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ESMAP
Energy Sector Management Assistance Program

Knowledge Series 013/12

Rwanda | Extending Access to Energy

Lessons from a Sector-Wide Approach (SWAp)

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EXECUTIVE SUMMARY

In recent years, different approaches to providing aid have emerged. The sector-wide approach (SWAp) is a country-led, results-focused framework that brings together development partners and other stakeholders to coordinate aid within a sector. This approach aims to support country and government leadership in sector policy and planning, utilizing government systems and procedures and an agreed expenditure program. SWAps have traditionally been used to coordinate investments in schools and hospitals, but recently have been applied to other infrastructure sectors.

Rwanda is one of the first countries to use a SWAp in the energy sector to increase access to electricity. With the assistance of Energy Sector Management Assistance Program's Africa Renewable Energy Access (AFREA) Program, the SWAp began in 2009 with the goal of increasing electricity access from 6 percent of the population to 16 percent by 2013.

The SWAp is anchored by an investment prospectus that integrates technical, financial, and implementation planning components. The prospectus provides comprehensive details on the electrification plan, helping to reduce the costs facing development partners.

This report provides a number of key lessons realized from the Rwanda Energy SWAp for development partners and governments considering using such an approach. Country and government ownership and leadership is essential for efficient program planning and implementation, as is an alignment with national priorities and policies. Accurate data analysis to determine the costs and benefits is essential, as well as a clear picture of the technical and financial investments required.

Overall, the experience in Rwanda shows that SWAps in the energy sector can achieve success. Access to energy within the country has increased and more than US$ 200 million has been raised toward the costs of the electrification program, which is now being implemented.

Box 1 I SWAp Project Details

Project Title:	Sector-Wide Approach to Extending Access to Energy
Sector:	Energy
Type of Project:	Electricity Access Program
Country:	Rwanda
Population:	11.37 million (2011)
Targeted Electricity Access:	Increase access from 6% to 16% by 2013
Total Cost of Access Program:	US$ 377.6 million
Project Status:	Ongoing (2009–2013)

THE VALUE OF A SECTOR-WIDE APPROACH

The sector-wide approach (SWAp) emerged in the 1990s as an alternative to traditional development aid. The SWAp—based on a country-led, results-focused framework—encourages engagement across all sector stakeholders to ensure that investments work together to contribute to desired outcomes.

This approach emphasizes government and donor partnerships, with government assuming a leadership role and working with partners to formulate policy. The use of existing government systems and processes and the achievement of specific goals and outcomes are key to this approach. In addition, donors and other stakeholders assist with financing, drawing on diverse channels of funding, and bringing ongoing projects in line with sector priorities. A SWAp can help promote local involvement, accountability, and capacity in the countries in which they are implemented.

In 2009, Rwanda initiated a SWAp in the energy sector to help achieve its target of increasing access to electricity from 6 percent of the population to 16 percent over a five-year period, through 2013. The ongoing program also focuses on providing off-grid access to electricity for schools, hospitals, and administrative buildings that would not have electricity otherwise. A comprehensive investment prospectus provides development partners and local stakeholders with the technical and financial implementation plans for the program.

The experience in Rwanda suggests that using SWAps in the energy sector is a viable and attractive option. The successes and lessons learned, which are detailed in this report, can help inform the use of future SWAps across the energy sector.

KEY CHARACTERISTICS OF A SWAP

A SWAp differs from other approaches used to plan, finance, and implement development projects. For some countries and sectors, SWAps provide a more effective means of delivering development assistance than a traditional project-by-project approach. Through a SWAp approach, governments, donors, and other stakeholders join together within a particular sector to coordinate sector-specific policy, funding, and goals. Under government leadership, the approach involves movement over time toward common goals and more coordination for funding and procurement.

The traditional approach, in contrast, relies on donors to coordinate and implement aid on a project-by-project basis, with less government integration and leadership. Table 1 compares and contrasts the SWAp framework to a project-specific approach.

BACKGROUND ON SWAPS

SWAps have most commonly been used in the social infrastructure sectors, particularly healthcare and education. Recently, the approach has been extended to other sectors, including trade, agriculture, justice and law, and energy. Although middle-income countries, such as Brazil, have begun to use the framework, low-income countries have the most experience with SWAps and provide many important lessons. Education and health-sector SWAps have improved information sharing and increased the effectiveness of educational training and resource mobilization.[1]

Table 1 | Approaches to Development Assistance

Key Characteristics	SWAp	Program Approach
Scope	• Sector-wide emphasis on targeted capacity-strengthening of sector institutions in a staged manner • Results-focused, strategic • Long-term program	• Emphasis on project-specific technical assistance • Weak results focus: the "success" of many local projects does not deliver nationally transformative impacts
Government Involvement	• Country ownership and government leadership across financiers and country systems • Coherent policy framework and strategy	• Weak government leadership • Outside national priorities
Stakeholder Involvement	• Throughout the sector • Joint accountability	• Specialized in technical areas
Level of Coordination	• Harmonization of processes, procedures, implementation, and monitoring • Lower transaction costs • All projects financed within SWAp timeframe	• Project-specific monitoring and evaluation • High transaction costs tied to each project • Possible duplication of activities • Each implementation unit funded by specific donors
Funding	• Basket funding: all funding directed toward a single-expenditure program and policy • Predictable financial flows: a single-expenditure plan increases transparency of the use of all funding sources	• Donors focus their funding on specific projects, without coordination with other donors • Less predictability, often because full expenditures plans are not completed
Drivers	• Aligned to national priorities • Demand driven: donors may direct funding to targeted subprojects	• Supply driven: donors determine the project focus

Source | Authors.

Uganda's experience using a SWAp for water access suggests that a minimum of five years is needed for a successful program. Nepal, one of the first countries to implement the SWAp framework in the energy sector, coordinated national policies to clarify the energy-related legal framework and improve financing in a sector that is heavily dependent on external donors.

PROJECT DESCRIPTION AND DESIGN

The Rwanda Energy SWAp arose out of a combination of different factors, including a low electrification rate of 6 percent (approximately 65,000 connections in 2008), a severe drought period that led to supply shortages, and a low available generation capacity of 41 MW. Together these preconditions highlighted the need for energy diversification and better power planning and implementation.

Against this backdrop, the Economic Development and Poverty Reduction Strategy set a target to increase connections from 100,000 in 2008 to 350,000 by 2012, with a special emphasis on electrification for social infrastructure.

To execute a comprehensive, inclusive strategy, the Ministers of Finance and Energy and senior development partners launched the energy SWAp with the main objectives of meeting basic energy needs, providing electricity for accelerated growth, and powering the social sectors.

New legislation encouraged a significant role for private-sector investment and management in developing the sector. This support, combined with a regulatory environment to enable cost recovery for investors and protection of consumer interests, is vital to the implementation of the program.

The SWAp's main objectives include:

- determining a high-level investment and capacity building plan for sustainable and predictable financing over the term of the program;
- enabling electricity access expansion to meet Rwanda's national targets; and
- attaining supply adequacy by expanding generation capacity by qualified independent power producers.

From the broader perspective of powering growth and improving the quality of life of the population, the SWAp is designed to identify the lowest cost network rollout over the next 20 years, with a medium-term target for 2014. Specifically, the first five-year time period of the program aims to increase electricity connections from 100,000 to 350,000 and to substantially increase access to electricity for social infrastructure facilities in health and education sectors.

THE RWANDA ENERGY SWAP

A sector working group was formed in 2008 to implement the SWAp in Rwanda. A secretariat within the working group actively coordinated the interactions between government officials and development partners. Members include:

- Energy, Water, And Sanitation Authority[2] (EWSA), formerly Electrogaz, the organization responsible for all power-sector operations;
- Central government;
- Ministry of Infrastructure (MININFRA);
- Ministry of Finance and Economic Planning (MINECOFIN);
- Other line ministries, including the Ministry of Local Government (MINALOC), Ministry of Health (MINISANTE), and the Ministry of Education (MINEDUC);

- Rwanda Utilities Regulatory Agency (RURA);
- Local government; and
- Development partners, including the African Development Bank, the World Bank, the International Finance Corporation, and the governments of Belgium and the Netherlands.

PLANNING THE SWAP FRAMEWORK

The Electricity Sector Access Program Investment Prospectus presents a five-year plan for extending electricity access that achieves Rwanda's targets and integrates technical, financial, and implementation planning components.

The prospectus was developed in efforts to raise US$ 250 million from development partners to cofinance the gap in funding for access program investments and focuses on the period from 2009 to 2013. The technical, financial, and implementation planning, however, is developed on a longer horizon through 2020. The prospectus presents a transparent and sustainable financing platform through a combination of in-country funds (via tariffs, revenues from connection charges, and government contributions) and the balance, to be funded from development partner contributions via their respective program agreements. Aiming to ease the analytical burden on development partners by providing credible information on Rwanda's electrification plans, the prospectus presents all relevant information and analysis in one document.

The prospectus:

- describes the role of electricity sector institutions, the relevant policy background, and the legal environment;
- provides the physical plan for extending lowest cost network access, taking into account implementation capacity and sustainability, and addressing required financing based on credible estimates of capital expenditure costs and financial inflows;
- considers the social and economic characteristics of each sublocation within the country, as well as demand conditions;
- addresses the technical and economic aspects of access expansion and energy supply alternatives—grid-based and off-grid, as well as decentralized service options—and affordability to new beneficiaries; and
- provides a framework for monitoring and evaluating program outcomes.

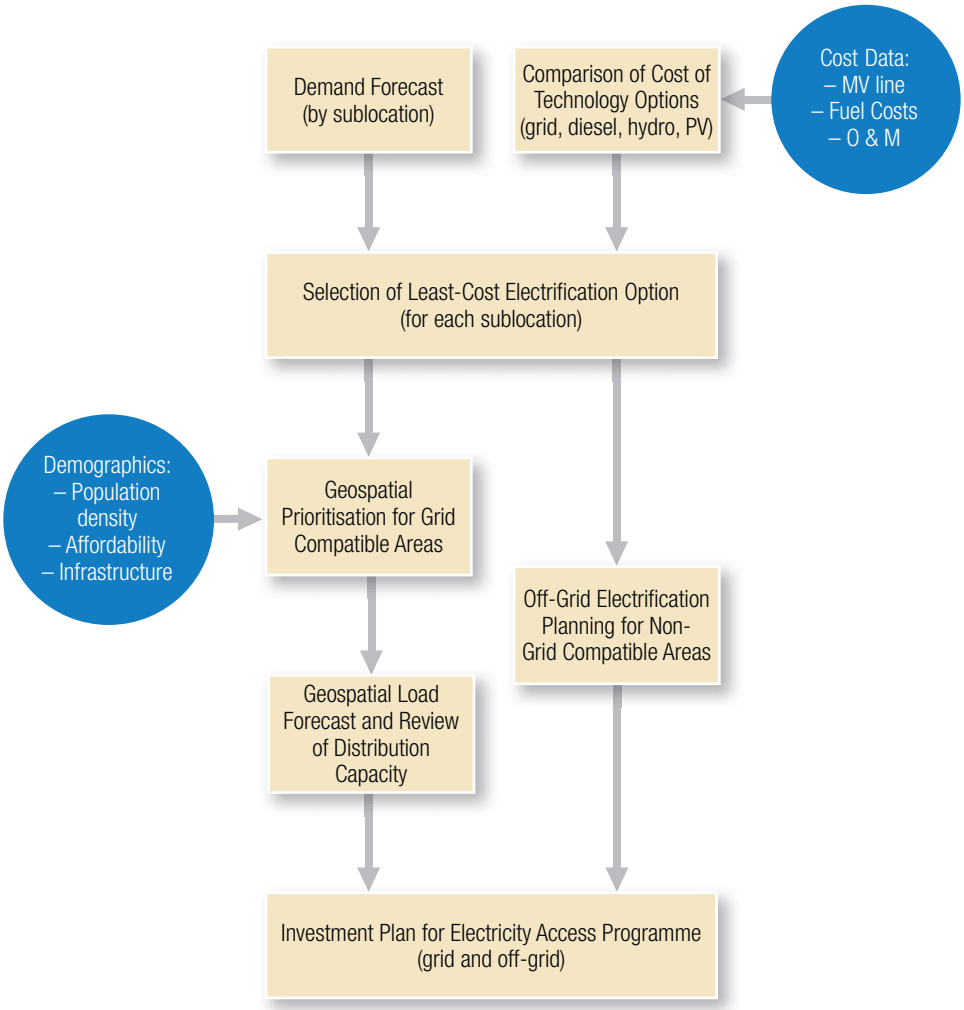
The prospectus was presented at the donor roundtable in March 2009 and proved a successful path to rallying stakeholders, support, and financing for the first phase of the national electrification program.

SPATIAL NETWORK PLAN

This technical plan identifies the best way for electricity to be extended over the next 20 years, based on social and economic characteristics of different locations within the country, and the supply and demand conditions in each sublocation, geospatially speaking. An overview of the spatial planning approach is provided in Figure 1.

The country was divided into 9,300 planning cells and a simple demand forecast was computed for each, in addition to the capital and operating costs of different methods of providing electricity. The least-cost option for electrification was selected for each

Figure 1 | Spatial Planning Approach



Source | World Bank 2009.

cell by comparing the cheapest decentralized electrification option (from diesel, micro-hydropower, and solar photovoltaic) to the cost of making a grid extension. By applying weight to grid-compatible cells, depending on demographic and cost factors, a geospatial prioritization plan was created to ensure the program maximizes benefits while minimizing costs.

ADDRESSING THE ISSUE OF AFFORDABILITY

In most areas in Rwanda, between 50 and 80 percent of households have incomes of less than US$ 1.25 per day. Estimates for each planning cell indicated that between 19 and 51 percent of the population would elect to receive electricity access if offered, depending on income levels. The average take-up rate based on these affordability levels was 34 percent.

A study conducted by the Ministry of Infrastructure in late 2009 explored the uptake of electricity connections in the Nyagatare district. Results from this study and work done by the Belgian Technical Cooperation indicated that approximately 35 percent had accepted the connection. This suggests that the prospectus' estimations of the technical issue of affordability are accurate and realistic (Box 2).

Box 2 | Evaluating the Affordability of Electricity in Rwanda

Extending access to electricity will help alleviate poverty in Rwanda. However, examining individual households' ability to pay for electricity is crucial to balance the goal of alleviating poverty against the program's financial sustainability.

Currently, no detailed information exists regarding consumers' ability to pay for electricity in Rwanda. The prospectus uses data on household expenditures from the Household Living Conditions Study (EICV2) and general information on comparative expenditures on energy in the region. The EICV2 survey collected data on 6,900 households and divides the country into 30 districts, which are then split into expenditure quintiles. A recent survey commissioned by the European Union has also been used to compare the results of the EICV2 survey with more recent data.

The data broadly shows that the average household in the highest quintile in each district spends 3 times the average household in the next highest spending quintile, and 13 times the average household in the lowest quintile. The data also shows that households in the Kigali area are able to spend relatively more than other parts of the country. Nevertheless, widespread poverty remains in the Kigali area, with over 40 percent of survey respondents spending less than US$ 2.50 per week.

The survey responses have been used to estimate the proportion of households in each district able to afford an electricity connection, assuming that a household could afford an electricity connection if:

$$\text{Total Expenditure} \times \text{Energy Expenditure (\%)} > \text{Current Tariff} \times \text{Minimum Consumption (kWh)}$$

The minimum consumption level is assumed to be 20 kWh per month. This is a very low level of consumption from two to three energy-efficient light bulbs and a radio. The proportion of energy expenditure in each household varies, depending on the characteristics of each household and community, and on the cost of electricity substitutes (such as kerosene, batteries, and candles). Recent comparative data on urban household expenditures on energy in Africa ranged from 12.5 percent in Burkino Faso to almost 25 percent in Mauritania, and, along with data from Ethiopia, support two important conclusions:

1 | Poorer households (typically in more rural communities) tend to spend a higher proportion of their expenditures on energy, often because household expenditures in rural areas do not include food that is grown within the household; and

2 | Average household expenditures on fuel and power are typically in the range of 5 to 6 percent in urban areas and 10 to 12 percent in rural areas.

The following assumptions have been used on the maximum proportion of expenditures that would be spent on electricity in Rwanda:

Approximate Average Expenditures on Electricity

Area	Max. Energy Expenditures (%)	Expenditures on Min. Consumption (%)
Urban	10	2–3
Peri-urban	15	4–5
Rural	20	8–10
Deep Rural	25	10–14

Source | Authors.

A further assumption is economic growth in Rwanda, in which average household income is expected to increase by 5 percent annually over the next 10 years. The overall effect of this income increase is an average 1.5 percent increase in the proportion of households that can afford electricity.

COSTING, FINANCING, BENEFITS, AND RESULTS

Under the energy SWAp, Rwanda created an integrated financing and funding plan for the access program. The financing plan identified the capital sources that would pay for the up-front costs of the grid and off-grid extensions, and the funding plan mapped out the financial inflows that would be available from tariffs and reliable subsidies to fund each stage of the development process.

FINANCING PLAN

To determine the level of financing required to support the program, the prospectus provided a detailed estimation of program costs.

Capital costs of the physical plan for extending access revealed that medium-voltage powerline extensions comprised the most significant cost. Several initiatives allowed this cost item to be reduced. The medium-voltage power lines were revised to use wooden or concrete poles—rather than the more expensive lattice-framed steel towers—that could also be locally manufactured. The low-voltage reticulation in rural areas was revised to use single-phase and single-wire, earth-return technology.

Operating expenses and power purchase costs took into account the existing and new-grid and off-grid connections, new generation and transmission investments, and EWSA's technical assistance needs. Information from the prospectus assisted in securing additionally needed funds from the international donor community. For an overview of program funding required, see Table 2.

Table 2 | Summary of Access Program Support Required (US$ millions)

Capital cost of access program	$ 377.6
Self-financing from Electrogaz	(–$ 39.5)
Revenue from connection charges	(–$ 27.9)
Government contributions	(–$ 50.0)
Existing donor commitments	(–$ 35.7)
Support Required	**$ 224.5**

Source | Castalia 2009.

The additional US$ 225 million required was provided following a donor roundtable held in March 2009 with major development partners, EWSA, and key government ministries.

FUNDING THE ENERGY ACCESS PROGRAM

The funding plan shows that the access program is not only technically viable, but also financially sustainable and stable over the long term. The funding framework for the Rwanda access program was developed from an assessment of ability-to-pay and from other countries' experiences, including that of Tunisia.

Financially sound utility. EWSA was expected to contribute 10 percent to capital costs from retained earnings. Cost-recovery tariffs in Rwanda were an important aspect of making this funding contribution credible to development partners, as Rwanda has among the highest electricity tariffs in Sub-Saharan Africa.

Connection charges based on ability to pay. Consumers were expected to pay a nominal US$ 100 connection charge or about 10 percent of the average connection cost.

Government and donor support through grants. Support of this nature is required to meet 80 percent of program costs.

The sector operating costs will be met through operating revenues. Forecasted cash flows suggest that this will be achievable for every quarter of the access program.

Within the SWAp framework, funds can be dispersed from development partners in a number of ways, including:

- Budget support | All funds are combined for the sector and the Ministry of Finance disburses funds across the sector according to government priorities
- Basket funding, or pooled funding | Development partners deposit all their funds into a dedicated account, either with the sector ministry or the Ministry of Finance, established to specifically fund all, or individual activities of the SWAp
- Nonpooled funding | Funding provided to finance specific projects within the SWAp program

The experience in Rwanda suggests that keeping options open for wide participation has benefits in attracting program support.

BENEFITS OF EMPLOYING A SWAP

The SWAp framework is expected to bring a number of benefits, regardless of the sector in which it is applied. The degree to which these benefits are achieved will depend on the characteristics of the sector in addition to the quality of the design, implementation, and monitoring processes. Key benefits of employing the SWAp framework include:

- Clear leadership by government, guided by national policy and knowledge of available resources;
- Increased predictability of funding, especially when using a public expenditure plan;
- The ability to secure additional financing as a result of the investment prospectus and coordinated approach to the project, increasing the awareness of complementary investments;
- Improved accountability and transparency of resource use and a more simple means to disperse funds from a centralized authority;
- Reduced transaction costs resulting from the coordinated approach to activities, funding, and implementation between donors, government, and recipients;
- Effective partnerships and increased coordination of donor assistance, made possible through the efforts of the stakeholder working group and centralized program management; and
- Greater influence over policies, priorities, and implementation plans through the centralized stakeholder working group.

SWAps in the energy sector also benefit from the coordination of all participants in the sector. For example, the SWAp approach coordinates the supply chain to ensure that infrastructure is expanded efficiently, without duplication. In contrast, the traditional project-by-project approach may have focused entirely on extending distribution services, without regard to capacity in transmission networks and generation assets.

RESULTS

Thus far, the access program focuses on the communities close to the existing grid, with more than 95 percent of planned new connections through 2012 to take place within 5 kilometers of the existing grid. Such planning has helped minimize program costs and maximize economic opportunities while setting the stage to increase EWSA's annual implementation rate capacity. In remote areas of the country, social facilities will gain access to electricity by solar PV units.

Implementation results to date are positive in that EWSA is meeting or exceeding the targets set for investment and new connections, as well as for unit-cost reduction targets in the investment cost per new connection.

Initial success has been achieved in raising the national electrification rate from 6 percent to 10 percent by 2011. Such efforts have increased the number of households connected to electricity from 110,896 to 228,043 by August 2011. This progress is on track to achieve the objective of 16 percent electrification by the end of 2013.

Furthermore, under the SWAp program, EWSA has increased its annual implementation rate from under 1,000 connections per year prior to the start of the program in 2008 to a current annualized rate net of 60,000 new connections. Additionally and significantly, this implementation has been achieved in conformity to the target unit-cost average of US$ 600 per new connection, when compared to historical average costs from the pre-SWAp program that averaged from US$ 2,000 per new connection and beyond. More details on the electrification progress are provided in Table 3.

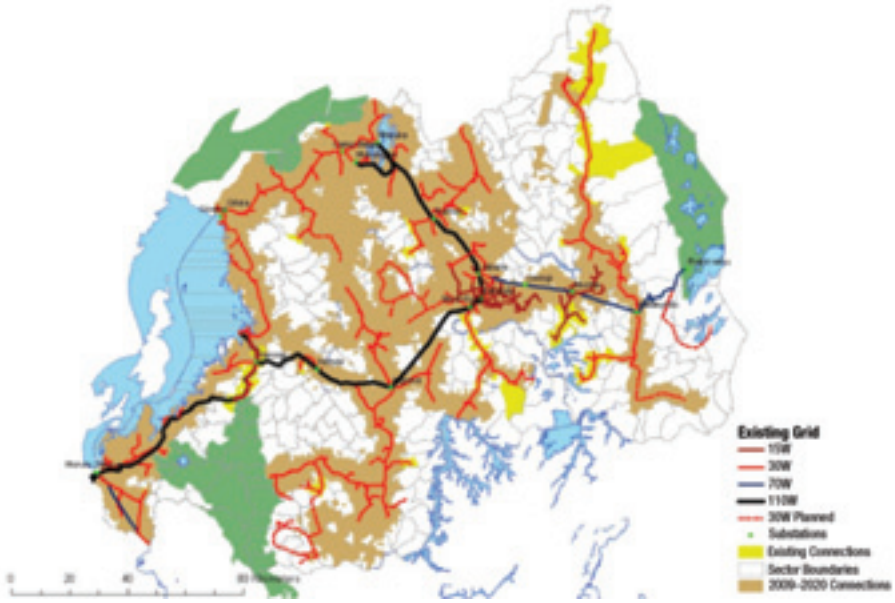
Estimates show that by 2020, 35 percent of the population will have access to electricity, in addition to 70 percent of schools and all health centers and administrative offices. Figure 2 illustrates the planned extension to the grid network, using the GIS database created as part of the SWAp.

Table 3 | Electrification Results in Rwanda

Program Connections to Electricity	2008	2009	2010	2011 (August)	2014 (Target)
New Connections	<5,000	32,995	43,733	40,419	
Households	110,896	143,891	187,624	228,043	350,000
Health Centers	50%	—	—	—	100%
Schools	20%	—	—	—	50%
Administrative Offices	25%	—	—	—	100%

Source | World Bank Supervision Report for the Rwanda Electricity Access Scale-up and Sector-Wide Approach (SWAp) Development Project.

Figure 2 | Energy Access Program through 2020



Source | World Bank 2009.

MONITORING AND IMPLEMENTATION

To achieve the objectives of the access program, the implementation plan must ensure the capacity to cover critical areas of human resources, materials, funding, and management capabilities. Efficient monitoring and evaluation of the access program implementation is important to maintain progress, achieve targets and ensure that support for the program continues beyond the initial five-year period of the prospectus.

A program directorate within EWSA was established to implement the program, focusing on network planning, system development, and procuring supplies and contractors in a timely and cost-effective manner. This ensures sufficient technical expertise through partnerships with local institutions and ensures accountability for meeting financial and funding plans.

Further implementation capacity through external private-sector participants also ensures that success continues over the longer term. This is particularly crucial for Rwanda, where EWSA and local private sector firms will need additional support to meet program targets.

Monitoring and evaluation of the SWAp framework is in line with the system used for the National Electricity Access Program (embedded within the SWAp framework). The National Electrification Program Management Directorate (PMD) within EWSA is the main unit responsible for collecting and reporting data for the grid rollout plan. The Ministry of Infrastructure is responsible for the off-grid program. Table 4 provides an overview of the monitoring and evaluation framework used for the Rwanda SWAp.

Table 4 | Monitoring and Evaluation of Rwanda SWAp

Primary Outcome Indicators		Frequency	Data Collection & Reporting
Project Outcomes; Indicators of Success	Households connected to electricity	Annual	PMD
	Public institutions connected to electricity		
	Average cost per connection		
	Rolling average monthly interruptions per kilometer of medium-voltage power line	Quarterly	National Dispatching Centre
Intermediate Outcome Indicators			
National Grid Rollout	Distribution network constructed	Quarterly	PMD
	Transformers rehabilitated/replaced		
	Improved customer complaint & resolution system		
Green Connections	New customers using CFLs	Quarterly	Rwanda Electricity Corporation (RECO) Energy Efficiency
	Estimated load reduction		
Technical Assistance, Capacity Strengthening, & Implementation Support	Joint annual sector-performance report	Annual/ Quarterly	SWAp Secretariat
	Spatial grid rollout investment plan		
	Quarterly program monitoring progress reports		

Source | World Bank 2009.

Each indicator is measured against its baseline value and the target values for each financial year from 2010 to 2013. The monitoring and evaluation plan has improved the collection of basic data in the sector. The increased quality and availability of data will help develop new policies and strategies and strengthen the capacity of sector institutions.

RECOMMENDATIONS

A number of innovative features contributed to the success of the Rwanda Energy SWAp and will prove instrumental in future SWAp efforts, including the following:

Government (country) ownership and leadership. Willingness to lead and rally donors to fund a harmonized, sector-wide program is essential. The Government of Rwanda provided such leadership throughout the chain of accountability from the

cabinet (the Ministry of Infrastructure and Ministry of Finance and Economic Planning), through other line ministries (Health, Education, and Environment) to EWSA.

Alignment with national priorities and policies. Such alignment proved critical to achieve objectives and move away from the fragmented, project-by-project approach.

Stakeholder buy-in. Commitment and support from donors and EWSA from the outset of the SWAp has ensured sufficient financing, as well as technical and management support. Enabling partners to select the target of their funding contributions—in terms of scope, financing, instrument, and timing—in addition to providing a "menu" of investment options consistent with Rwanda's priorities as identified in the SWAp prospectus has enhanced this process.

Utilization of data. In light of limited data availability, the approach taken to using data was instrumental in achieving credible estimates of program costs and outcomes. Data was collected from a variety of sources, including EWSA, government ministries, and the Centre for Geographic Information System and Remote Sensing at the National University of Rwanda. The quality of this data varied significantly. However, working with the local university to evaluate the data and improve future information collection was a success factor for the program. Calculations regarding the affordability of electricity and the expected take-up rates of the new connections proved to be accurate.

Realistic assessment of risk. To allow donors to make informed decisions regarding their contributions to the program, changes within the sector and policy risks were detailed with results from sensitivity testing. The key risks identified included a change in political support, insufficient demand from consumers, failure to achieve capital-cost reductions or operating efficiencies, and an inability to mobilize funding from customer payments due to nonpayment.

Credible prospectus. The SWAp investment prospectus served as a rallying point for donor involvement. The technical and financial analysis that supported the prospectus was robust and reliable, and reduced the due-diligence costs for donors, resulting in US$ 225 million of funds pledged to support the new connections. The prospectus also identified the appropriate technical assistance and targeted the capacity building required for effective implementation.

South-South cooperation. Finding the most appropriate technical designs and implementing successful techniques from other "South" countries were crucial elements of this SWAp. The Tunisian Company of Electriticy and Gas (STEG), provided assistance regarding low-cost techniques for distributing electricity, particularly in rural areas, to help lower costs by at least 16 percent. This included using a combination of locally made wooden and concrete poles in place of the traditional steel lattice frame towers, and using single-phase, single-wire earth-return technology, a cost-effective and reliable technique.[3] As such, South-South cooperation should be encouraged in other SWAps.

LESSONS LEARNED

To date, the Rwanda Energy SWAp has achieved a number of objectives despite being only halfway through the initial five-year implementation period. Lessons learned from this experience are crucial to improve future SWAps and to find more efficient and effective methods of extending access to essential infrastructure.

The donor roundtable conference, held in March 2009, encouraged donors to pledge funds toward the program and provided a forum for the presentation of the investment prospectus to the donor community. A total of US$ 225 million in donations was pledged towards the first phase of the program (2009–13), supporting the funds already pledged by the Government of Rwanda, revenues from connection charges, and self-financing from EWSA.

During the first two years of implementation, new electrical connections were achieved within the budgeted unit-cost estimates of US$ 1,000 per connection. This is substantially lower than the pre-SWAp average project costs, and was possible due to the commitment to reduce connection costs by introducing lower cost technical designs and equipment.

Staffing of key stakeholder groups is important for an effective SWAp. During the implementation of the Rwanda SWAp, establishment of the program management department within EWSA proved to be a major challenge, due to the limited pool of suitably qualified professionals available and difficulties paying market rates for key staff salaries. As a result, deployment of monitoring and evaluation systems has been slower than anticipated.

Obtaining a clear picture of how financing will be achieved is vital to a successful SWAp. Development partners and the Government of Rwanda pledged enough to complete the funding needs of the SWAp program at the donor roundtable. However, difficulties were later encountered in ensuring a consistent flow of funds to finance various project stages.

CONCLUSION

Efficiently raising funds to meet program costs is an important feature of the SWAp. Funding from the Government of Rwanda and development partners reached US$ 320 million in 2009, helping to effectively accelerate growth and reduce poverty in the nation. As household income levels rise over time, the power sector in Rwanda is expected to become financially sustainable.

In terms of monitoring and evaluation, the existing framework has improved the collection and measurement of performance indicators, increasing EWSA's capacity in this area. Such efforts are essential to track progress, support timely decisions, and implement corrective actions. In addition, through the SWAp, EWSA employs the same monitoring and evaluation frameworks for both their own utility and the SWAp, avoiding parallel systems.

The Rwanda Energy SWAp has increased access to energy throughout the country and has increased the size of the market for EWSA, making a positive impact on the Rwandan economy and social outcomes. Although not yet complete, the SWAp serves as an instructive example for other countries considering using the approach in the energy sector.

ENDNOTES

[1] http://www.adb.org/education/cam-swap.pdf

[2] Founded in 1939, Electrogaz was the national utility supplying water, electricity, and gas in Rwanda. The company was split into Rwanda Electricity Corporation (RECO) and Rwanda Water Sanitation Authority (RWASCO) in 2008. In 2010, these companies merged to become EWSA, and EWSA was given additional responsibilities for sector policy and planning.

[3] http://www.ruralpower.org

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ACRONYMS AND ABBREVIATIONS

CFL	compact fluorescent lamp
EICV2	Household Living Conditions Study
EWSA	Energy, Water, and Sanitation Authority of Rwanda
kWh	kilowatt hour
MINALOC	Rwanda Ministry of Local Government
MINECOFIN	Rwanda Ministry of Finance and Economic Planning
MINEDUC	Rwanda Ministry of Education
MININFRA	Rwanda Ministry of Infrastructure
MINISANTE	Rwanda Ministry of Health
MV	medium voltage
MW	megawatt
O&M	operations and maintenance
PMD	Rwanda National Electrification Program Management Directorate
PV	photovoltaic
RECO	Rwanda Electricity Corporation
RURA	Rwanda Utilities Regulatory Agency
RWASCO	Rwanda Water Sanitation Authority
STEG	Tunisian Company of Electricity and Gas
SWAp	sector-wide approach
US$	United States dollar

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