1976-2016

OFID

Uniting against Poverty

Towards Universal Energy Access

OFID background paper

15th International Energy Forum Ministerial
September 26-28, 2016
Algiers, Algeria

Table of Contents

1. Energy poverty: what does it mean?

Although an exact definition has not yet found agreement, energy poverty may be defined as the lack of adequate, accessible and affordable energy to promote economic growth and satisfy basic human needs. This definition encompasses household demand for energy services such as cooking, space heating/cooling and lighting, as well as other energy needs for a society to develop and thrive.

There is no doubt that the greatest scientific achievement of the nineteenth century is the harnessing of electricity. Since the first electricity grid was built in San Francisco in 1879, the face of the Earth has transformed. People in developed countries take electricity for granted. However, this is not the case for all people. The widespread absence of modern energy access continues to hamper socioeconomic progress in developing countries worldwide.

Nearly 1.1 billion people—one in six globally—have no access to electricity at all, with sub-Saharan Africa, developing Asia, and Latin America the worst affected regions. This constraint compromises productivity and income generation, as well as learning, personal safety, healthcare delivery and many other aspects of daily life.

Lack of access to electricity is primarily a rural problem. Developing Asia has the largest number of people without electrification (675 million out of a regional population of 3.6 billion), while sub-Saharan Africa (SSA) has the highest percentage of population without electricity (72%). In these regions, more than 80% of the people without electricity live in rural areas. At the individual country level, one can clearly discern a strong, almost linear, relationship between the number of people with no electricity and the number of people living in rural areas. This fact has important implications when it comes to choosing appropriate intervention measures, as we shall see later.

In addition, 2.9 billion people have no access to clean cooking facilities, relying instead on the intensified use of traditional biomass fuels. This practice produces indoor air pollution, which can have a severe impact on health if people are exposed to it for longer periods of time, killing 4 million people every year. Women and

children are particularly vulnerable as they are more likely to spend time near the cook stove. The use of polluting fuels also has a highly detrimental impact on the environment, altering the balance of ecosystems and extending the CO2 carbon footprint.

2. The international community rallying — the birth of SDG7

After being omitted from the MDGs, the first reference to energy as a catalyst for sustainable development came at the World Summit on Sustainable Development in Johannesburg in 2002. Among other things, the Johannesburg Plan of Implementation called for action to: 1) improve access to reliable, affordable, economically viable, socially acceptable and environmentally sound energy services; and 2) recognize that energy services have a positive impact on poverty eradication and living standards.

In November 2007, the absence of an energy MDG was highlighted in the Riyadh Declaration, which was issued by OPEC heads of state at the conclusion of the Third OPEC Summit. The Declaration recognized that energy was essential for poverty eradication, sustainable development and the achievement of the MDGs and issued the first call for action to the international development institutions to engage in the fight for energy poverty eradication.

The role of energy in sustainable development was subsequently emphasized in numerous international forums, including the G8 Energy Ministers Meeting in Rome and the G20 Summit in Pittsburg—both in 2009—and the March 2010 Ministerial Meeting of the International Energy Forum in Cancun. The later called on all relevant stakeholders (including the energy industry) to step up their efforts and encouraged the IEF Secretariat to maintain energy poverty high on its agenda and future programmes of work. Responding to this call the IEF and OFID convened a symposium on energy poverty in Vienna, Austria (November 2011), with the objective to investigate the most effective means to alleviate energy poverty and to review the roles of different stakeholders.

In September 2011, the UN Secretary-General launched a "*Sustainable Energy for All*" (SE4ALL) initiative to drive action and mobilize commitments to achieve three objectives: 1) universal access to modern energy services; 2) double the global rate

of improvement in energy efficiency; and 3) double the share of renewable energy in the global energy mix. The year 2012 was subsequently declared the "*International Year of Sustainable Energy for All*" and the period 2014–2024 the "*Decade of Sustainable Energy for All.*" That same year (2012), at the Rio+20 Summit in Brazil, the objective of sustainable energy for all achieved official recognition as a priority in the post-2015 development agenda. After further consultations and refinements, it was formally announced as SDG7, along with the other 16 SDGs, in September 2015.

SDG7 centers on ensuring "universal access to affordable, reliable, sustainable and modern energy." It further sets out to "increase substantially the share of renewable energy in the global energy mix," to "double the global rate of improvement in energy efficiency" and to "expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, particularly LDCs and small island developing states. It also pledges to "enhance international cooperation to facilitate access to clean energy research and technologies, including renewable energy, energy efficiency, and advanced and cleaner fossil fuel technologies, and promote investment in energy infrastructure and clean energy technologies." The year 2030 marks the deadline.

3. Universal energy access — the solutions

Providing electricity to everyone is still an unsolved challenge from a global perspective. Central electricity generation with transmission and distribution is still considered as the most cost-competitive way of providing electricity. Though this might be true for most urban and densely populated areas, the situation in rural areas is different.

With the reduction of inequalities lying central to the SDGs, the achievement of energy access for all is a must. At the core of this effort are the needs of rural communities and smallholder farmers, who need energy to increase productivity, provide light for education and stop indoor air pollution. The reality is that most rural villages, in SSA in particular, were destined to stay "in the dark" had the grid extension model been the sole electrification alternative.

The IEA estimates that only 30% of the world's rural population currently without access to electricity is best served by extending the main grid. Decentralized stand-alone systems and mini-grids schemes are best suited to generating the energy for such communities.

Stand-alone systems constitute the opposite end of the spectrum to grid extension. They are small systems applied in scarcely populated areas to provide basic electricity services (e.g. lighting and phone charging) mainly to households. Although household income may benefit from these systems (through charging phones for a fee, for example, or due to lighting extending the working hours for a seamstress,) they are too small to generate motive power for productive uses such as grinding, carpentry or crop irrigation. Still, households are much better off using small solar systems or solar lanterns than relying on candles, firelight or kerosene lamps, which all come with distinct disadvantages.

In locations that are too remote for grid-connection to be a technically or economically feasible option, mini-grids constitute an intermediate solution—between conventional grid connection and stand-alone systems—for the provision of electricity. Mini-grids are defined here as a power source of a typical capacity ranging from a few kW to a few MW, supplying electricity to consumers in a remote location through a local distribution grid justified by the population density in the concerned location. The power source could be a diesel-powered generator, a renewable energy power plant, or a hybrid power plant.

The IEA estimates that 40% of the new capacity needed to ensure universal access to electricity by 2030 will come from mini-grids. However, these schemes, in particular the mini-grids, face major implementing and operational hurdles related to socioeconomic, policy, regulatory, economic and financing issues. When developing rural electrification programs, it is essential to consider questions such as operation and maintenance, the role of the private sector, tariffs and subsidies, and capacity building and training.

3.1 Future Energy Mix

Looking at the global picture, the demand for energy is only going to get bigger by 2035. The global middle class is expected to double to nearly five billion, which

means twice as many people will need commercial fuels for heating, cooling, mobility and manufacturing. Ongoing economic expansion throughout Africa and Asia will drive rising world demand for energy over the next two decades at an average rate of 1.4 percent a year[1].

When choosing mechanisms to design and deploy policies to meet future energy demand, policymakers need to look at cost-effectiveness. But it must be kept in mind that there is no one-size-fits-all solution. Advantage must be taken of the complete range of organizational and technical possibilities so as to be able to adapt to a given situation.

Renewable energy sources have witnessed impressive growth rates over the last decade, with global investment reaching US$330bn in 2015. This phenomenal growth is taking place principally in developed and emerging developing countries; China accounted for almost one-thirds of the investment in 2015. By 2015, global total renewable power generating capacity (including hydro) was 1,849GW[2]. Various forms of policy and government support have sustained this growth.

It is clear that renewable energy sources have considerable potential to meet mainstream electricity needs. However, having solved the problems of harnessing them there is a further challenge: that of integrating them into the supply system. Sun, wind, tides and waves cannot be controlled to provide either continuous base-load power or peak-load power when it is needed. To satisfy the growing energy needs of a growing global population, *all* energy sources—including traditional fuels—will need to be tapped. What we are looking at, therefore, is a global energy supply mix that is characterized by diversity.

The share of global power generation of non-fossil fuels, including nuclear, renewables and biofuels, is expected to increase, reaching nearly 45 percent by 2035, from 32 percent in 2014. Despite the market size of fossil fuels in power sector decreasing, conventional fuels will remain dominating the global energy mix in 2035 at 80 percent, down from 86 percent in 2014.

[1] BP Energy Outlook 2035, 2016
[2] Renewable Energy Global Status Report 2015, REN 21

Due to its cleanliness and abundance, natural gas will certainly play an important bridging role when it comes to shaping our common low-carbon future. Indeed, according to all credible forecasts, gas will be the fastest-growing fossil fuel and will meet as much of the increase in demand as coal and oil combined. Natural gas consumption is projected to increase 1.8 percent a year, mainly as a result of an increase in demand from Asia and Middle East. This will be met by rising conventional gas production, mostly from the Middle East and Russia, as well as about half from shale gas, of which the USA will account for three-quarters of the world's total supply[3].

3.2 The Role of the Petroleum Industry

the Oil and Gas Industry is in a unique position to use its resources—in particular its technical expertise and knowledge—to develop creative solutions for providing better access to energy and to create opportunities for replicating and scaling up investments in energy access, working together with other stakeholders including development funds, business developers and other industry initiatives, to advance energy access.

With this in mind, OFID and World Petroleum Council (WPC) were recently launched the "Oil and Gas Industry Energy Access Platform (EAP)", a collaboration between OFID, WPC, TOTAL, SHELL, Schlumberger, OMV, IGU, GLPG, BCG and other strategic partners such as Shell Foundation. The membership of the EAP is open to all companies within the oil and gas industry, as well as to other stakeholders, including development funds and business developers.

The EAP will provide an opportunity for oil and gas companies to collaborate with other stakeholders on specific actions focused on energy access, including:

1. Sharing best practices, data and disseminate knowledge about energy access solutions, in particular where these solutions accelerate progress towards SDG7.

[3] BP Energy Outlook 2035, 2016

2. Leveraging industry capabilities to support access to energy, including modern energy and efficient solutions.
3. Helping the industry in identifying corporate social responsibility opportunities in host countries, and harmonize robust, practical and cost-effective approaches for facing energy access challenges.
4. Fostering communication within industry about energy access solutions.
5. Contributing to better integrate energy access in policies and projects at country level.

Furthermore, EAP members can discuss their work on specific initiatives such as the Zero Routine Flaring by 2030 Initiative, the Climate and Clean Air Coalition, the Oil and Gas Climate Initiative, or partnerships with governments across the world as well as other international bodies and industries.

The EAP members promote activities in several areas, including:

1. Clean cooking solutions including liquid petroleum gas (LPG),
2. Mini-grid solutions,
3. Utilization of gas flaring from oil production facilities for energy access,
4. Distribution of off-grid electricity products,
5. Gas to Power for communities, especially local,
6. Ecosystem and markets, such as local content, skill development, supply chain assessment, assessment of the local needs.

4. Financing Universal Energy Access

Estimates of the investment needed for universal energy access range from $12bn to $279bn per annum from 2010 to 2030, indicating a significant degree of uncertainty. The amount of required investment is highly dependent on the assumption of technical solutions, financing methods, and subsidies, among other country-specific attributes. However, the estimate most widely accepted is that given by the SE4ALL Global Tracking Report of 2015. It assesses the annual investment required to achieve universal energy access by 2030 at $50bn, including both access to electricity ($45 billion per annum) and clean cooking facilities (around $4.4bn per year).

When this sum is compared to the amount currently invested globally in improving access to energy required it reveals an annual investment gap of over $40bn. According to the IEA, if all announced investment commitments and policies are realized, an average $19bn yearly will be invested annually in power plants and new transmission and distribution lines through 2030. Again, this is far below the $45bn annual requirement for universal electricity access.

Regardless of the precise figure of the required investment, the financing requirements are bound to be large, and various ways of raising additional capital need to be considered. In addition, there are other important factors to consider: the wide variety of technology solutions; the multitude of different actors and stakeholders; and the board diversity of regional/country circumstances.

To bridge the investment gap, all available types and sources of funding will need to be tapped: international funds, public-private partnerships, bank finance at multilateral, bilateral and local levels. However, the availability of funds alone is not the critical issue. For example, the total volume of assets held by global public investors (central banks, sovereign funds and public pension funds) is close to $29.7 tn. Never the less, financing for energy supply might be challenging due to competition among various sectors of the economy over the amount of capital available, despite the growth in liquidity in financial markets over the course of time.

Furthermore, the enormous investment requirements confirm the need for more innovative financing vehicles, cost-effective technology solutions, and consistent and credible policies.

With regard to attracting financing, one of the biggest obstacles is the perceived risk element, since energy access projects are predominantly small-scale and target poor communities. Several options are available to mitigate this risk, including the following two examples.

Aggregation solutions are financial clustering mechanisms that convert a broad range of small projects into pools large enough to reduce transaction costs and meet investors' requirements for diversification, scale and liquidity.

Convertible grants are provided by dedicated funds at an early stage of the project life as a means of attracting private and commercial financing. The grant covers first losses; otherwise it is paid back to the contributor. An example is provided by the "OFID-REEEP Revolving Capital Pool", set up recently as a cooperation facility between OFID and the Renewable Energy and Energy Efficiency Network (REEEP). The Pool offers repayable grants at zero interest to start-up businesses to help them provide affordable modern energy services and unlock their potential for scale up.

In providing energy access, an important stakeholder group is small- and medium-sized energy enterprises. Due to their size, small and medium-sized enterprises (SMEs) have little access to traditional finance. Here, multilateral development banks and Development Finance Institutions (DFIs) play a prominent role in bridging the financing gap, together with other public and private resources. OFID is an equity partner in The Energy Access Fund (EAF), an impact investment fund sponsored by Schneider Electric. The EAF supports energy-related SMEs through the provision of equity investments of €2.5m–€5m.

It is local banks, however, that are better equipped to offer loans to the local private sector and small credits to consumers. The role of international aid agencies can be at the level of providing assistance to the local financial sector, including credit enhancement and risk mitigation, in addition to capacity building. For OFID, this worked successfully in the case of its US$10m loan to Armenia's Ardshinbank, which is using the financing to fund local SMEs involved in the construction and operation of small-scale hydropower plants (SHPPs).

The examples of innovative financing solutions are numerous, but what will underpin financing for universal access to modern energy services is the creation of an investment-enabling environment. This environment must be politically, institutionally and economically stable at the macro-level and have a regulatory framework at the micro-level. For instance, a key factor in approving OFID's loan to Ardshinbank was the political commitment of the Armenian Government to promoting SHPPs.

Governments also need to elucidate their long-term choices concerning energy access pathways. This is a clear requirement, for instance, in the case of mini-grids. For mini-grids projects, given the long-term investment perspective needed to

develop them, private investors' involvement may be deterred if they are not assured that schemes will not be superseded by connection to the national grid.

Of critical importance is the role of the private sector. With its efficiency and flexibility, the private sector is vital in ensuring universal energy access. A wide investor base comprising the private and public sectors together with DFIs can combine their different strengths. However, existing experience indicates that it is often difficult to prove the business case for the private sector participation in energy access projects. Therefore, governments need to create the policy environment and the regulatory frameworks that are conducive to the participation of private investors and to the encouragement of public and private partnerships and initiatives. For example, a key element in the successful financing of power projects is the commitment of Governments to power purchasing agreements (PPAs).

Finally, a key barrier limiting wider access to modern energy services by the poor is their lack of ability to pay for services. Pro-poor "smart" subsidies can extend energy access for rural and poor people. Such subsidies should be transparent, well oriented and should reach low-income households. Cross-sector tax/subsidy can be a self-sustained finance approach to the benefit of small-scale energy access projects. For example, the tariff paid by grid-connected customers could be adjusted slightly upward in order to provide subsidies to mini-grid projects in remote areas.

OFID leading the charge

OFID has been implementing energy projects for almost forty years. Since 2007, though, its efforts have intensified following a direct mandate from its Member Countries in the Solemn Declaration of the Third OPEC Summit. This mandate was framed in 2008 in Jeddah, with the announcement by the late King Abdullah of his energy initiative. OFID acting on this mandate crafted its energy for the poor initiative as a concrete action plan. Energy poverty alleviation has since become OFID's primary strategic focus, with activities carried out at both advocacy and operational levels.

During the transition from the MDGs to SDGs, OFID was one of the leading proponents of energy poverty eradication and the first to label energy access the "9th missing MDG." In 2011, this pioneering role resulted in OFID joining the United Nations Sustainable Energy for All (SE4ALL) initiative and its advisory board. From this position, OFID has expanded its sphere of influence as a champion of energy poverty eradication, strengthening existing partnerships with the likes of the World Bank, the Asian Development Bank, CAF, and IFAD to find and fund solutions.

At an operational level, OFID has taken concerted action to work with its partner countries to prioritize universal access to sustainable modern energy services. OFID considers both conventional and renewable energy sources to be viable and pursues both in the quest for solutions that will satisfy the basic energy needs of the poor.

OFID's efforts were boosted in June 2012, when its finance ministers issued a *Declaration on Energy Poverty* and committed a minimum of US$1bn to help fund the EPI. One year later, following operational success and high demand from partner countries, this commitment was converted from a one-time obligation, to a revolving pledge.

Since 2008, OFID has expanded the number of energy projects in its portfolio, providing a total of over US$2.5bn in financing through its various operating windows, including public, private and trade. This amount represents around 25% of the total value of all OFID commitments for the period. This sum, made available to governments, private companies, SMEs, NGOs, and entrepreneurs, has supported over 180 operations worldwide.

In fighting energy poverty, OFID delivers a wide range of solutions to suit all kinds of circumstances. From large, capital-intensive investments to innovative, small-scale community schemes. From gas pipelines and power plants to solar lanterns and clean cookstoves. The technology utilized is based on need and not on any preference on OFID's part. The end-result—providing people with the energy they need to live safe, productive lives—is far more important than the fuel source.