit services Millions of people reached	On-grid electricity Microcredit services	Colombia	Since 1997	www.codensa.com.co www.mapfre.com.co
Lydec slum electricity – on-grid energy provider, local authorities, national initiative for human development, NGO and local micro entrepreneurs	On-grid energy for poor communities Water services	Peri-urban/ urban households	Collective electricity meters are connected to a network of private meters Local intermediaries responsible for customer management and reselling of energy Water and sanitation services are also provided Social tariffs are offered in several schemes	Risk of electricity theft is reduced or avoided due to affordable energy Established customers are retained and new ones introduced	Access to affordable, safe and reliable electricity is provided to more than 30,000 inhabitants with 80,000 to follow in a single project Quality of life is improved due to access to energy, water and sanitation	On-grid electricity Water services	Morocco/	Since 1998	www.lydec.ma www.indh.gov.ma www.habitafrica.org





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