Providing Sustainable Access to Energy

By Gilles Vermot Desroches and Aram Kalanyan

Executive summary

Today nearly 1.3 billion people — almost 1 of every 5 persons on the planet — lack access to modern energy. Almost all live in poverty in rural sub-Saharan Africa and developing Asia, unconnected to utility networks. Many companies offer stand-alone solar-powered systems and mini-grid solutions, but the target communities often cannot afford the purchase price and lack the know-how to operate the systems. This paper discusses the elements of a successful, sustainable approach to rural electrification projects, with examples of innovative business models and a case study of Schneider Electric's Access to Energy program.

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Schneider Electric

Introduction

According to the International Energy Agency, in 2014 nearly 1.3 billion people — about 18% of the global population — were without access to electricity and 2.7 billion people — 40% of the world — relied on the traditional use of biomass (animal waste, wood, charcoal) for cooking. Almost all of them (97%) live in sub-Saharan Africa and developing Asia areas, with 84% living in rural areas.[1]

There is a well-recognised correlation between income level and access to energy. Countries with a large proportion of people earning less than $2 per day tend to have low electrification rates and a high percentage of the population who rely on biomass for cooking.

'Almost 1 of out of every 5 people lack access to electricity'.

Access to energy is transformational. Electricity reduces poverty, improves health (especially for women and children), increases productivity, enhances educational opportunities, improves the standard of living, and promotes environmental sustainability. For instance, electric water pumps enable farmers to irrigate fields and thus improve the yield of their crop. (Agriculture is the primary source of income in developing nations.) Switching to modern cooking fuels and technologies not only reduces carbon emissions but, more important, avoids the catastrophic health consequences of cooking with biomass. The World Health Organisation estimates that over 4 million people die prematurely each year — some 11,000 per day — from illnesses attributable to the household air pollution from cooking with solid fuels.[2] Women and girls are freed from the often-dangerous survival activity of traveling long distances to gather firewood. Children can do their homework after sundown, and their parents can attend evening classes. Street lighting makes it safer for people (especially women and girls) to move around at night. Doctors and healthcare workers no longer have to deliver babies or treat patients in the dark, and hospitals can refrigerate vaccines and medicines.

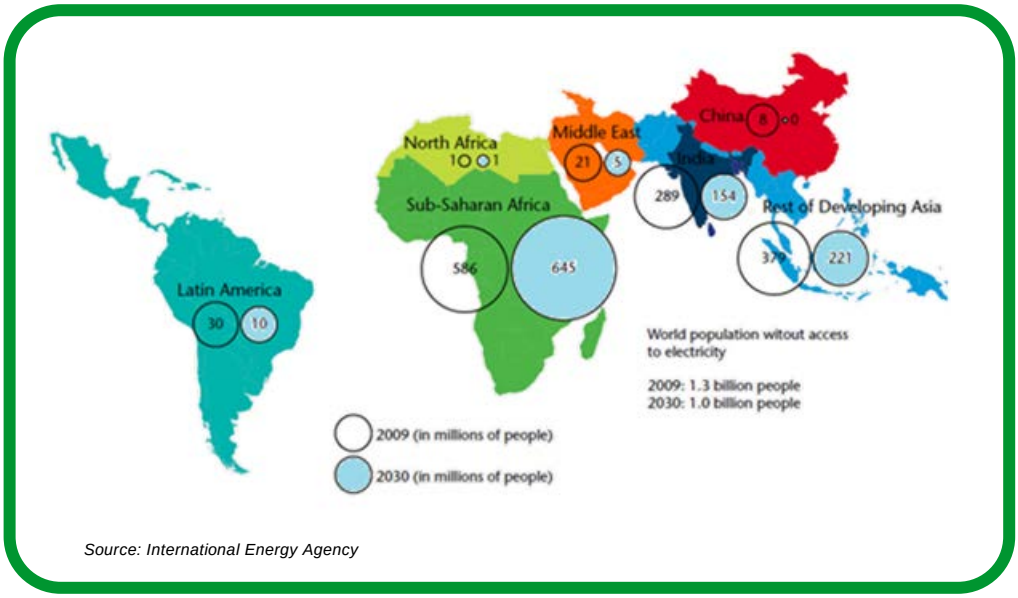


Figure 1
Recent and projected populations without access to energy by region

The UN Advisory Group on Energy and Climate Change has identified access to energy as a key factor in reducing poverty — the top priority on its list of Millennium Development Goals (MDGs). The United Nations has set goals for 2030 to both ensure universal access to modern energy services and reduce global energy intensity by 40%.[3] It is estimated that

1 International Energy Agency, "World Energy Outlook 2014."

2 World Health Organization, Fact Sheet #292, "Household air pollution and health" (March 2014).

3 UN Advisory Group on Energy and Climate Change, "Energy for a Sustainable Future – Summary Report and Recommendations" (2010).

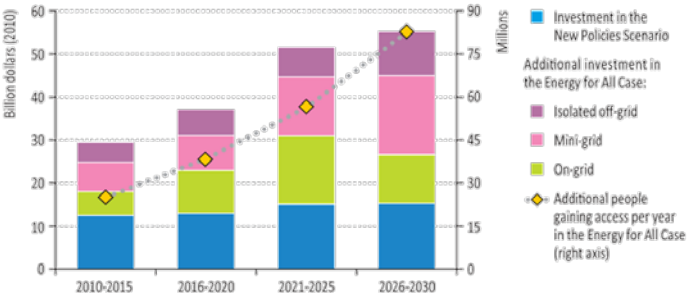
nearly $1 trillion in cumulative investment is needed to achieve universal energy access by 2030.[4]

To address the issue of universal access to energy, the United Nations launched the Sustainable Energy for All (SE4ALL) initiative to mobilise governments, the private sector, and civil society to realise three interconnected objectives:

- Ensure universal access to modern energy services
- Double the global rate of improvement in energy efficiency
- Double the share of renewable energy in the global energy mix

The SE4ALL initiative supports the UN resolution declaring 2014–2024 the 'Decade for Sustainable Energy for All', which calls upon member states to step up their efforts to prioritise universal access to sustainable modern energy services. As the world's energy needs continue to grow, it also encourages governments, international and regional organisations, and other relevant stakeholders to increase their use of new and renewable energy resources.

The World Bank and the International Energy Agency (IEA) work toward this global goal by funding projects and supporting stakeholders in rural areas without electricity. Rural areas are more in need of electrification projects because they are 'off grid', meaning that they are not connected to utilities' power transmission and distribution network. In fact, according to the International Energy Agency, 60% of additional electricity generation by 2030 will come from off-grid installations, including stand-alone systems and mini-grids. See **Figure 2**.



Source: International Energy Agency

Figure 2
Average annual investment in access to energy by type and number of people connected in the SE4ALL scenario

Regional situation: Asia

According to the International Energy Agency, in 2014, 620 million people in Asia did not have electricity: 304 million in India, 140 in Southeast Asia, and 175 million in Bangladesh, North Korea, Mongolia, Nepal, Pakistan, Sri Lanka and other Asian countries.[5] See **Figure 3.**

Electrification rates are low in rural and remote off-grid areas compared with urban areas reached by the grid. As a consequence, many governments in Asia have encouraged rural electrification programs, acknowledging that electricity access would not only help economic development but also accrue social benefits (education, healthcare, overall standard of living). The rural electrification rate in Asia varies widely from country to country, even among those with the same per-capita gross domestic product (GDP). For instance, only 6% of Vietnamese people living in rural areas are without electricity whereas 41% of rural Indonesia still has no access to energy.

[4] International Energy Agency, "World Energy Outlook 2012."

[5] International Energy Agency, "World Energy Outlook 2014."

One major step in rural developing Asia is to provide solar solutions to households and small businesses. India is one of the more active markets, due to more financial services being available to the rural poor and the relatively high price of diesel. In Indonesia, however, because diesel prices are about half of those in India due to subsidies, solar development lags behind other Asian countries.

SOURCE: IEA, World Energy Outlook 2014

Electricity access in Developing Asia - 2012

Region	Population without electricity millions	National electrification rate %	Urban electrification rate %	Rural electrification rate %
China	3	100%	100%	100%
India	304	75%	94%	67%
Southeast Asia	140	77%	92%	65%
Brunei	*0*	*100%*	*100%*	*99%*
Cambodia	*10*	*34%*	*97%*	*18%*
Indonesia	*60*	*76%*	*92%*	*59%*
Laos	*1*	*78%*	*93%*	*70%*
Malaysia	*0*	*100%*	*100%*	*99%*
Myanmar	*36*	*32%*	*60%*	*18%*
Philippines	*29*	*70%*	*89%*	*52%*
Singapore	*0*	*100%*	*100%*	*100%*
Thailand	*1*	*99%*	*100%*	*99%*
Vietnam	*4*	*96%*	*100%*	*94%*
Rest of developing Asia	175	61%	82%	52%
Bangladesh	*62*	*60%*	*90%*	*48%*
DPR Korea	*18*	*26%*	*36%*	*11%*
Mongolia	*0*	*90%*	*98%*	*73%*
Nepal	*7*	*76%*	*97%*	*72%*
Pakistan	*56*	*69%*	*88%*	*57%*
Sri Lanka	*2*	*89%*	*97%*	*88%*
Other Asia	*29*	*32%*	*59%*	*23%*
Developing Asia	620	83%	95%	74%

Figure 3
Comparison of Asian countries' access to energy

Regional situation: Africa

According to the International Energy Agency, in 2014, 622 million of people in Africa had no access to electricity.[6] In a business-as-usual scenario, this number is expected to increase to 645 million people by 2030 due to population growth. As shown in **Figure 4**, access to modern energy services, though increasing, remains very limited. It is estimated that 86% of people living in rural areas in sub-Saharan Africa have no access to electricity, compared with 37% in urban areas. Nearly 730 million people rely on the traditional use of biomass for cooking, causing 600 000 premature deaths a year attributable to household air pollution resulting from the traditional use of solid fuels.

Sub-Saharan Africa has ample energy resources (both fossil fuel and renewable), but the opportunities to extend them to the rural poor are often missed. Specifically, the entire continent has excellent solar potential, wind power is viable in the coastal regions, and nearly 30% of the world's oil and gas discoveries were made in sub-Saharan Africa in the past five years.[7]

[6] International Energy Agency, "World Energy Outlook 2014."

[7] International Energy Agency, "World Energy Outlook 2014."

SOURCE: IEA, World Energy Outlook 2014

Electricity access in Africa - 2012

Region	Population without electricity millions	National electrification rate %	Urban electrification rate %	Rural electrification rate %
Africa	**622**	**43%**	**68%**	**26%**
Sub-Saharan Africa	**621**	**32%**	**59%**	**16%**
Angola	*15*	*30%*	*46%*	*6%*
Benin	*7*	*28%*	*55%*	*6%*
Botswana	*1*	*66%*	*75%*	*51%*
Burkina Faso	*14*	*16%*	*54%*	*2%*
Burundi	*9*	*10%*	*34%*	*7%*
Cameroon	*10*	*54%*	*88%*	*17%*
Cabo Verde	*0*	*94%*	*100%*	*84%*
Central African Republic	*4*	*3%*	*5%*	*1%*
Chad	*12*	*4%*	*16%*	*0%*
Comoros	*0*	*45%*	*72%*	*35%*
Congo	*3*	*35%*	*52%*	*5%*
Côte d'Ivoire	*15*	*26%*	*42%*	*8%*
Democratic Republic of Co	*60*	*9%*	*24%*	*1%*
Djibouti	*0*	*50%*	*61%*	*14%*
Equatorial Guinea	*0*	*66%*	*93%*	*48%*
Eritrea	*4*	*32%*	*86%*	*17%*
Ethiopia	*70*	*23%*	*85%*	*10%*
Gabon	*1*	*60%*	*64%*	*34%*
Gambia	*1*	*35%*	*60%*	*2%*
Ghana	*7*	*72%*	*90%*	*52%*
Guinea	*10*	*12%*	*28%*	*3%*
Guinea-Bissau	*1*	*20%*	*37%*	*6%*
Kenya	*35*	*20%*	*60%*	*7%*
Lesotho	*2*	*28%*	*55%*	*17%*
Liberia	*4*	*2%*	*3%*	*0%*
Madagascar	*19*	*15%*	*37%*	*4%*
Malawi	*15*	*9%*	*33%*	*5%*
Mali	*11*	*27%*	*55%*	*12%*
Mauritania	*3*	*21%*	*47%*	*2%*
Mauritius	*0*	*100%*	*100%*	*100%*
Mozambique	*15*	*39%*	*66%*	*27%*
Namibia	*2*	*30%*	*50%*	*17%*
Niger	*15*	*14%*	*62%*	*4%*
Nigeria	*93*	*45%*	*55%*	*35%*
Réunion	*0*	*99%*	*100%*	*87%*
Rwanda	*10*	*17%*	*67%*	*5%*
Sao Tome and Principe	*0*	*59%*	*70%*	*40%*
Senegal	*6*	*55%*	*90%*	*28%*
Seychelles	*0*	*97%*	*97%*	*97%*
Sierra Leone	*6*	*5%*	*11%*	*1%*
Somalia	*9*	*15%*	*33%*	*4%*
South Africa	*8*	*85%*	*88%*	*82%*
South Sudan	*11*	*1%*	*4%*	*0%*
Sudan	*24*	*35%*	*63%*	*21%*
Swaziland	*1*	*27%*	*40%*	*24%*
Tanzania	*36*	*24%*	*71%*	*7%*
Togo	*5*	*27%*	*35%*	*21%*
Uganda	*31*	*15%*	*55%*	*7%*
Zambia	*10*	*26%*	*45%*	*14%*
Zimbabwe	*8*	*40%*	*80%*	*14%*
North Africa	**1**	**99%**	**100%**	**99%**
Algeria	*0*	*99%*	*100%*	*96%*
Egypt	*0*	*100%*	*100%*	*99%*
Libya	*0*	*100%*	*100%*	*99%*
Morocco	*0*	*99%*	*100%*	*97%*
Tunisia	*0*	*100%*	*100%*	*100%*

Figure 4

Comparison of African countries' access to energy

Regional situation: Latin America

According to the International Energy Agency, in 2014, 23 million people in Latin America lacked electricity.[8] As seen in **Figure 5,** those without access to energy are almost entirely in rural areas: the rural electrification rate is 82%, whereas the urban electrification rate is 99%.

Although Haiti, Nicaragua, Argentina, Panama, Peru, Bolivia, and Honduras still have significant rural electrification challenges, most people in general have electricity. Unlike sub-Saharan Africa or developing Asia, South America is well on the way to becoming totally electrified in a few years. Still, measures must be carried out in rural areas to provide more people with clean energy.

SOURCE: IEA, World Energy Outlook 2014

Electricity access in Latin America - 2012

Region	Population without electricity millions	National electrification rate %	Urban electrification rate %	Rural electrification rate %
Argentina	1,5	96%	99%	61%
Bolivia	1,2	88%	99%	66%
Brazil	1,0	100%	100%	97%
Colombia	1,4	97%	100%	89%
Costa Rica	0,0	99%	100%	98%
Cuba	0,2	98%	100%	93%
Dominican Republic	0,4	96%	99%	90%
Ecuador	0,9	94%	99%	84%
El Salvador	0,5	93%	98%	82%
Guatemala	2,2	86%	96%	75%
Haiti	7,3	28%	44%	8%
Honduras	1,1	86%	96%	75%
Jamaica	0,2	93%	98%	87%
Nicaragua	1,6	74%	91%	50%
Panama	0,4	89%	97%	63%
Paraguay	0,1	99%	100%	98%
Peru	2,7	91%	99%	65%
Trinidad and Tobago	0,0	97%	99%	96%
Uruguay	0,0	99%	100%	92%
Venezuela	0,1	100%	100%	98%
Other Latin America	0,2	91%	94%	87%
Latin America	23	95%	99%	82%

Figure 5
Comparison of Latin American countries' access to energy

Bottom of the pyramid (BoP) concept

The 'bottom of the pyramid' (BoP) is a concept formulated by C. K. Prahalad in his 2004 book *Fortune at the Bottom of the Pyramid: Eradicating Poverty Through Profits*. Prahalad argues that while people living on less than $2 per day — those at the bottom of the pyramid — are forgotten by businesses, they are an emerging segment with a huge potential of untapped buying power. The crux of the argument is that the future will develop from serving the poor, by alleviating poverty and enabling access to innovative, affordable solutions.

BoP strategies need to fulfil three requirements. First, programs must attain social and environmental objectives, i.e., be relevant in terms of development. Second, they must be sustainable over time. Third, these programs must impact as many people as possible though scalability.

[8] According to the International Energy Agency, in 2014,

Providing the BoP with access to affordable and reliable energy services eliminates a major obstacle to creating lasting social and economic development. Access to energy reduces poverty, improves health, increases productivity, enhances competitiveness, and promotes economic growth.

Rural electrification solutions

Globally, 'off grid' populations live for the most part in rural areas not connected to utilities' power transmission and distribution network. It may not be feasible to extend the power grid to these regions because of their remote locations, low population density, or lack of existing infrastructure. Consequently, their electricity would need to be supplied locally by decentralised, independent off-grid technologies using diesel, solar energy, or other renewable sources. The two options for such local off-grid electrification are

- stand-alone systems
- mini-grids

Stand-alone system

Stand-alone systems are small-scale, autonomous sources of energy. Worldwide, 216 million people utilise stand-alone systems as their access to energy. These systems have been developed to help people mainly at an individual or household level. In particular, solar lamps or lanterns and solar home systems (see **Figure 6**) are emerging as key alternatives in meeting the basic needs of off-grid households.

Stand-alone system (DC or AC) solutions provide portable lighting from 1 W (for individuals) and mobile charging to 2 kW (enough for health centres, schools, small companies and shops).

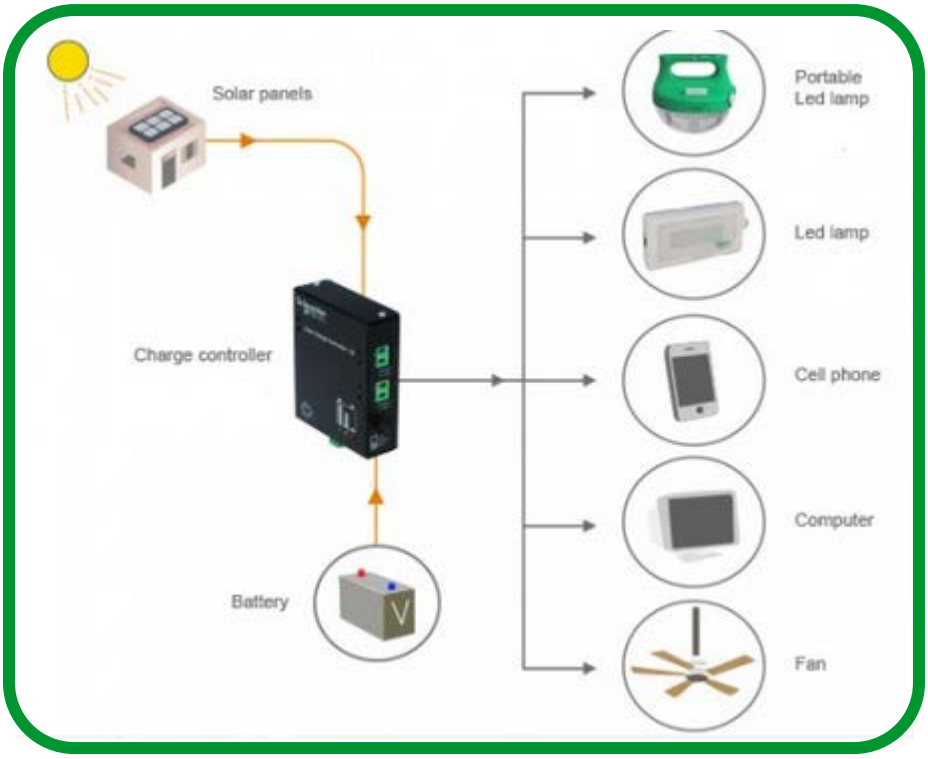


Figure 6
A solar home system comprises a solar charge controller, one or more solar panels in parallel, a battery, and the connected DC loads

These products are characterised by their ease of use, safety, brighter and cleaner lighting, long product life, and significantly lower lifecycle costs compared with conventional sources of lighting (mainly kerosene).

Several companies (including Philips, D-Light, Sundaya and Schneider Electric) offer solar home system and lighting solutions such as portable solar lamps for the BoP population. Generally, these products are readily available from rural retailers such as gas stations, telecom distributors, cooperatives, supermarkets, small entrepreneurs, solar distributors, and energy/information & communication technology kiosks.

'Mini-grids are a cost-effective, reliable, and sustainable means of supplying power to rural communities'.

Mini-grids

A mini-grid is essentially a small local electricity utility that produces power using a generator. The power is distributed over wires to households and shops within the generator's vicinity. Mini-grids generate electricity on a small scale, 10 kW to 10 MW. (Micro-grids are similar but operate at a smaller size and generation capacity, 1-10 kW.) About 400 million people globally get their electricity from mini-grids.

Mini-grids utilise diesel, renewable (plus battery), or hybrid (combined) fuel sources to produce power and often also include an energy storage system. (See **Figure 7.**) They are the best way to integrate renewable energy resources at the community level and allow for customer participation in the electricity company.

Figure 7
This solar mini-grid uses an MPPT charge controller to harvest energy from solar panels and store it in a battery bank. An inverter then converts the DC to AC for the customers.

The major obstacle to deploying mini-grids is that low-income people do not have the resources to pay for the solutions. Nevertheless, mini-grids are a cost-effective, reliable, and sustainable means of supplying power to rural communities, especially in isolated areas where grid extension is too costly.

Launching electrification projects

As noted previously, providing electricity to rural areas without access to energy is the greatest need. In launching a rural electrification project, the first step is to evaluate the unique circumstances of the area. There is no 'one size fits all' approach, and solutions must be tailored to fit the situation. The specific regional characteristics dictate not only the best type of technology for the electrification project but also which business and financial models would be most effective.

For example, if the area is relatively densely populated, a mini-grid would make more sense than stand-alone lighting products. The cost of energy would be lower for consumers (a BoP household can spend up to 30% of its income on poor-quality energy), and the project would be economically viable for developers and electricity providers.

Business models

A key component of the BoP concept is that any solution to alleviate poverty must be sustainable over time. A project will be more successful — and therefore sustainable — when the community is actively engaged in its operation. Consequently, electrification projects benefit from developing a local expertise and involving the local population.

'A project will be more successful — and therefore sustainable — when the community is actively engaged in its operation'.

One approach would be for a company to help integrate stand-alone systems and mini-grids as a single infrastructure. Community residents would receive training so that they could then be self-sufficient in managing the project: operate the system, perform maintenance, collect tariffs, etc.

Another scenario would be for a company or government to build and operate a mini-grid system, then enter into a service contract with customers or a utility to manage the system.

No matter what the business model, the important point is that the community actively participate in the project.

Distribution models

Distribution — getting the energy to off-grid customers — is a critical success factor. Four major distribution models are used by private sector:

- **Institutional partnerships,** where companies band together with for-profit or non-profit organisations that have a significant presence in rural areas
- **Branch operations** set up by companies in the target areas
- **Micro-franchising,** where companies identify micro-entrepreneurs at the village level, and work closely with them on distribution, marketing, and servicing
- **Traditional distribution channel,** where companies sell products to distributors, who in turn sell them to dealers who have a network of sub-dealers or micro-entrepreneurs (depending on how remote the area is)

'Last mile' challenges particularly concern developers' distribution of off-grid energy to remote areas. Geographic and demographic constraints make it difficult and costly for energy solutions providers to have a local presence. In addition, the lack of road infrastructure is often an obstacle to the development of networks and supply chains, especially as it adds to the cost of energy solutions for the end customers.

Financing models

Providing access to energy is technologically easy, but making electrification of remote villages with low-income people economically viable is difficult. Ensuring financial sustainability is the most difficult challenge.

Although some off-grid households are able to purchase solar home system and lighting solutions easily on a cash basis, many low-income people cannot afford the upfront costs.

Providing financing to the poor for solar home system and lighting products remains unaddressed in most emerging countries. Commercial banks and micro-finance institutions do not extend credit for solar home system and lighting, citing high transactional and operational costs in the face of low demand and the remote location of most target customers. Additionally, given the low-income status of such consumers, banks and micro-

finance institutions see a high default risk, part of it stemming from their distrust of the product quality and after-sales challenges. Indeed, if the product dies before the loan is repaid, the chances of recovery decrease. Product quality is a key factor in ensuring the viability of the off-grid lighting market.

Nevertheless, innovative financing models have emerged across the world to overcome these barriers.

The first one is the fee-for-service/rental model for solar lanterns. A micro-entrepreneur rents the charged batteries and/or lanterns to customers. The micro-entrepreneur could either buy its inventory upfront or pay a supplier in instalments. SELCO, Barefoot, and Schneider Electric are some of the companies that are piloting such models in India, for instance.

'Innovative financing models have emerged across the world to help off-grid households get access to energy'.

Another approach is the pay-as-you-go plan. For instance, the technology company Simpa has collaborated with SELCO to introduce such a program in the state of Karnataka in India. Consumers pre-pay for energy credits through an 'easy recharge' process that imitates the mobile airtime recharge process. In fact, payments are made via mobile phones. Each payment accumulates toward the final purchase price of a solar home system. Once fully paid, the system unlocks permanently and delivers free solar energy from that point onward.

Countries with a large emigrant population leverage diaspora remittance programs to provide off-grid solar home systems and lighting products to those without access to energy. Remittances are funds transferred from migrants to their home country. For example, an initiative in Haiti promotes a business model in which senders (outside Haiti) use remittances to buy solar products from a money transfer organisation, which then provides the products to receivers (in Haiti).[9]

Payroll deduction programs are another scheme for financing solar home systems and lighting products. A financial institution would set up an arrangement with the employer to deduct loan payments directly from employees' payroll. Government agencies — particularly in the healthcare and education sectors — often are the leading employers in rural areas.

A modular approach to stand-alone solar lighting products can also help off-grid households get access to energy. This enables low-income consumers to purchase a basic system with one light initially and then add more lights and other capabilities as and when their income increases.

Case study: Schneider Electric

As a global specialist in energy management with operations in over 100 countries, Schneider Electric offers a comprehensive product and solutions portfolio that includes reliable, affordable, and clean stand-along solar lighting mobile charging capabilities, and mini-grid solutions. With 44% of its sales coming from developing economies — where most of the people lacking access to electricity live — Schneider Electric launched its Access to Energy program in 2009. The program comprises energy services training to develop local competencies, joint investment initiatives to financially support entrepreneurial efforts that promote access to energy, and partnerships to develop innovative, effective business models tailored to the community's unique situation.

Likewise, a collaborative effort among Schneider Electric and eight other industrial partners and research organisations, the MiCROSOL project, which is a research program, aims to develop a single, modular standard technology for producing electricity, drinking water, and heat simultaneously — primarily to benefit micro-industries located in rural areas of countries

[9] Multilateral Investment Fund, "Solar Energy: Remittances fuel clean energy in Haiti"

with high levels of sunshine, especially in Africa. It is based on the principle of cogeneration of electricity and heat, applying a new approach to solar thermodynamics.

Another Access to Energy solution, Villasol, is a solar-powered micro off-grid facility for decentralised rural electrification. The facility supplies domestic, entrepreneurial, and community needs such as schools, health centres, water supply, and public lighting, all without connection to the national grid.

Developing local competencies

Since 2009, Schneider Electric has trained 63,000 people from 26 developing countries in energy management–related skills. Training has been tailored for each particular region: basic introductory instruction, more graduated education, evening courses; 'train the trainer' programs that enable those trained to then spread their learning to others — whatever best meets the unique needs of that specific location.

Training the rural poor as electricians opens the door to employment and offers a way out of poverty for people earning only $1–2 dollars per day

'Training empowers local communities to acquire long-term competencies to maintain and develop access to energy solutions'.

Perhaps just as important, training empowers local communities to acquire long-term competencies to maintain and develop access to energy solutions. It gives communities the essential keys to be self-sufficient. Self-sufficiency is a prerequisite to promoting long-term access to energy.

Supporting local start-up initiatives

For Schneider Electric, access to energy also means supporting entrepreneurial activities that contribute to sustainable development. In particular, that means creating investment vehicles to financially support companies dedicated to bringing electricity to the Bottom of the Pyramid.

The Schneider Electric Energy Access (SEEA) impact-investing fund was created in July 2009 to work as a global sustainable venture capital fund. With investments of €100,000–€400,000, the fund supports small and medium-size companies that contribute in innovative ways to providing access to energy. The fund leverages Schneider Electric in-house technical and management expertise to foster 'value creation' in order to achieve the social and environmental impact.

For example, the SEEA fund has backed One Degree Solar, a company that designs, produces, and distributes solar products for off-grid communities in Kenya; Fenix International, which develops access to energy solutions in partnership with mobile telecom operators in East Africa; Nova Lumos, a technology company that offers solar home systems which enable customers to pre-pay for power via mobile phones; and SunFunder, a crowdsourced startup finance company that provides short-term working capital and loans for solar home systems, microgrids, and commercial solar projects in emerging markets.

Investing in these companies helps strengthen the financial system that is needed — and often unavailable to — people at the bottom of the pyramid.

Further, in partnership with other European entities, Schneider Electric jointly launched the Energy Access Ventures Fund in 2015 to boost access to energy in sub-Saharan Africa. This fund targets small businesses in Africa that specialise in promoting low-carbon and low-cost electricity access solutions in rural areas that cannot access regular finance. At the beginning, the fund is focusing on Burundi, Ethiopia, Kenya, Malawi, Mozambique, Rwanda, Tanzania, Uganda, Zambia, and Zimbabwe. The objective of the Energy Access Ventures

Fund is to combine economic investment, innovation, and skill development. The fund is backed by the experience of the Schneider Electric Energy Access fund, to help develop entrepreneurial initiatives to improve access to energy.

In addition to funding, a range of technical support will be provided to offer practical help and advice for local businesses concerning management, governance, energy efficiency, and environmental best practices. The fund will also provide the following resources to its selected beneficiaries:

- Access to skilled professionals via Schneider Electric operations staff (engineers, procurement specialists, marketing experts, and engineering consultants) to support local businesses and share their skills to reinforce existing human capital
- A social and environmental impact assessment of their activities to help reduce their environmental impact
- Technical advice to help meet international compliance regulations

Partnering with stakeholders

Schneider Electric partners with multiple industry segments, dealing with all kind of stakeholders in both the public and private sectors. Collaborating with other stakeholders is crucial to finding innovative ways to overcome the barriers of providing access to energy in BoP environments. Just as there is no ‘one size fits all’ technological solution, there is no universal business model or approach that will work in every situation.

Consequently, Schneider Electric has established partnerships with more than 50 non-governmental organisations (NGOs), local educational institutions, national authorities and governmental ministries (both in France and in BoP countries), many different types of distributors (local distributors, wholesalers, and non-specialised professional distributors), large international suppliers (such as Rexel, Sonepar, and Total), as well as panel builders, contractors, system integrators, and other specialists.

For instance, a joint initiative between the Nigerian government and Schneider Electric, the Isaac Boro Energy Training College was inaugurated in February 2014. The school brought 30 Nigerian students to receive energy-management training in Grenoble and then take that knowledge back to Nigeria so that they would be able to develop their own business with the competencies acquired at Isaac Boro.

Schneider Electric has also developed a partnership with Total to promote access to energy and roll out off-grid solutions to as many people as possible. Specifically, the two companies co-designed the adaptable Mobiya TS 120 solar lamp that won a design award from the International Council of Societies of Industrial Design.

Conclusion

Access to modern energy is crucial to human well-being and a country’s economic development, but today 1.3 billion people lack electricity. What those of us in the developed world take for granted at the push of a button is unavailable to almost 1 out of every 5 people on the planet. Without access to modern energy, these people encounter great difficulty in day-to-day living. Tackling the challenge of providing access to energy for all is a top global priority for us all — governments, private sector companies, and civil society in general.

Almost all of the population without access to energy lives in rural areas of sub-Saharan Africa and developing Asia. These areas are for the most part ‘off grid’, places not connected to utilities’ power transmission and distribution network. Consequently, their electricity would

need to be supplied locally by decentralised, independent off-grid technologies using solar energy or other renewable sources — either stand-alone systems or mini-grids.

Virtually everyone without access to modern energy is poor, earning less than $2 per day. Paying for solar-powered home energy systems individually or mini-grids collectively is an almost insurmountable obstacle. Traditional financial institutions are unlikely to extend credit to the lowest-income population in order to purchase such products and solutions.

But the 'bottom of the pyramid' (BoP) concept argues that the poorest among us — those earning less than $2 per day, those at the bottom of the pyramid — are an emerging segment with a huge potential of untapped buying power. The crux of the argument is that the future will develop from serving the poor, by alleviating poverty and enabling access to innovative, affordable solutions.

There is no 'one size fits all' approach to providing access to energy for the bottom of the pyramid, and solutions must be tailored to fit the situation. The specific regional characteristics dictate not only the best type of technology for the electrification project but also which business and financial models would be most effective.

Schneider Electric has been operating its Access to Energy program since 2009. It concentrates efforts on 3 complementary initiatives:

- The funding of entrepreneurs to contribute to small company development and the investment in companies who participate to the electricity supply and access
- The creation of business models, distribution channels, and dedicated innovative offers
- The development of trainings in energy trade jobs

A key component of the BoP concept is that any solution to alleviate poverty must be sustainable over time. A project will be more successful — and therefore sustainable — when the community is actively engaged in its operation. Consequently, electrification projects benefit from developing a local expertise and involving the local population. Similarly, providing access to energy is technologically easy, but making electrification of remote villages with low-income people economically viable is difficult. Ensuring financial sustainability is the most difficult challenge.

Providing the BoP with access to affordable and reliable energy services eliminates a major obstacle to creating lasting social and economic development. Access to energy reduces poverty, improves health, increases productivity, enhances competitiveness, and promotes economic growth.

About the author

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