

Policy Report Note

Democratic Republic of Congo

This note summarizes a report prepared by Lighting Africa to identify key policy barriers to the adoption of modern lighting products and services in Democratic Republic of Congo (DRC), and offers recommendations for their mitigation. (Lighting Africa Policy Report: Democratic Republic of Congo, March 2011, prepared by Marge and Econoler with subsequent updates by the Lighting Africa Team.) The report involved consultations with a range of stakeholders—across the supply chain—to obtain an independent, objective assessment of the prevailing policy environment for low cost lighting and electrification services in the country. DRC is one of eight countries studied.

Energy Sector Overview

The Democratic Republic of Congo has one of the lowest rates of electrification in all of Africa. Eleven percent of the population has access to electricity (25 percent in urban areas, and four percent in rural areas).

The energy supply of the DRC is heavily dependent on traditional biomass (firewood, charcoal, and waste), which represented 95 percent of total energy consumption in 2009. Electricity accounted for only two percent of the energy supply of the DRC, while oil products, mainly gasoline, diesel, gas, and kerosene, accounted for three percent. Large urban areas are responsible for most of the charcoal consumption while firewood and waste biomass are used primarily in rural and suburban zones.

The DRC has the largest hydroelectric capacity in Africa, with the potential to generate 100 gigawatts (GW) of power. To date, however, only about two percent of this potential has been realized. As of 2009, the DRC had a total production capacity of 2,589 MW of which 95 percent was hydroelectric.

The electricity sector is dominated by the *Société nationale d'électricité* (SNEL), a government owned company responsible for 95 percent of all electricity production. Key government entities in the energy market are listed in Table I.

One of the major developments in the energy sector is the Electricity Code policy project, which passed in 2009. This project has facilitated important changes in DRC's energy sector, including the creation of the Electricity Regulation Authority (ARE), the National Electrification Fund (FONEL), and the National Electrification Agency (AGENA).

Democratic Republic of Congo (DRC) at a Glance

- Population: 73.6 million people
- GDP Per Capita: US\$200
- GDP Growth Rate: 6.5 percent
- Electricity Access Rate: 11 percent
- Electricity Use Per Capita: 101 kWh
- While GDP growth has risen in the past few years, per capita income is among the lowest in the world
- Key Sectors: Mining
- Endowed with natural resources
- Member of Common Market for Eastern and Southern Africa (COMESA)



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Table I. Key Government Agencies in the Democratic Republic of Congo

- **Ministry of Energy.** Responsible for developing energy policy and providing technical oversight of SNEL.
- **Société nationale d'électricité (SNEL).** Public company charged with the production, transport, and distribution of electricity in the DRC.
- **Electricity Regulation Authority (ARE).** Oversees the protection of consumer interests and facilitates private sector participation in energy sector development.
- **National Energy Commission (NCE).** A government entity under the supervision of the Ministry of Energy. The NCE is responsible for advising, researching, and coordinating energy sector activities in the DRC.
- **Technical Energy Support Unit (CATE).** Incorporated into the Ministry of Energy, provides institutional support to the Ministry and public projects, and ensures reinforcement of the capacities of public companies and administrations in the Energy Sector.
- **La CER.** A part of SNEL, responsible for identifying and developing electrification projects in rural zones.
- **National Renewable Energies Service (SENEN).** Responsible for rural electrification projects under the Ministry for Rural Development in coordination with the Ministry of Energy.
- **Ministry of Public Health.** Installing energy systems as part of its rural health program (SANRU).

Lighting Africa

The DRC Lighting Africa program supports the government in its efforts to help bring reliable and affordable modern lighting to DRC's people. It complements current grid extension and off-grid rural electrification efforts by creating an enabling environment for the introduction of innovative new off-grid lighting solutions and the phase out of traditional lighting sources. Recent advances in lighting technology, including Compact Fluorescent Lamps (CFLs) and Light Emitting Diodes (LEDs), promise better lighting solutions—ones that are clean, portable, durable, lower cost, and higher quality—than conventional lighting options. The larger Lighting Africa Program operates across Africa in addition to DRC, helping to mobilize the private sector to provide affordable, renewable, and clean lighting to rural, urban, and peri-urban customers without electricity access and focusing mainly on low-income households and micro businesses.

Lighting Options in DRC

Lighting options in the DRC can be grouped into two categories: (i) commercial, including electricity, kerosene and gas lamps, and candles; and (ii) traditional, such as firewood and vegetable oil lamps. There are major differences in the lighting options used in rural and urban areas. In urban areas, 92 percent of the population use commercial sources of energy and only 8 percent use traditional energy sources. In rural areas, 46 percent of the population use commercial energy sources, while 54 percent use traditional energy sources. Table 2 depicts the sources of energy used for lighting in the DRC.



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Table 2. Lighting Sources in Democratic Republic Of Congo (2009)

Sources	Urban Areas (percent of urban population)	Rural Areas (percent of rural population)
Electricity	34	1.7
Kerosene	52	42
Candles	6	2
Solar	0	0
Biogas/Gas	0.1	0
Firewood	2	21
Other	6	33

The three main lighting sources in DRC are firewood, vegetable oil lamps, and kerosene lamps. Kerosene lamps are the most widely used, accounting for 52 percent of urban households and 42 percent of rural households. In 2009, the average weekly consumption of kerosene was roughly one liter per household in urban areas and 0.75 liters per household in rural areas. The use of firewood for lighting is mostly found among those that suffer from extreme poverty, most of which reside in rural areas; only two percent of the population in urban areas use fuelwood for lighting compared to 20 percent in rural areas. Vegetable oil lamps are also used to provide lighting. While mainly in rural areas, they can also be found in urban areas such as Kinshasa, the capital and largest city of the DRC. The percentage of “Other” sources of lighting in rural areas is also very high. These include traditional lamps that use resins for combustion and modern lamps that use non-rechargeable batteries. It should also be noted that while the heavy reliance on traditional energy sources in rural areas can be partly explained by the extreme poverty of the population, the lack of oil products and electricity in isolated areas is also a significant factor.

Status of Off-Grid Lighting

Existing solar companies. Several private companies have begun to distribute solar products, although the market for them is typically very expensive. While companies usually sell their products in cities, their largest potential client base is in the rural areas. To address this situation, several private companies have created non-government organizations (NGOs) to promote solar products in rural markets in order to avoid negative fiscal measures, to take advantage of fiscal exemptions provided to these organizations, and accordingly, to offer reduced prices.

Despite the presence of suppliers for modern off-grid photovoltaic (PV) technologies, their use in households for lighting purposes remains rare. Purchasers of these systems are primarily religious communities, health centers, financial institutions, and similar larger organizations. The following major private sector companies presently supply PV products:

- VVS International RDC LTD
- AFRIPLAN Consulting Solar Energy
- INSOL
- Congo Energy SPRL
- SETREMA
- Solution for Africa
- IDH Solar Energy
- Sattel International

Off-grid lighting products are imported from various locations, but primarily the European Union (EU) and Asia.

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The fast moving goods market. The products offered on the market vary and include non-rechargeable lanterns and flashlights, rechargeable flashlights, solar kits with CFL or LED light sources, and occasionally, hand crank powered flashlights. Table 3 lists some of the commonly found products in the DRC lighting market. Most of these technologies are imported from the EU, China, and Israel with quality levels that are strongly linked to price.

For example, the market is dominated by informal street vendors of lighting products, such as LED and CFL rechargeable lamps, where poor quality products are sold at low prices and product lifetime ranges from just a few days to six months. The market for solar kits is essentially nonexistent in the informal market due to their elevated costs.

Newly established companies. No information.

Table 3. Products Found in DRC Lighting Market

Types of Lighting Technologies	Price of Unit in Formal Sector (USD)	Price of Unit in Informal Sector (USD)
Solar lantern with cell phone charger	130	Nonexistent
Solar lantern	80	Less than 65
Hand crank LED lantern	5-15	--
Solar lamp	25	5-10
Rechargeable battery kit with lamp	40	--
Solar kit for cell phone charging only	850	Nonexistent
Solar kit with 10 light sources, one television, one radio, one tape recorder, and one cell phone charger	2,500	Nonexistent
Solar system with six light sources, one television, one radio	1,400	Nonexistent

Where is the Off-Grid Market Going?

The development of the off-grid lighting market is highly linked to electrification. The primary purpose for the development of off-grid lighting is to provide an interim option for households that do not currently have access to electricity and for households which have access to very unreliable electricity supplies.

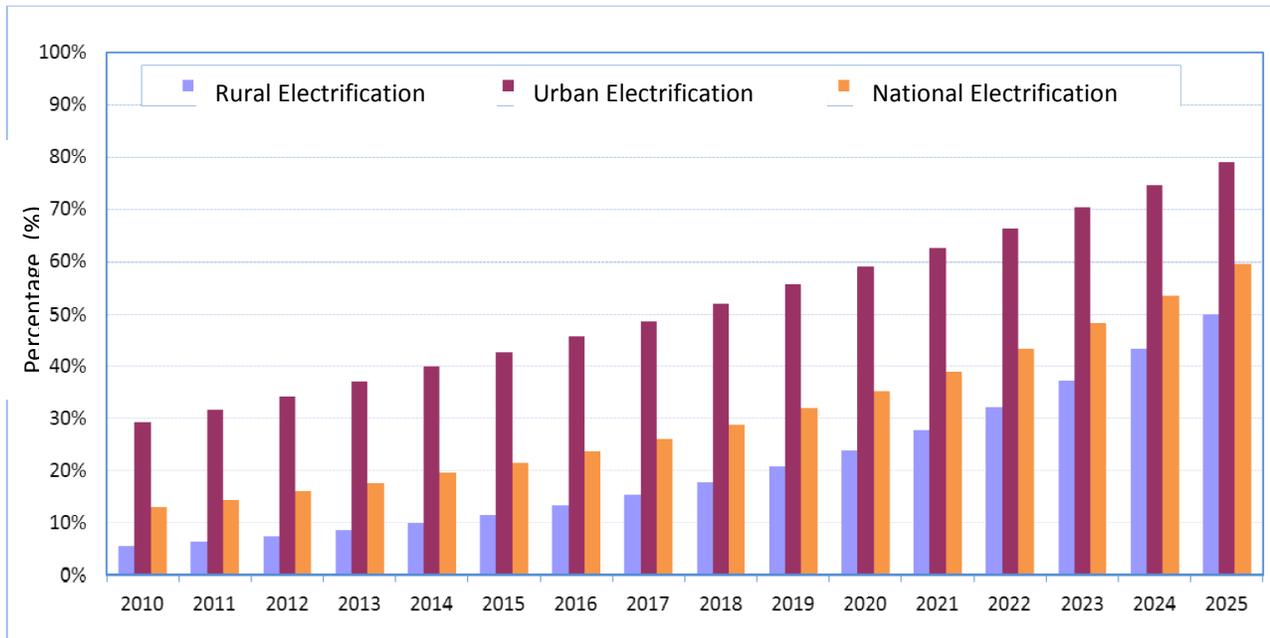
The DRC Country Study employed a simple model to estimate electricity access rates through 2025. Figure 1 presents a modelled scenario projecting access to electricity over the next 15 years. The DRC government has set a goal for a national electrification rate of 60 percent by 2025, in accordance with the objectives set by the Millennium Development Goals (MDGs). Based on the accomplishment of these goals, the study made the following assumptions:

- A 16 percent annual increase in electrification in rural areas.
- Annual electrification increases in urban areas of 8 percent, 7 percent, and 6 percent, respectively, over the periods 2010 to 2015, 2015 to 2020, and 2020 to 2025.
- A 2.9 percent annual population growth rate.



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Figure 1. Modeled Growth of DRC Electricity Access



Despite these ambitious goals, it is estimated that 75 percent of rural households and 16 percent of urban households will continue to be without access to electricity in the next 10 years. Additionally, it should be noted that these figures are highly optimistic. If the status quo is maintained, over 90 percent of rural households and 50 percent of the urban households will remain without electricity over the next 10 years. This is the primary market that Lighting Africa seeks to serve in DRC. Modern low cost lighting technologies are very important in the rural and suburban zones where the majority of poverty is concentrated. In urban zones, the demand for these technologies may be equally important due to the high rate of outages and low reliability of electrical access.

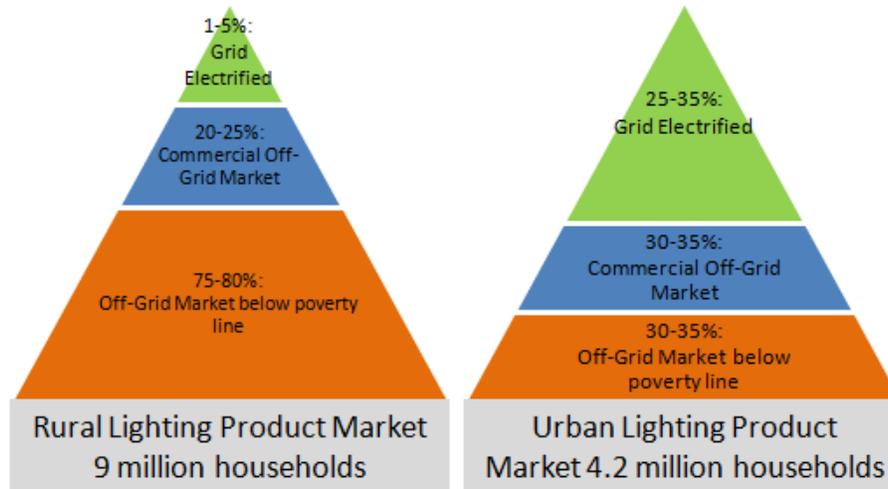
For the purpose of the study, the potential market was divided into three groups and then further divided into categories for rural and urban areas.

Figure 2 indicates how the urban and rural population were organized as potential target markets, including those currently with access to grid electricity; those without access, above the poverty line (commercial market); and those without access, below the poverty line (off-grid market).



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Figure 2. Rural and Urban Lighting Product Markets



This analysis of different market segments helps to determine which groups are likely to be able to most easily purchase modern lighting technologies if they are made available. The study noted that the grid electrified population would have no trouble purchasing modern off-grid lighting products. This market segment could aid in the rapid development of the market because they could purchase the products without any incentives, driven simply by the appeal of superior lighting quality. In the framework of creating subsidies to benefit the poor population, this market segment could create market distortions that would not reach the intended beneficiaries. The study noted that improvements in the reliability and availability of grid electricity could affect this market considerably.

Under the right conditions, the commercial off-grid market could develop rapidly as well. As in the currently electrified market, the study recommended the availability of high quality products and campaigns aimed at promoting and disseminating modern off-grid technologies.

For the base of the pyramid—the poverty market—significant political initiatives would be required to make modern lighting technologies affordable for the poor. But even then, due to the extreme poverty of this population, a portion of this market segment would not be able to attain these new technologies.

Overall, the study shows that there is likely a significant market for modern off-grid lighting technologies in the country. However, considerable steps would have to be taken to ensure that this market develops and that those parts of the population with the biggest need for the technologies would have access to them. In 2-3 years, assuming one unit was bought per household, it is not unfathomable that a market of 1.3 million units of off-grid lighting products could exist. This equates to 26 billion CDF (US\$30 million) and could save 30 million liters of oil per year, valued at 30 billion CDF (US\$34 million). Given the potential savings and market size, a 10 month return on investment could be expected, without exemptions or initiatives. To demonstrate, if a household bought a solar lamp for US\$40, its savings in kerosene would allow a return on investment in eight to eleven months.

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Policy and Institutional Environment for Modern Off-Grid Lighting in DRC

Fiscal Measures

Kerosene does not benefit from any fiscal exemption in DRC. It is taxed at the same rate as gasoline, diesel, and gas. However, the contribution to the National Road Maintenance Fund (*Fond national d'entretien routier*, FONER) that is imposed on other products is not applied to kerosene. At present, there are no political or fiscal initiatives to promote the growth of the PV and modern lighting product market.

Laws Governing Private Business Development

Several statutory provisions govern business in DRC. The most important laws that can have a direct effect on the development of the market for modern off-grid lighting technologies are those pertaining to the investment code, the value added tax (VAT), and the electricity code.

Financing Mechanisms

No financing mechanism is currently in place for projects promoting modern off-grid lighting technologies. Within the framework of the government's strategy for the development of renewable energy for electrification, however, the DRC government is creating the National Electrification Fund which will represent a new financial mechanism.

The potential beneficiaries eligible for funds are private operators, small businesses, NGOs, rural cooperatives, and financial institutions. The FONEL will finance decentralized systems using renewable energies, among others.

In addition to the FONEL, there are several microfinance institutions (MFIs), which already operate in the cities and rural areas. These institutions are excellent intermediaries to gain access to the poor.

Private Sector Effectiveness

The private sector is evolving in a difficult environment due to socio-political crises that the DRC has been facing for the last 30 years. This situation discourages private investors and public assistance in development. Investments in basic services for the population have suffered, as evidenced by the current state of electric generating facilities.

Registered companies that offer energy solutions to the population have not been able to develop adequately. The informal sector, on the other hand, has grown offering affordable products in the country.

Sustained efforts are required to clean up the business environment. According to the IFC/World Bank's *Doing Business 2011* report, which depicts the ease of doing business in 183 countries around the world, the DRC ranks 175th. In several important parameters the country is ranked in an extremely poor position: starting a business (rank 146/183), getting credit (rank 138/183), protecting investors (rank 154/183), and enforcing contracts (172/183). However, the report did note some progress made by the DRC, including advancing two positions from its standing in 2010. The improvement of the business sector to attract investors is a major priority for DRC authorities. In 2010, the government demonstrated its commitment in this area when, in consultation with the private sector, it agreed to accelerate the membership process of the DRC to *l'Organisation pour l'harmonisation en Afrique du droit des affaires* (OHADA). As a result, reforms are expected in tax-related policy.

Product Quality

The quality of lighting technologies sold by existing companies is closely linked with its price (the higher the price typically the higher the quality and vice versa). The lower priced informal market, for example, is comprised primarily of low quality products.



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Conclusions and Recommendations

Key Barriers

- **Lack of Recognition of Off-grid Lighting Products**, as a complementary and interim option to grid connectivity, especially in un-electrified rural areas. Modern off-grid lighting solutions are not explicitly mentioned in the current energy development policy.
- **Inappropriate and Inefficient Government Frameworks for Action.** Government programs responsible for increasing electricity access are numerous. Hence, there is an overlap of initiatives and roles.
- **Slow Process to Adopt the Electricity Code.** This is a crucial reform to regulate activities involving energy solutions. The Bill has been approved since 2009 but the examination process in parliament has not been finalized. After the Bill is passed, time will still be required to establish the National Electrification Agency and the FONEL, as current regulations do not account for modern off-grid technologies.
- **Low Priority of Off-grid Technologies among Consumers.** At present, lighting is not valued by consumers in the same way as other widely disseminated products, such as mobile phones. Grid electricity has always been the ideal and perceived as the most sought after lighting source to replace traditional sources, even for the rural populations that face uncertainly long connection times. This has resulted in a mindset among households that attributes a low value to off-grid lighting options. Furthermore, there is no awareness of or education about off-grid lighting.
- **Low Quality Products in Market.** Off-grid lighting technologies are dominant in the informal sector, which supplies low quality lighting products at low prices to the population. This is in part a result of an absence of quality standards for consumers and other buyers to distinguish between good and low quality products, the latter of which can lead to market spoilage.
- **Inadequate Fiscal Measures.** The existing fiscal measures encourage high prices for off-grid modern lighting products distributed in the formal market.
- **Low Purchasing Power of a Large Portion of the Off-grid Lighting Target Market.** It is worth noting that 80 percent of the population in DRC lives below the poverty line. The main market- those who suffer from a lack of electricity- resides in rural areas where the purchasing power of households is very low. Households are unable to afford the initial product costs due to their low income levels.
- **Absence of Big Players in Lighting and PV Markets, and the Predominance of the Informal Sector.** There are very few companies specializing in PV products and modern off-grid lighting; the ones that do exist tend to be small and operate primarily in the informal sector. They often do not have sufficient assets to make investments in stock.
- **Lack of Off-grid Lighting Product Availability in the Marketplace.** Unlike other Sub-Saharan African countries where a range of products (of varying quality) share the market, in the DRC there is a limited range of off-grid lighting products available. The current market is much more targeted to urban consumers using grid-rechargeable systems.

Key Recommendations

- **Enhance Political Participation.** The superiority of modern off-grid lighting over traditional sources of lighting needs to be clearly recognized in the country's policy and strategy papers. An important step in this process would be to explicitly address off-grid lighting products in laws pertaining to the development of rural energy.
- **Increase Awareness and Education.** Raising awareness and educating all market players is fundamental for the rapid development of the modern off-grid lighting market. All market players should be targeted. For national agencies—customs office, Ministry of Energy, AGENA, standards and quality control services—it is crucial to reinforce capacity. Consumers should be informed through a national awareness campaign about the mechanisms

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put in place to facilitate the acquisition of the devices. The benefits of modern lighting products for health, education, and income generation should also be advanced.

- **Address Product Quality Issues.** There is a need for DRC to adopt and use internationally recognized standards, such as those promoted by Lighting Africa, to foster successful product uptake and sustainable market development over the long term. These standards will create interest and confidence in the formal sector and must be accompanied by the labelling of certified products so consumers are aware of the difference in product quality. Financial incentives should only be given to products complying with the standards in order to reduce their prices and foster competition with lower quality products.
- **Make High Quality Products Available in the Market and Affordable to Consumers.** This will entail government consideration of the following measures: duty and tax reductions on imports of high-quality modern off-grid lighting products; flexible mechanisms for upfront cost payment (through FONEL); and the implementation of pilot projects to stimulate the market and raise awareness and interest among consumers.
- **Create an Enabling Environment for Private Sector Participation.** The formal sector is largely non-existent in the off-grid lighting technologies market. This sector should be encouraged and motivated to expand its activities, as the investment required to promote off-grid lighting technologies in the informal sector is not available at present.
- **Subsidize the Bottom of the Pyramid.** Subsidies will eventually be required to reach people living below poverty line.

About Lighting Africa

Lighting Africa, a joint World Bank and IFC program, seeks to accelerate the development of markets for modern off-grid lighting products in Sub-Saharan Africa where an estimated 10 to 30 percent of household incomes are spent on hazardous and low quality fuel-based lighting products. The goal is to mobilize and provide support to the private sector to supply quality, affordable, clean, and safe lighting to 2.5 million people by facilitating the sale of 500,000 off-grid lighting units by 2012 (target achieved and exceeded with 4 million people reached), while at the same time creating a sustainable commercial platform that will realize the vision of providing 250 million people with modern off-grid lighting products by 2030.

About the Public-Private Infrastructure Advisory Facility (PPIAF)

PPIAF is a multi-donor trust fund that provides technical assistance to governments in developing countries in support of the enabling environment conducive to private investment, including the necessary policies, laws, regulations, institutions, and government capacity. It also supports governments to develop specific infrastructure projects with private sector participation. PPIAF is a major donor of the Lighting Africa program, supporting off-grid lighting policy studies and international off-grid lighting conferences.

About the Africa Renewable Energy Access program (AFREA)

AFREA was established in 2009 to help meet energy needs and widen access to energy services in Sub-Saharan African countries in an environmentally responsible way. AFREA funds support the implementation of the World Bank's Africa Energy Unit (AFTEG) strategy and its clients, through analytical and advisory activities, while also providing recipient-executed technical assistance and investment grants that help speed up the deployment of renewable energy systems regionally. AFREA is a donor of the Lighting Africa program.

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