

Policy Report Note

Ghana

This note summarizes a report prepared by Lighting Africa to identify key policy barriers to the adoption of modern lighting products and services in Ghana, and offers recommendations for their mitigation. (Lighting Africa Policy Report: Ghana, 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. Ghana is one of eight countries studied.

Energy Sector Overview

Estimated at 9,459 kilotons of energy (ktoe) in 2008, Ghana's primary energy supply is highly dependent on traditional biomass (wood fuels, charcoal, and wastes), accounting for 67 percent of total primary energy supply. Conversely, petroleum products and electricity represented only 28 percent and six percent of the primary energy mix, respectively. Biomass, predominantly wood fuels and agricultural wastes, is largely used by rural households and charcoal is used in urban areas for cooking.

Oil products include gasoline, diesel, jet fuel, and fuel oil for transportation and power generation. Liquefied Petroleum Gas (LPG) in rural areas is rare. Kerosene is used primarily for lighting in un-electrified rural, peri-urban, and urban households. Hydropower is the main electricity source. Installed capacity for electricity generation was 1,930 MW in 2009. Hydroelectricity represented 77 percent of the total electricity generated, with the remainder being thermal based.

The percentage of people who have access to electricity in Ghana is 67 percent, which is high compared to other countries in Sub-Saharan Africa. Yet there are disparities.

In urban areas, over 85 percent of the population was electrified in 2008 versus only 23 percent in rural areas. Access in Northern, Upper East, and Upper West regions is low, with 60 percent of the population lacking electricity. In other regions (except Greater Accra), 20 to 42 percent of the population is un-electrified. The Government of Ghana (GoG) has initiated several reforms in the power sector, including independent power production (IPP) and an increase of low electricity tariffs up to international levels. The GoG intends to increase the share of renewable energy (RE) in its national energy mix through a tailored policy and regulatory framework.

For low consumption consumers, rural and urban households benefit from the lifeline tariff, in place since 2001. A subsidized connection charge has helped low income families with first connections. Yet, the cost of connectivity has become a major bottleneck for remote projects. There is a continued need to improve grid access for a significant number of people, despite the connection subsidy.

Ghana at a Glance

- Population: 24.8 million people
- GDP Per Capita: \$2,500
- GDP Growth Rate: 5.7 percent
- Politically stable
- Oil production began December 2010; goal to boost economic growth
- Key Sectors: Agriculture, mining, light manufacturing
- Member: Community of Sahel-Saharan States (CEN-SAD)



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Table 1. Key Government Agencies in Ghana's Energy Sector

- **Ministry of Energy (MOE).** Responsible for formulation and implementation of energy sector policies and administration and supervision of operations/activities of energy sector institutions.
- **Public Utilities Regulatory Commission (PURC).** Independent agency overseeing performance of public utilities, promoting competition among service providers, protecting consumer interest, and examining and approving utility rates for electricity, natural gas, and water.
- **Energy Commission (EC).** Technical regulator of electricity and natural gas utilities. EC is mandated to grant licenses to public utilities for transmission, distribution, and sale of electricity and natural gas. Also responsible for establishing and enforcing performance standards and ensuring uniform rules of practice for electricity and natural gas.
- **Volta River Authority (VRA).** Wholly owned state entity responsible for electricity generation and transmission, through subsidiary Northern Electrification Department (NED), VRA is responsible for power distribution in North Ghana, serving Brong-Ahafo and Northern, Upper East, and Upper West regions. Since 2008, VRA transmission/power dispatch roles have been transferred to an independent utility, the Ghana Grid Company Limited (GRIDCo).
- **Electricity Company of Ghana (ECG).** A state-owned entity responsible for electricity distribution to consumers in Southern Ghana, namely in the Ashanti, Central, Greater Accra, Eastern, and Volta regions.

Lighting Options in Ghana

The census generally provides details on the source of lighting used by households in both rural and urban areas. This may be the most useful information in estimating access to modern lighting services with regard to kerosene consumption and grid connections.

Results from the 2008 survey reveal that kerosene and electricity are the main sources of lighting in Ghana, together accounting for 99 percent of household lighting (roughly 49 percent each). However, as shown in Table 2, important disparities are observed between usage in urban and rural areas.

- Kerosene is the main light source in rural households (72 percent).
- Electricity is the main light source in urban households (78 percent).
- While electricity is the main source of lighting in urban households, 25 percent of urban households use kerosene for illumination (in addition to electricity).
- Of the rural areas, the Savannah regions are the most reliant on kerosene for lighting, followed by the coastal regions.
- Lighting sources other than electricity and kerosene are marginal in Ghana, although gas lamps, candles, and torches are utilized to some extent in both urban (one percent of households) and rural (0.8 percent of households) areas.
- The use of solar energy for lighting remains negligible across the country.

Aside from lighting, kerosene is also used as a fuel for cooking in Ghana. Approximately one percent of urban households and 0.2 percent of rural families use kerosene as cooking fuel.

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The 2008 census suggests a strong case for market segmentation in the development of the off-grid market in Ghana. Rural households make up the main market for modern off-grid lighting products, since they are looking for ways to shift from kerosene-based lighting to modern lighting technologies, especially as kerosene price volatility increases. Nevertheless, urban households, both electrified and non, may play an even stronger role as the commercial driver of the off-grid lighting market since they are likely to have an easier time making the switch from kerosene to modern lighting. Moreover, despite the high incidence of grid connectivity in urban Ghana, power supply is often not sufficient, continuous, or reliable, providing further support for expansion and/or easier adoption of modern lighting by this segment.

Table 2. Lighting Fuel Sources in Ghana (2008)

Source of Lighting	Urban Areas (Percent)			Rural Areas (Percent)				Ghana
	Accra (GAMA ¹)	Other Urban	All	Coastal	Forest	Savannah	All	
Grid Electricity	88	74	78	29	32	17	27	49
Kerosene	9	25	20	70	67	81	72	49
Gas Lamp	0.1	0.4	0.3	0.3	0.4	0.8	0.5	0.4
Candles/Torches (flashlights)	2	0.2	0.8	0.2	0.2	0.5	0.3	0.5
Solar Energy	0.1	0.0	0.0	0.0	0.0	0.3	0.1	0.1
Generator	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
No Light	1.0	0.4	0.6	0.4	0.1	0.3	0.2	0.4
Other	0.0	0.1	0.0	0.0	0.2	0.6	0.3	0.2

Lighting Africa

The Ghana Lighting Africa program supports the government in its efforts to help bring reliable and affordable modern lighting to Ghana'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 advantages in lighting technology, including Compact Fluorescent Lamps (CFL) and Light Emitting Diodes (LEDs), promise improved lighting that is clean, portable, durable, lower cost, and higher quality than conventional lighting options (kerosene, etc.). Lighting Africa aims to mobilize the private sector to provide modern lighting to rural, urban, and peri-urban customers without electricity access—predominantly low-income households and micro businesses.

¹ GAMA means Greater Accra Metropolitan Area. GAMA comprises the Accra Metropolitan Area (AMA), the Tema Municipal Area (TMA), and Urban areas in Ga East and Ga West Districts.



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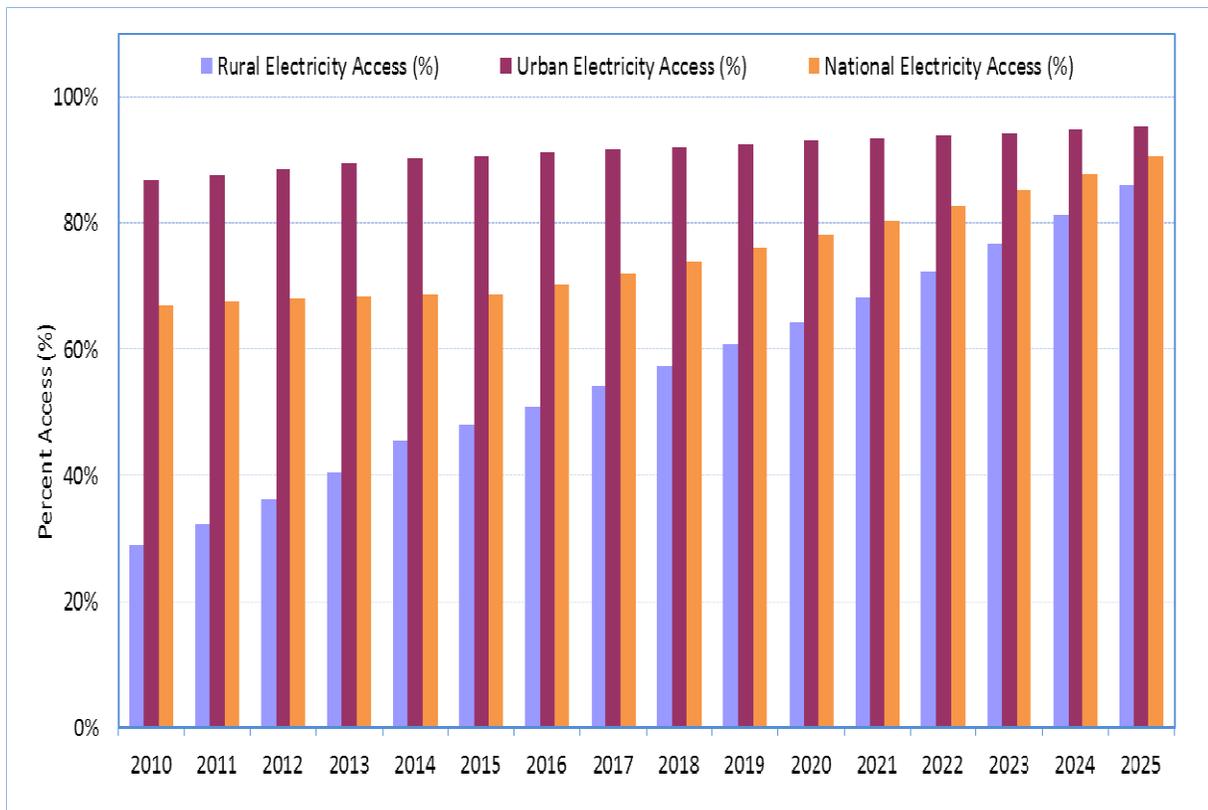
Where is the Market Going?

In Ghana, a majority of the un-electrified populations are small, remote, disparate communities residing in rural and peri-urban areas where grid connectivity is overlooked, often because demand is thought to be too low and connectivity too expensive. At present, it is estimated that about eight million people are not benefiting from electricity services.

To better analyze the implications of enhanced energy access for urban and rural off-grid lighting products for the future, a model was developed using simple assumptions. The model incorporated information on Ghana’s electrification rate, plans to increase generation capacity, and government efforts to electrify rural households via both standard grid connection and other methods- isolated grids or individual power systems (diesel, photovoltaics, wind). The results of the model are presented in Figure 1.

The model indicates that in urban areas, electricity access could reach 90 percent by 2015 and 95 percent by 2025. In rural areas, electricity access is more likely to reach about 48 percent (1.5 million households) by 2015 and over 85 percent by 2025. Modern off-grid lighting products would serve this population well, especially as an interim step towards getting electricity, since it appears to be a long ways off still. Hence the model demonstrates that there is potential for a strong primary market for off-grid lighting products in Ghana among rural populations, followed closely by urban populations, both electrified and non, due to urban electricity constraints and poor power distribution.

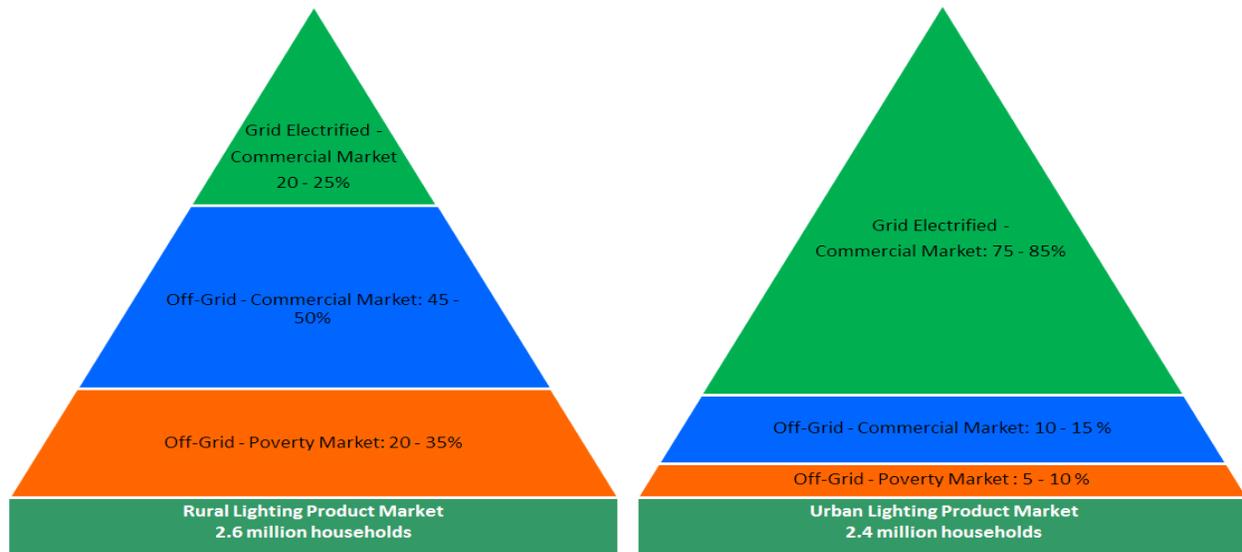
Figure 1. Modeled Growth of Ghana Electricity Access by 2025



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Figure 2 characterizes this market in more detail, and demonstrates the ways in which urban and rural populations might be disaggregated into potential target markets (i.e., a commercial market and poverty markets).

Figure 2. Potential Market for Grid and Modern Off-Grid Lighting²



As shown in Figure 2, the primary market is divided in six segments between rural and urban areas (three market segments per diagram). The features of each market are described below.

- Urban and Rural Grid Connected Market (two segments).** The rural and urban electrified market segments include from 75 to 85 percent of urban households, and 25 percent of rural households. This translates to 1.8 to 2 million urban households and 650,000 rural households. This is a fully commercial market that might buy lighting products as a back-up for the grid or other uses outside the home. It is expected that not all households in these groups will participate in the market, as it is likely to depend on the electricity supply and its characteristics (e.g., higher participation is anticipated during power interruptions, times of poor grid quality, and times when supply does not match demand, particularly in isolated grids). According to Lighting Africa's market assessment, 20 percent of grid connected participants stated that they have daily power cuts at peak times, while 42 percent of households experience losses at off-peak times (7 pm to 7 am).³ In general, it is anticipated that off-grid lighting products will be adopted on a *temporary* basis. For low-income electrified households, off-grid lighting products could also be purchased to reduce electricity bills, if they are affordable and do not involve an operating cost.
- Urban and Rural Off-grid Commercial Market (two segments).** This market is comprised of rural and urban households that are assumed to be able to afford electricity services, but are not yet connected to the grid. Similar to the grid connected market, this market is characterized as a commercial market opportunity.

² A commercial market is a market interested in a lighting product; a poverty market is an off-grid market that is constrained by income as well as geographic isolation.

³ IFC/World Bank. 2008. Lighting Africa Market Assessment Results: Quantitative Assessment – Ghana.

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However, development of this market will likely necessitate government intervention to address a number of market barriers including poor product quality and lack of consumer awareness, high initial product costs, and lack of availability of good quality modern lighting products in the marketplace. This market segment is also likely to purchase modern lighting products as an intermediary option while waiting for electrification to come over the next 5 to 10 years. The commercial market segment is comprised of 45-50 percent of rural households and 10-15 percent of urban households. This equates to about 1.2 to 1.3 million rural households and 240,000 to 360,000 urban households.

- Urban and Rural Poverty Market (two segments).** The off-grid urban and rural market segments include people living below the poverty line who are constrained primarily by income levels and geographic isolation, as well as people who do not prioritize lighting products due to upfront costs. A total of 20 to 35 percent of rural households and 5 to 10 percent of urban households (520,000 to 910,000 rural households and 120,000 to 240,000 urban households) will still be un-electrified after 2020, despite government efforts. The urban and rural off-grid poverty markets also include those who could likely afford to buy modern off-grid lighting products with government assistance and by those who cannot afford modern lighting regardless of government intervention. Strong government intervention will be required to lower upfront costs, facilitate payment, and open the market to those who are currently using kerosene for lighting. Other beneficiaries of modern lighting products would include indirect recipients or those offered lighting products for free by the government, non government organizations (NGOs), or donors.

Policy and Institutional Environment for Modern Off-Grid Lighting

Fiscal Measures

Kerosene and Fuels. Kerosene is exempt from the debt recovery levy and the road fund levy in relation to premium fuel. In addition, kerosene for households is also cross-subsidized but kerosene consumed for mining purposes is not. Because of its use for illumination by rural and low-income families, the price of kerosene for households is subsidized at 23 percent below the price in the mining sector. However, an additional primary distribution margin, a levy for the Unified Petroleum Price Fund (UPPF), and marketer charges are added to encourage transporters and ensure regular supply of kerosene to remote locations. Through the UPPF, the government pays for haulage of petroleum products to all regions in Ghana to allow uniform prices and availability for Ghanaians, regardless of their place of residence. Haulage costs are paid to transporters based on a determined rate, the quantity of petroleum products transported, and the distance covered by the vehicle. All petroleum products are subject to a levy by the Energy Fund to support Research and Development (R&D) and to promote Ghana's natural energy resources, particularly renewable energy. Based on the above, there is room to increase the availability of modern off-grid lighting products in rural areas using the Energy Fund, the UPPF scheme, and other levies such as the national electrification levy. It will be critical for the government to recognize modern off-grid lighting products in its efforts to increase access to modern energy services across Ghana.

PV and Lighting Products. Following the energy crisis of 1998, the GoG enacted certain measures to reduce the electricity demand and lessen its dependence on hydroelectric dams. One of these measures involved eliminating duties and the value added tax (VAT) on solar generating sets. The qualification for the exemption depends on the product being classified under the correct Harmonized System (HS) code as listed in Table 3.

As this table indicates, imported modern off-grid lighting products are doubly hit with taxes, including a VAT of 12.5 percent and a National Health Insurance Levy (NHIL) of 3.5 percent. On-grid lighting is subject to a 10 percent import duty; other fees include the Economic Community of West African States (ECOWAS) levy and the export development levy, each of which is 0.5 percent. CFL off-grid lighting, CFL off-grid lighting with a solar panel, and LED off-grid lighting are all subject to a 10 percent import duty and 12.5 percent VAT plus other fees (ECOWAS/EDIF).



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Table 3. Harmonized System Code for PV and Lighting Systems/Products

Lighting Type	Devices	Harmonized System Code	Duties	VAT	Other Fees
On-Grid Lighting	Incandescent 60 W lamp bulb	701100000	10 percent	12.5 percent	3.5 percent
	Incandescent 60 W spotlight bulb	9405100000	20 percent	12.5 percent	3.5 percent
	Fluorescent tube	8539310000	10 percent	12.5 percent	3.5 percent
Off-Grid Lighting	<ul style="list-style-type: none"> • CFL off-grid lighting • CFL off-grid lighting with solar panel • LED off-grid lighting • LED off-grid lighting with solar panel 	940550090	10 percent	12.5 percent	3.5 percent
Solar Panels	<ul style="list-style-type: none"> • 2 W - 3 W module • 20 W module • 100 W module 	8541400000	0 percent	12.5 percent	3.5 percent

According to applicable duty levies, solar panels are exempt from duties but still face a 12.5 percent VAT and fees of 3.5 percent. Solar system accessories on the other hand are not eligible for duty exemption. Solar lanterns, for example, which fall under LED off-grid lighting, are not exempted. Consequently, this is the area where government actions can propel a portion of the consumers who are now in the poverty market into the commercial market by reducing prices through the elimination of customs duties on solar lanterns. Modern off-grid lighting products that are solar powered may qualify under this duty exemption scheme. Government actions could include listing eligible products, taking relevant actions to enforce the measure, and educating customs on the targeted products. Another option could be a coupon program that offsets the taxes and duties on high-quality lighting products (LA Quality Mark). This may be a way to avoid having to persuade authorities for HS code revision.

Laws Governing Private Business Development

Over the years, Ghana's trade policy and investment conditions have been quite liberal, allowing for the unrestricted set-up of companies and the import of most lighting products with the applicable duties and taxes. The main laws governing businesses are the Ghana Investment Promotion Center (GIPC) Act and the Free Zone Act. Both of these contain identical provisions dealing with the protection of investments, expropriation, and dispute settlement.

Both foreign and local investors may hold a 100 percent share in a free-zone enterprise. Companies that meet the requirements of a free-zone enterprise are exempt from duties on all their imports provided that they re-export 70 percent or more of their products. This provision limits the benefits that a free-zone-established company may gain from the distribution of modern off-grid lighting products in the country. However, the private sector, which participates in a modern off-grid lighting solution distribution business, may want to establish agencies or distribution centers in neighboring countries (ECOWAS) to allow the modern off-grid lighting industry to grow. This can reduce the price of devices through bulk procurement. Other incentives under the free-zone scheme include a 10-year tax holiday on corporate income and guarantees for repatriation of profits.

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For already established investors, general incentives for companies setting up in Ghana under the GIPC Act include:

- Customs duty exemptions for plants and machinery of registered companies.
- Zero rating on import duties and the VAT for solar and wind energy generating sets.
- Reduced corporate taxes for companies listed on the Ghana Stock Exchange.
- Tax rebates for manufacturers located outside Accra or regional capitals.
- Capital incentives for plants and machinery.
- Investment guarantees regarding the transfer of capital, taxation, and risk coverage.

Moreover, the GIPC Board may negotiate special incentive packages with the approval of the President to promote identified strategic or major investments. Tax exemptions have been granted where the beneficiaries are engaged in projects of strategic importance to the Ghanaian economy. The diffusion of modern off-grid lighting products in Ghana could fall under this provision as it will serve primarily the underprivileged rural and low-income population. Therefore, the possibility of granting special incentives to reduce prices and make products affordable has to be seriously considered by the government. It is also important to consider modern off-grid lighting in the preparation of the renewable energy law and policy. As the law intends to send a clear signal to the market about rural electrification through renewable energy technologies, modern off-grid lighting devices may be incorporated into the same package as a dedicated part of the options, although it is an interim solution until full electricity services become available (i.e., before SHS and/or grid connection).

Available Organizational Support

Rural electrification is the responsibility of the Power Directorate of the Ministry of Energy. Moreover, the Ghana Energy Development and Access Project (GEDAP) is based at the Ministry of Energy as is its Project Management Unit. The GEDAP off-grid scheme (Global Partnership on Output-Based AID, GPOBA portion) is managed by the ARB-APEX Bank. Therefore, the GEDAP project could support the dissemination of modern off-grid lighting products in Ghana to structure the market and scale up its current intervention. The Energy Commission also appears to be a government agency that could serve as linkage between policy interventions and the practical development of the modern off-grid lighting market in Ghana. The Energy Commission has participated in the promotion of CFLs in Ghana and is in charge of the exploitation of Ghana's RE resources. Apart from government organizations, many other organizations such as the Energy Foundation, the Ghana Electrical Dealers Association (GEDA), the National Organizer of the Ghana Union Traders Association (GUTA), and the Association of Ghana Solar Industries (AGSI), which are strongly rooted in the private sector, could be highly supportive in the successful diffusion of modern off-grid lighting devices in the country.

Financing Mechanisms

The cost of borrowing plays a major role in the viability of developing a robust market for modern off-grid lighting products in Ghana. Financing assistance in terms of low-interest, long-term loans, and loan guarantees can play an important role in overcoming this obstacle. Lowering the cost of capital can bring down the average price of modern off-grid lighting products and reduce the risk of investment. Initial purchase prices for solar products could be a disincentive,⁴ especially for target populations. This could be countered by setting up schemes that would make it easy for those in low market groups to purchase the products (e.g., aligning payments to their current rates of buying kerosene).

- The Energy Commission Act, 1997 (ACT 541) of Ghana makes provision for the Energy Fund. One of the areas of fund utilization is the promotion of R&D in renewable energy technologies. The Energy Fund raises about US\$500,000 per year from a levy on petroleum products. However, this amount is insufficient to support large-

⁴ LA market research studies in Ghana.



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scale renewable energy development.⁵ The Energy Fund could integrate its services into modern off-grid lighting solutions by developing and managing a baseline database for the country to quantify the size of potential market segments for appropriate lighting products in volume and value terms.

- The E+Co Ghana Office provided funding through debt or equity for clean energy businesses/off-grid products and funding to 15 entrepreneurs⁶ in Ghana at an average interest rate of 29 percent. The minimum loan is US\$50,000 and the maximum US\$2 million with a 6-month moratorium. E+Co, in conjunction with the United Nations' African Rural Energy Enterprise Development (AREED) program and local partner KITE, assisted in the development of business plans and formal appraisals. The AREED team conducted due diligence on candidate enterprises.
- ARB Apex Bank Ltd., through rural banks across the country, is the main financing agent of the US\$6 million World Bank/GEDAP/GPOBA project. Its financing plan for renewable energy and modern off-grid lighting products (three-year tenure) stands at a 29 percent interest rate. Processes in project implementation are as follows: (i) rural community banks approve consumer loans; (ii) upon approval, consumers are expected to show willingness to pay by making a down payment of 10 percent; (iii) a selected certified installer or supplier who is a member of AGSI and registered with the Energy Commission performs the installation or supply; (iv) verification is performed by rural banks and the ARB Apex Bank; (v) rural banks pay the installer/supplier, with no money paid directly to customers/end-users; and (vi) consumers repay their loan, principal plus interest, within three years.

Many other NGOs have designed microcredit schemes to help rural households develop small businesses or purchase basic goods. The main issue is the high interest rate offered to customers, which increases product costs by almost 30 percent. The interest rate of commercial banks in Ghana ranges from 29 to 49 percent, while microfinance institutions (MFIs) can be even higher, averaging about 60 percent per year. Policy implications fostering modern off-grid lighting products in Ghana would require a market-driven mechanism which takes into account the low ability of the major portion of interested households to pay for these services. Interested stakeholders involve bankers and small and medium enterprises (SMEs) and suppliers, but mainly end-users. Possible financial schemes could include subsidized interest, microcredit, and other successful approaches currently operating in rural areas and low-income communities (tontines, group purchases, and agricultural cooperatives). While it is important to keep the schemes as market and private sector driven as possible to allow for fair competition, government intervention is required to ensure rapid market growth and higher probabilities for success. This intervention should simplify the regulatory environment, allow off-grid lighting sector growth, boost economies of scale for the private sector, and provide a clearer framework for the efficient application of modern off-grid solutions across Ghana.

Private Sector Effectiveness

There are many private enterprises active in off-grid lighting products or similar areas such as the PV market. From the Ghana Country Report it was found that the entrepreneurial culture among private companies, even in the informal sector, is high in Ghana. Although some solar PV distributors have networks established in rural areas, most of the PV distributors lack strong distribution logistics and networks to ensure consistent product availability. The result is unreliable product presence and lack of availability at the relevant point of purchase. This is one of the key bottlenecks to solar PV market development.

Within Ghana, private sector-driven initiatives are constrained by a difficult environment for doing business. The most common challenges relate to dealing with public agencies for import and sale of products, tax payments, and the predominance of the informal sector.

⁵ World Bank. 2007. Ghana Energy Development and Access Project. Project Appraisal Document.

⁶ Source: Mr. Vincent Yankey, E + Co Ghana Office.



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Moreover, access to financing is a major challenge with high interest rates and collateral required by commercial banks. These assertions, gathered from interviews with private enterprises and organizations, are documented in the Enterprise Surveys of the World Bank and IFC, which identified the following hurdles:⁷

- More than 30 percent of enterprises list tax rates as a major constraint, with Ghanaian private companies spending 57 percent more time in meetings with tax officials than the average in the African region. This favors corruption as firms have to pay informally to get things done.
- Sixty-nine percent of service firms compete against unregistered or informal firms.
- Access to finance is a major constraint for 66 percent of firms while the value of collateral needed for a loan represents 128 percent of the loan amount.

Despite the needed efforts to fully build upon private sector strengths for a rapid market development, the environment for doing business in Ghana is improving year by year. According to the IFC/World Bank's *Doing Business 2011*, Ghana is ranked 67 out of the 183 economies studied. This is a tremendous improvement over the two years prior, when the country was ranked 87/183 (2009) and 77/183 (2010). Ghana's ranking has positively evolved in aspects such as access to credit (rank 46/183 in 2011 versus 109/183 in 2009), protecting investors (rank 44/183), and enforcing contracts (rank 45/183). A major improvement in the past year involved establishing a centralized collateral registry and granting an operating license to a private credit bureau which began operations in April 2010 to enhance access to credit.

Conclusions and Recommendations

Key Barriers

- **Lack of Recognition of Modern off-grid Lighting Products** as a complementary option for rural access to modern energy. Currently, government policy for off-grid rural electrification exempts solar panels from the 10 percent duty. Solar-powered lighting devices are not included in the policy. The role of modern off-grid lighting products in providing basic modern energy services to unelectrified households and communities is overlooked/misunderstood by policymakers.
- **Local Markets do not fully benefit from Free-zone Privileges.** Companies established under the Free Zone Act are exempt from duties on all their imports provided that they re-export at least 70 percent of their products. Although most modern off-grid lighting products are sold in rural areas, such provisions do not include the countryside. This could reduce product prices and increase affordability.
- **Policy Discrimination against Modern Off-grid Lighting Products.** The existing energy subsidy policy measures (for kerosene and electricity) are discriminating against people who are keen to use modern off-grid lighting products but lack the financial capacity to do so.
- **Existing Tax Policy Maintains High Prices for Modern Lighting Products.** Currently, modern lighting products are not exempt from duties and taxes. As a result, importers and distributors of these products increase their price in order to secure business profits. This restricts households with already low purchasing power to access these lighting technologies.
- **Low Priority of Modern Off-grid Lighting Products among Consumers.** With insufficient income, many poor consumers regard modern off-grid lighting as a lower priority than other daily living needs and expenses. Urban and rural unelectrified households already have daily expenses organized around other sources of lighting.
- **Predominance of Low Cost, Low Quality Off-grid Lighting Products in the Market.** The market is dominated by low-cost, low-quality products from the informal market, which is literally "killing" the formal market business as reported by the Association of Ghana Solar Industries.

⁷ World Bank/IFC. 2007. Enterprise Surveys: Ghana Country Profile 2007.



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- **Low Purchase Power of a Large Portion of Modern Off-grid Lighting Market Beneficiaries.** The major problem associated with the use of modern off-grid lighting products in households is the initial cost of purchase,⁸ especially for the lower-income group of consumers who find modern lighting devices unaffordable.
- **Lack of Trust from the Private Sector of the Modern Off-grid Lighting Market, Except for PV Systems.** Modern off-grid lighting products are perceived as a small market. This results in very low investments in this sector and in the absence of major players (unlike in the cell phone market).
- **Small Size of Most Interested Private Enterprises.** The small size of enterprises operating in the lighting sector could be a constraint to accessing credit and scaling up the market because of an absence of needed investments.

Key Recommendations

Based on the prevailing policy environment and the remaining barriers, the following recommendations may foster a sustainable transformation of the modern lighting market in Ghana. The policy intervention should consist of an integrated, comprehensive approach with clear targets and expected outcomes. The market could rapidly develop on a commercial basis from the participation of electrified households in urban and rural areas that do not require specific assistance. Recommended policy interventions include the following:

- **Increase Political Participation.** It is important to explicitly recognize off-grid lighting options as part of the solutions for improving access to modern energy in Ghana. Thus, there is a need to reflect this importance in the renewable energy law and policy under preparation, and in rural electrification schemes.
- **Enhance Awareness and Education.** Awareness raising and education of key stakeholders is fundamental as products are new in the market and the advantages have not been properly acknowledged by most market players. Consumers need to be able to identify quality products and be stimulated to purchase. Businesses need to be encouraged to sell these products and have confidence that a business which includes lighting products will succeed.
- **Address Product Quality Issues.** Internationally accepted standards, as those developed by Lighting Africa, create confidence in the market and help avoid costly national standard development. While the Ghana Standards Board could pre-approve products based on international standards. The main question is how such standards will be enforced in a market where the informal sector is predominant and the market is flooded with low cost products.
- **Make High-Quality Products Affordable and Available in the Market.** The following two measures could support the introduction of more high quality and affordable products in the market: The first one consists of removing duty and tax exemptions on imports of high quality, modern off-grid lighting products. The objective is to encourage private players to invest in the modern lighting market by eliminating the additional surtax on eligible good quality products. This will make high-quality modern lighting devices more affordable, which would help to develop the commercial segment of the market first. This would aid in lowering prices for other market segments. The second measure relates to offering flexible mechanisms to help consumers overcome first costs.. The payment facility should build on current habits for food, kerosene, and other goods (i.e., disbursing small amounts at a time). It will be essential to build and support a network of microfinance institutions, community cooperatives, and associations that can offer the payment facility.
- **Subsidize the Bottom of the Pyramid.** Households are very price sensitive when purchasing a device. Consequently, high-cost products could inhibit the successful diffusion of modern off-grid lighting products. Low-income segments may not be able to purchase a modern lighting device without some type of financial assistance. The existing exemptions, fiscal measures, and subsidy schemes have to be explored. These include

⁸ Source: AGSI



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the relaxation of the duty on imports of off-grid lighting products and solar panels. Moreover, several existing subsidy schemes could be used to lower product costs and foster the early market, mainly for low-income groups. Assistance to end-users through innovative financing mechanisms, such as microcredit, could also encourage household participation.

- **Create an Enabling Environment for Private Sector Participation.** The private sector should be viewed as a central player for the delivery of modern off-grid lighting products. Efforts to make financing available to the private sector in a more flexible manner should be pursued.
- **Encourage Bulk Procurement.** Options for bulk procurement and government guarantees should be investigated. Applying or adjusting duty and tax measures could also be an incentive for private enterprises to reduce perceived risks associated with this new market. Supporting schemes like the GEDAP could favor the business environment, allow bulk procurement, and help develop small businesses in rural areas.

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.

