ENERGY-EFFICIENCY OPPORTUNITIES IN SUB-SAHARAN AFRICA

SCALING UP RENEWABLE ENERGY (SURE)

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INTRODUCTION

Sub-Saharan Africa (SSA) faces the challenge of guaranteeing energy access for a growing population while continuing to experience slowed economies and navigating a transition to net-zero emissions. Even before the COVID-19 pandemic, the region struggled with high official unemployment rates ranging from 10 to 30 percent of the labor force.

Energy-efficiency policies are one of the most effective ways to reduce electricity costs for businesses and consumers, including low-income and vulnerable populations. Energy efficiency can create local jobs for both men and women, including jobs focused on efficient appliances and building materials manufacturing, industrial energy efficiency, and building retrofits. Energy efficiency also reduces public expenditure in generation capacity and is a cost-effective way to boost competitiveness in industrial and commercial sectors that can spur economic growth.

SSA is a region with high potential for emissions to rise in the coming decades. Its population is set to double by 2050 with the addition of one billion people. Urbanization is expected to grow at an unprecedented pace, with Africa’s urban zones reaching half a billion people by 2040. This change will have significant implications for energy demand for transport, industry, buildings, cooling, and agriculture. It will drive further energy consumption and increase greenhouse gas (GHG) emissions. Energy efficiency can significantly reduce GHG emissions of energy-intensive industries and transport while reducing operating costs and improving air quality.

Energy efficiency can help moderate the increase in energy demand from the residential sector and accelerate energy access. Electrification using renewable energy sources, combined with subsidized modern appliances, can also contribute to women’s empowerment in SSA by alleviating women’s time poverty, decreasing exposure to indoor air pollutants, and reducing the risk of gender-based violence.

Through the Scaling Up Renewable Energy program (SURE), the U.S. Agency for International Development (USAID) provides technical assistance to improve energy systems’ productivity and enable sustainable development in partner countries. USAID promotes key energy-efficiency building blocks that create markets for energy-efficient technologies by lowering the barriers to their adoption. The building blocks are organized in three core areas—energy-efficiency standards and retrofits; market priming and financing; and policy planning—that follow a flexible approach, facilitating synergies with existing programs.

HIGH-IMPACT ENERGY-EFFICIENCY INTERVENTIONS

ENERGY-EFFICIENCY STANDARDS AND RETROFITS

Countries without standards and labeling (S&L) regulations face the risk of becoming dumping grounds and secondhand markets for outdated appliances. S&L regulations seek to remove inefficient appliances and/or equipment from the market by focusing on changing the behavior of manufacturers and retailers rather than consumers. The advantages include significant savings on electrical energy and the ability to

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1 Experience from previous epidemics suggests that COVID-19 will affect groups who are most vulnerable and amplify any existing inequalities across countries, communities, households, and individuals.
2 SSA has an average per capita (pc) CO2 emission of 0.8 tons (t) CO2 and ten countries with an index of less than 0.1 t CO2/pc, significantly lower than the average of 8 t CO2/pc in advanced economies. The region contributes less that 10 percent of global greenhouse gas emissions.
limit energy growth without interfering in economic growth. S&L programs have been present in various SSA countries for some time (South Africa-2000, Ghana-2002, Nigeria-2011, Kenya-2012) but generally have limited scope. Also, S&L programs are not yet a mainstay in most SSA countries. This is due to program costs, lack of a favorable regulatory environment, and a weak market for energy-efficient equipment. Table 1 outlines some S&L flagship programs across SSA regions.

**POTENTIAL USAID INTERVENTIONS**

USAID can support the development of minimum energy performance standards (MEPS) and schemes for monitoring energy, cost savings, and GHG mitigation results. USAID can also work to support the adoption of energy management standards (ISO 50001) as well as the development of tools for the success of energy performance contracting (EPC) services or more comprehensive schemes like super ESCOs at either the local or regional level. USAID can also support the implementation of energy-efficiency retrofits and the establishment of a constructive dialogue between government and industry. Utility demand-side management programs and training of local experts to work with customers on compliance are areas that can bring visibility to the interventions as well.

**MARKET PRIMING AND FINANCING**

Well-functioning capital markets can increase the trust of potential capital providers and enhance financial flows. In various countries, the adoption of financial instruments such as green bonds have enabled banks to raise funds for the construction of EDGE-certified green housing.

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**Box 1: Ghana’s Enhancement of Testing Facilities for Cooling.**

The MCC–Ghana Power Compact is supporting the country’s energy-efficiency efforts by providing funds for strengthening the existing standards and regulations, retrofitting outdated appliances in government institutions, replacing inefficient street lighting, building energy auditing capacity in three technical universities, and piloting an energy-efficiency school curriculum module. As part of this program, a new air conditioner and refrigerator test laboratory was inaugurated in November 2021. The laboratory will support Ghana’s National Appliance Standards and Labeling Systems Program. The facility will be maintained and sustained by the Ghana Standards Authority and by the fees charged to importers for appliance testing and certification. It also will end Ghana’s reliance on third-party certifications conducted abroad.

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4 A Super ESCO is an entity established by a government or via PPPs to serve as an intermediary between the government, facility owners and ESCOs for the implementation of large-scale EE projects, primarily in public facilities (i.e. hospitals, schools, government buildings), where the deployment of energy savings programs is more complicated due to public contracting rules.
developments. A group of financial institutions has been deploying EE investment programs in SSA, usually within the framework of economic growth initiatives. Overall, the programs include grants, long-term loans (green credit lines) with competitive terms through local partner banks, technical assistance to banks for project appraisal, capacity-building for energy audits, and support to companies to implement strategies to optimize the use of energy resources.

The Sustainable Use of Natural Resource and Energy Finance (SUNREF) has facilitated investments in boilers, heat recovery units, refrigeration systems, compressors, air-conditioning, thermal insulation, and energy management in buildings in countries like Nigeria, Côte d’Ivoire, Senegal, Cameroon, Kenya, South Africa, and Mauritius. The Sustainable Energy Fund for Africa (SEFA) recently provided a grant to support the Government of Kenya to create a super ESCO that will channel funds into public sector energy-efficiency investments such as hospitals, schools, and street lighting. The ongoing European Investment Bank (EIB) Demand Side Management, Social Infrastructures, Renewables and Energy Efficiency (DESIREE) program seeks to contribute to greater investments in energy efficiency and electrification of social infrastructure in Côte d’Ivoire, Kenya, and Uganda.

POTENTIAL USAID INTERVENTIONS
Public authorities in SSA can foster the use of innovative financing instruments by establishing enabling policy frameworks that include financial incentives and specific standards with implementation guidelines. USAID can also support the creation and management of specialized funds to leverage private investment in energy efficiency using a clear and robust process for reporting, monitoring, and verification. The interventions can be incorporated within the existing EE financing initiatives in SSA or adapted to specific programs that seek to promote specific EE solutions (e.g., sustainable cooling, green housing, etc.) or programs intended to meet a country’s nationally determined contributions (NDC) target (e.g., energy efficiency in industry).

IMPLEMENTING NEW APPROACHES AND EMERGING BUSINESS MODELS
Alternative business models can reduce the risk perception of energy efficiency. Nigeria (186 million people) loses about a third of its agricultural production due to lack of refrigeration. It also is estimated that 50 million rural Nigerians are unlikely to be vaccinated against common diseases and are acutely vulnerable to malnutrition and hunger due to lack of electricity and basic refrigeration. Efforts are ongoing to identify and scale up cold chain innovations (from simple low-tech evaporative coolers in Nigeria to more sophisticated solar cooling units being sold in Kenya and South Africa) and affordable off-grid solar systems to power efficient fans and refrigerators.

In the past, energy-efficiency business models typically have revolved around a product or technology. New business models such as Cooling as a Service (CaaS) and Energy Savings Insurance (ESI) are now focusing on more user-centered energy services. CaaS enables customers to base their decision on life-cycle cost rather than on the purchase price of cooling equipment. The model avoids upfront investment as the end customer pays for the amount of cooling used (e.g., tons of cooling by month) rather than the cost of the equipment and infrastructure that delivers the cooling. ESI, on the other hand, is a scheme that guarantees the client the monetary energy savings of a

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5 EDGE is a green building certification system promoted by the World Bank Group that seeks to make buildings more resource efficient.
6 The United Nations Framework Convention on Climate Change (UNFCCC) estimates that about $32 trillion of direct capital investment is needed to avoid the worst physical impacts of climate change by 2030, out of which $1.7 trillion (5.3 percent) is required in SSA. Mungai et al. (2022) estimates that Congo, Senegal, Ghana, Madagascar, and South Africa are the top five countries for investment potential in energy efficiency, totaling as much as $7,484 million.
7 Africa Centre of Excellence for Sustainable Cooling and Cold Chain Summit
project through a combination of risk mitigation instruments: performance contract, third party validation, and performance insurance. In Africa, CaaS is being implemented in Nigeria, Kenya, and South Africa, while ESI soon will be implemented in Morocco. This transition opens opportunities for technology providers, financial institutions, and insurance companies interested in innovative and proven solutions

POTENTIAL USAID INTERVENTIONS
USAID can support governmental agencies in the design and implementation of market transformation programs to reach economies of scale. These can be done through instruments such as incentives (rebate, grant, loan, tax credit, etc.) for high-efficiency products and/or programs to purchase large volumes of high-efficiency equipment (bulk procurement) by a single buyer or by aggregating demand. USAID can also support the deployment and scaling up of proven business models that enhance investments in energy efficiency.

POLICY PLANNING AND IMPLEMENTATION
Energy efficiency policies are one of the most effective ways to drive investments and induce behavioral changes in electricity consumers. The Economic Commission of West African States (ECOWAS) established the ECOWAS Centre for Renewable Energies and Energy Efficiency (ECREEE) in 2010, with the mandate to develop a common policy for the promotion of energy efficiency in its 15 member states. The initiative has supported structural organization, institutional strengthening, and the development of national policies, strategies, and action plans for its member countries. In Ghana and Côte d’Ivoire, this has translated into appliance labeling programs and associated regulations that have resulted in estimated peak energy savings of over 120 megawatts (MW) in Ghana and 100 MW in Côte d’Ivoire, displacing the need for more than $100 million in generation investment and reducing carbon dioxide emissions. In the south, the 16 member states of the Southern Africa Development Commission (SADC) adopted an energy-efficiency policy framework in 2015 with the aim to reduce national and regional energy demand and improve the financial viability of the power sector. The initiative has helped to provide rural communities with compact fluorescent light bulbs (CFLs) and light emitting diodes (LEDs) and increased energy access.

ECOWAS heads of state also adopted a gender mainstreaming policy for energy access in June 2017 with the main objective to guarantee gender equality in the energy sector. Following the adoption, states began developing national action plans for gender mainstreaming in energy access, building on the progress of the ECOWAS Programme on Gender Mainstreaming in Energy Access (ECOW-GEN) launched in 2013 with the four members states of the Mano River Union (MRU)—Cote d’Ivoire, Guinea, Liberia, and Sierra Leone.8

Box 2: South Africa’s Tax Incentive.
In South Africa, the 12L Tax Incentive provides an allowance for businesses to implement energy-efficiency savings. Promulgated in November 2013, the incentive has been extended to 2025. The savings allow for tax deductions of 95 cents/kilowatt-hour (kWh) saved on energy consumption. The energy savings must be over a period of 12 months. The savings are verified and measured by the South African National Accreditation Systems (SANAS). Other institutions involved are the South African National Energy Development Institute (SANEDI), the South African Revenue Services (SARS), the Department of Energy (DOE), and the National Treasury. SANEDI plays the role of implementing and overseeing the application process of the incentive claimant and issuing the 12L Tax Incentive certificate when the application is approved. Since inception, there have been energy savings of over 27 billion kWh and a reduction in carbon emissions of over 26 billion kilograms. Tax rebates amount to over $1.5 million.

8 ECOWAS Programme on Gender Mainstreaming in Energy Access (ECOW-GEN)
POTENTIAL USAID INTERVENTIONS
USAID can help integrate energy efficiency into national power development and integrated resource plans to support the implementation of NDCs. Beneficiaries can build on the progress of the regional energy-efficiency policy planning and implementation experiences of ECOWAS, EAC, and SADC. Technical assistance usually covers energy-efficiency policy prioritization, road mapping, and enhancement of modeling and planning capacity. USAID also can support the development of the capacity of SSA governments to integrate gender considerations into their energy-efficiency and electrification programs and help strengthen initiatives like ECOW-GEN.

Box 3: ECOWAS Energy-Efficiency Policy.
In 2013, ECREEE developed and adopted, on behalf of the ECOWAS Commission, an energy-efficiency policy framework to support the 15 member countries in reducing their carbon footprint. As a result, each member state has developed and approved a National Energy Efficiency Action Plan (NEEAP), which contains three components: i) Energy Efficiency in Buildings, ii) Energy Efficiency in Industry, and iii) Energy Efficiency Standards and Labels. Through the first component, ECOWAS developed a regional building code that has been translated into national regulations and is being implemented by member states. In the industrial sector, member countries are implementing Energy Management Standards based on the ISO 50001 standard. Other actions undertaken include training of energy auditors throughout the region, certification of industries on energy management systems, and implementation of the ISO 14000 series in the industries.

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