

SWAZILAND
Energizing Rural Transformation

Project Concept Document

Africa Regional Office
AFTEG

Date: August 20, 2003 Sector Manager/Director: Yusupha B. Crookes Country Manager/Director: Faye S. Omar Project ID: P077179 Lending Instrument: Specific Investment Loan (SIL)	Team Leader: Malcolm Cosgrove-Davies Sector(s): Power (75%), Telecommunications (25%) Theme(s): Infrastructure services for private sector development (P), Rural services and infrastructure (S), Other environment and natural resources management (S)
--	--

Global Supplemental ID: P077158 Sector Manager/Director: Reynold Duncan Lending Instrument: Specific Investment Loan (SIL) Focal Area: C - Climate change Supplement Fully Blended? Yes	Team Leader: Malcolm Cosgrove-Davies Sector(s): General energy sector (100%) Theme(s): Infrastructure services for private sector development (P)
--	--

Project Financing Data

Loan Credit Grant Guarantee Other: Prototype Carbon Fund

For Loans/Credits/Others:

Total Project Cost (US\$m): \$118.00

Cofinancing:

Total Bank Financing (US\$m):

Has there been a discussion of the IBRD financial product menu with the borrower? Yes No

Borrower Rationale for Choice of Loan Terms Available on File: Yes

Proposed Terms (IBRD): Fixed-Spread Loan (FSL)

Commitment fee: 0.85%

Front end fee (FEF) on Bank loan: 1.00%

Initial choice of Interest-rate basis:

Type of repayment schedule:

Fixed at Commitment, with the following repayment method (choose one):

Linked to Disbursement

Financing Plan (US\$m):	Source	Local	Foreign	Total
BORROWER		2.70	0.00	2.70
IBRD		3.00	17.00	20.00
PROTOTYPE CARBON FUND		7.00	1.00	8.00
BILATERAL AGENCIES (UNIDENTIFIED)		0.80	2.80	3.60
FOREIGN PRIVATE COMMERCIAL SOURCES (UNIDENTIFIED)		20.60	60.00	80.60
GLOBAL ENVIRONMENT FACILITY		3.10	0.00	3.10
Total:		37.20	80.80	118.00

Borrower/Recipient: GOVERNMENT OF SWAZILAND

Responsible agency: MULTIPLE AGENCIES

Principal Secretary, Ministry of Economic Planning and Development

Address: P.O Box 602, Mbabane, Swaziland

Contact Person: Ephraim Hlophe

Tel: 268-404-3765/8

Fax: 268-404-8144

Email: psmepd@iafrica.sz

Project implementation period: 2004-2008

OPCS PCD Form: Rev. March, 2000

A. Project Development Objective

1. Project development objective: (see Annex 1)

The objective of the project is to substantially expand rural and peri-urban access to electricity, telephone, and internet on a commercial basis in order to enhance the climate for rural development and job creation. The operation will have a specific focus on providing electricity and telecommunication to Small and Medium Enterprises (SMEs) for increased income generation in rural and peri-urban areas. It would also contribute to enhancement of quality of life for rural Swazis by reducing their isolation and modernizing rural social service such as health and education through access to energy and ICT services.

2. Global objective: (see Annex 1)

The global objective of the project is to contribute to global environmental protection by reductions in greenhouse gas emissions through the promotion of solar PV and generation of power from renewable sources.

3. Key performance indicators: (see Annex 1)

Key indicators include employment and economic gain due to SME participation in the project, and the number of households, commercial establishments, and institutions benefitting both directly and indirectly from the energy & ICT investments. See Annex 1 for detailed indicators.

B. Strategic Context

1. Sector-related Country Assistance Strategy (CAS) goal supported by the project: (see Annex 1)

Document number: **Date of latest CAS discussion:**

A CAS for Swaziland has not been prepared. However, this project is fully consistent with the Swazi National Development Strategy (NDS). This project is proposed against the background of a prevailing serious socioeconomic situation in Swaziland – flagging growth coupled with high unemployment and incidence of poverty and HIV/AIDS – and a fragile medium term outlook (IMF Country report No. 03/21, Jan. 2003). To wit, out of a population of about 1.1 million, about a third of the labor force is unemployed and a third of the working age population is infected with HIV/AIDS (the Government has reinforced its commitment to fight the disease through the establishment of the National Emergency response Committee on HIV/AIDS (NERCHA) and the Bank has recently approved \$62 million over five years from the Global HIV/AIDS Fund); moreover, the per capita income has steadily declined at about 2 percent per year over the last decade and now stands at about \$756/capita (compared to about \$1200/capita in 2001). These conditions have contributed to an environment in which the incidence and depth of poverty is pervasive and there are significant inequalities in income; with two-thirds of the population living under \$1 per day. Poverty is especially widespread and is predominant in rural areas where about 80% of the population lives.

The key development challenges facing the Government are to bolster growth, increase employment and reduce poverty. Central elements of the National Development Strategy to address these challenges include reform of key public enterprises, SME strategy to boost private investment and job creation, and focus on improving public infrastructure.

The Energy Sector contribution to the NDS, which focuses on poverty eradication, employment creation, gender equity, social integration, and environmental protection, is given in the draft National Energy Policy 2002. This Policy includes a strong focus on rural electrification and its links to rural development (see Section 2 below for more detail on the National Energy Policy). The proposed ERT Project will be a key tool for realizing the Government's Rural Electrification objectives, in direct support of the NDS, including reforms to enable improving sector performance and regulatory oversight.

With regard to the telecommunications sector, the draft telecommunications policy of 2002 seeks to support the NDS goal of improving the sector's efficiency through restructuring. In particular, separating the roles of policy formulation, regulation and operations; incorporating the incumbent telecommunications operator from a public enterprise into a limited shareholding public company limited by share under the Companies Act; and establishing an independent regulatory authority. The project will support the Government in achieving its NDS goal of undertaking sector reform, improving sector performance and increasing access to services.

1a. Global Operational strategy/Program objective addressed by the project:

The renewable energy activities supported under this Project are fully consistent with GEF's Operational Programs and Strategic priorities. The project specifically supports Operational Program # 6: Promoting the Adoption of Renewable Energy by Removing barriers and Reducing costs. The GEF strategic priorities addressed by the project are (a) increased financing viability for renewable energy investments; (b) establishment of a regulatory framework to provide fair and competitive grid access to renewable energy producers; and (c) Promoting productive uses of renewable energy in agriculture, education water and telecommunication. In particular, sustainable models for income generation will be demonstrated so that they can be replicated.

2. Main sector issues and Government strategy:

Power Sector Issues

1a) Issue: Current sector structure perpetuates some inefficiencies, does not promote commercial behavior, and does not account for recent developments in the sector.

The 1963 Electricity Act names the Swaziland Electricity Board (SEB) a vertically integrated utility, encompassing generation, transmission and distribution as the sole agent permitted to import, distribute, and supply electricity through the electricity grid. Of the 835 GWh sold in 2001, SEB produced about 245 GWh (29%) through the approximately 41 MW of installed hydropower plants and 9.5 MW of diesel plants, and purchased the balance from ESKOM South Africa. SEB delivers electricity to over 41,000 clients throughout the country, of whom about 25 bulk users accounted for 70% of the Board's income in 2002.

At the same time, private manufacturing firms, mostly in the sugar, pulp & paper, and forestry industries have an installed capacity of about 50 MW - equal to SEB's installed generating capacity - and produce power for both their factories as well as their associated company towns. In 1999, this production accounted for 27% of total electricity consumption in the country.

Despite this significant level of capacity and production, two key factors inhibit sale of private power to the grid network. The first is a sector regulatory structure which does not provide an enabling environment for such transactions. A second factor, the currently low cost of South African electric power (US\$0.02/kWh) also inhibits expanding local power generation. However, several factors open a potential for such development. These include the currently high demand charges, which would be reduced with local generation, opportunities for cogeneration, which can be a very efficient generation strategy, and the fact that renewable energy investments will displace coal fired power and thus could enter into carbon emission reduction contracts under the Clean Development Mechanism.

Ib) Government Strategy: Sector restructuring, featuring corporatization of SEB, opening of investments to private sector participation, and a commercially oriented approach to rural electrification

Stakeholders in Swaziland agree that the 1963 Electricity Act, is outdated and does not reflect recent international and regional developments such as independent power producers and commercial regulation by an independent regulator rather than through Performance Contracts with the sector ministry

As a result, the Government has embarked on a restructuring of the power sector with the intention of liberalizing the industry and allowing more effective private sector participation. The objectives of the restructuring are to:

- improve quality and reliability of supply
- increase efficiency and reduce costs of investment
- introduce a regulatory framework capable of securing a market oriented electricity supply industry, which can attract new players, finance, and investments and promote customer orientation in the industry
- increase the use of indigenous energy resources for electricity generation, thereby contributing to the security of supply
- ensuring development of the sector in an environmentally sustainable manner
- facilitate economic development by increasing access
- increase access of electricity throughout the country, and
- increase cost reflectivity and transparency of electricity tariffs

A review of the 1963 Electricity Act was undertaken and three bills, an Electricity Bill, and Energy Regulatory Authority Bill and a SEB Corporatization Bill have been drafted. The bills are expected to be to be enacted by June 2003.

While SEB, a state enterprise, is generally well run, it remains subject to inefficiencies in investment, bill collection, administration, operation, maintenance, and, above all financing, being a public enterprise . There is a growing concern regarding the impact of these inefficiencies on cost of service as well as competitiveness of the economy. The SEB Corporatisation Bill provides for the transformation of the *Swaziland Electricity Board* to the *Swazi Electricity Company* , a company under the Companies Act. Although the Government has embarked on a privatization

policy for the 59 public enterprises, the privatization of SEB is still a sensitive issue; hence, the initial focus on commercialization and corporatisation.

The Draft Electricity Bill opens the sector to private participation through a licensing regime overseen by a Regulatory Authority, invests the Authority with tariff setting powers, provides for access expansion with support from a Rural Access Fund, and provides for transition arrangements, dispute resolution, etc. The Energy Regulatory Authority Bill - establishes the Energy Regulatory Authority, and defines its procedures. The independent Energy Regulatory Authority, once in place, will be responsible for the monitoring and controlling of the industry and the issuing of licences.

Some important initial private sector entrants to the sector could be independent power producers (IPPs) based on renewable energy power generation. In particular, there are several sugar mills, operated by the Royal Swazi Sugar Corporation as well as by Illovo of South Africa, which have considerable potential for developing/expanding bagasse cogeneration systems which could both displace current power purchases, as well as inject some additional power to the grid network. The current low cost of electricity has stymied these investments. However, large industrial customers such as the sugar mills are subject to a relatively high demand charge, assessed on the basis of their peak consumption, for which SEB must ensure availability of sufficient generation capacity. The potential demand charge reduction from a cogeneration investment, coupled with income from sale of carbon emission reduction credits under the Clean Development Mechanism (CDM), make the investments financially interesting. Government seeks to create an enabling framework to encourage such investments. This will require work in policy and planning, capacity building, and support for initial investments.

The Government plans to create a Rural Access Trust Fund (RATF), through legislation currently under preparation. The RATF will be the subsidy mechanism which will buy down the non-commercial portion of a rural infrastructure investment, as a one-time, up-front subsidy. The remaining investment can then be undertaken on commercial terms. The RATF is being designed from the start as a multi-sectoral fund, which will have windows for rural electrification, rural telecom, and perhaps other rural infrastructure investments. While the new sector structure, including the RATF, would be open to all eligible bidders, new private sector market entrants are not expected in the near term due to the small size of the market and the limited in-country capacity. Thus SEB is expected to remain the primary implementer of rural electrification. In the telecom sector, SPTC and MTN are expected to remain the dominant actors.

Ila) Issue: Rural electrification rate of 5% is low in comparison to urban rate of 40-50%, and low in comparison to similar income countries,

Approximately 18% of Swazi households receive electricity service either from SEB or from manufacturing firms which serve company towns. This leaves about 82 percent of Swazi households “in the dark” without access to electricity and isolated from the benefits of commonplace modern goods and service. However, in rural Swaziland, where about 77% of the population lives (about 900,000 people or 180,000 households) the situation is even worse. With rural electricity coverage at only about 5% (compared to ~45% in urban areas), this means more than 170,000 households must make do with vastly inferior quality, far more expensive, polluting and hazardous sources of energy that can be injurious to their health as well. Many households

today spend US\$ 5-8 per month on alternative energy sources – batteries, candles, paraffin – for lighting, radio and TV. Lack of electricity deprives them of communication windows and information links to the outside world, forcing them to live on the wrong side of the “digital divide”. Moreover, the quality and effectiveness of essential social and community services in education and health is greatly diminished, and the productivity and income potential of micro- and small and medium enterprises is choked. This situation is underscored by the fact that rural households account for only 2% of total electricity consumption, as shown in Figure 1. *Electricity service delivery in Swaziland of 18% considerably lags behind other countries with comparable or even far lower per capita incomes – such as China (95%), India (45%), Vietnam (over 70%), Sri Lanka (75%) Indonesia (70%). Moreover, coverage is also low given Swaziland’s relatively higher per capita income in the Africa region - South Africa (63%), Namibia (34%), Cote d’Ivoire (38%),Zimbabwe (20%), Senegal (32%), Cameroon (31%), Ghana (35%).*

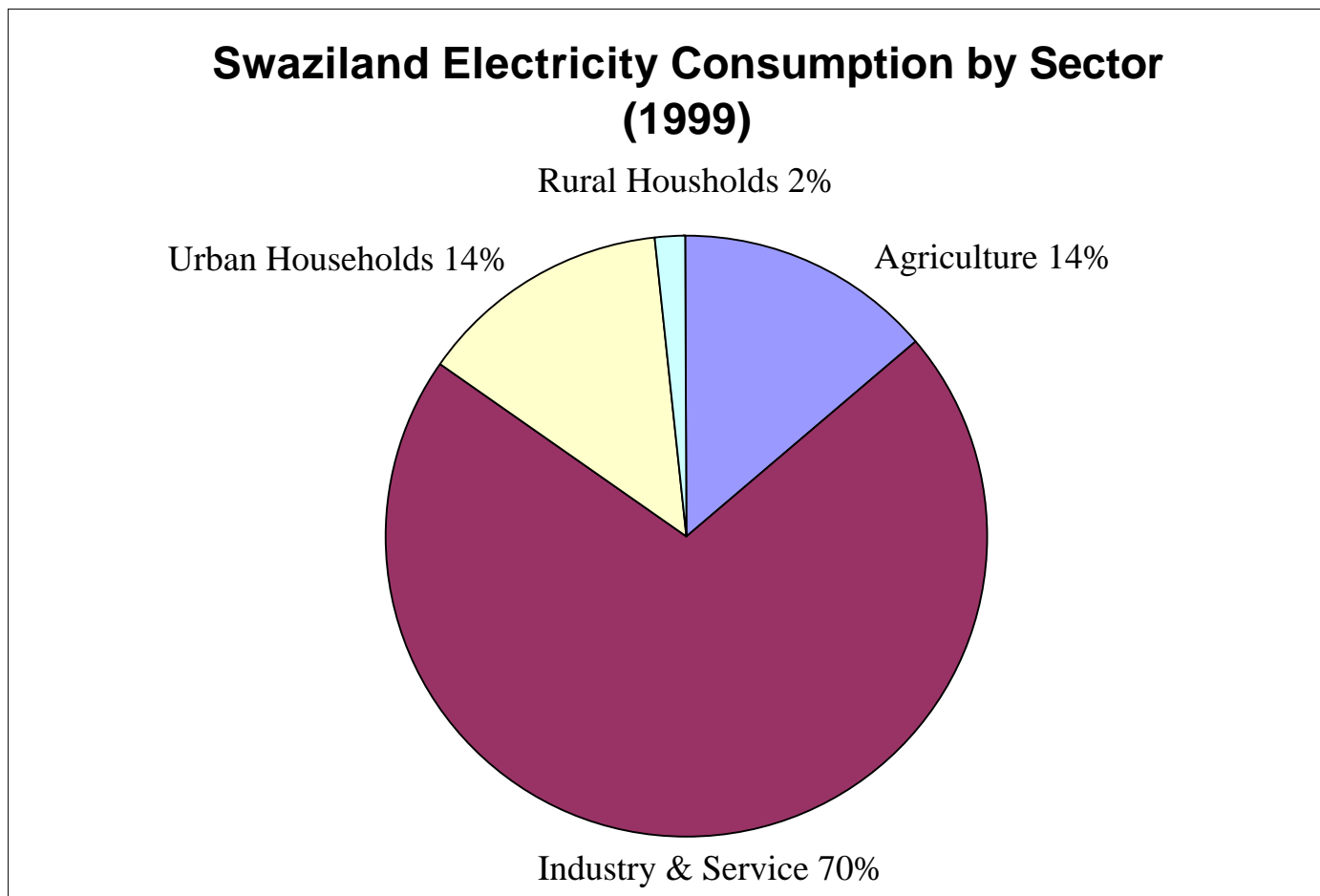


Figure 1. Swaziland Electricity Consumption by Sector

At present SEB has about 36,000 residential connections and the new connection rate to the SEB grid system is between 2000 and 3000 households per year. At this pace, it will take 50-75 years

to connect the remaining 150,000 households, assuming no population growth. *The development path associated with such a sectoral expansion trajectory is seen as politically unsustainable, economically wasteful and not acceptable to the Government.*

One significant explanation of the slow progress is the very high cost of providing electricity to the rural Swazi population, which has adopted a very scattered settlement pattern by international comparison. Another is that the financing of rural electrification relies almost exclusively on: (i) up-front consumer payments for a portion of the investment, with the balance paid over time; or (ii) donor funds provided up front for 100% of the investment costs. This effectively limits scale up of access on account of affordability barriers and scarce donor funds. While the SEB does contribute a small portion of its retained earnings towards rural electrification, this is an insignificant amount in relation to the job ahead. The current SEB connection policy, which requires an up-front payment of E3000 (~\$US400) on top of the cost of house wiring, is prohibitive to many potential rural customers.

Iib) Government Strategy: Explicitly incorporate rural electrification measures in sector reform by promoting commercially-oriented service provision with subsidies to cover the non-commercial portion of the investment from the Rural Access Fund

The Government's National Energy Policy, drafted with support from Denmark, and awaiting endorsement from Cabinet, places a strong emphasis on Rural Electrification, stating that, "access to adequate energy supplies is a key element of Government's rural development strategy". Specific mechanisms for implementing this policy includes the promotion of commercially-oriented rural electrification through the use of a "smart subsidy" mechanism, which is discussed in *Ib* above. Additional features of Government's strategy include a focus on efficiency improvements and cost reductions to help moderate the high per-connection costs for rural networks that result from the sparse settlement pattern common in rural areas of Swaziland. Although SEB has sought to keep its costs low, there remain additional opportunities to further reduce connection costs thus expanding the reach of grid service. In addition, a more commercially oriented SEB will seek other ways to reduce the initial cost barrier faced by many rural (and urban) households, including the use of low-cost "ready boards" for house wiring, and provisions for paying the connection cost over time. For those unreachable by the grid, Government's strategy provides for promotion of other service options. In particular, solar PV systems will be promoted based on a private sector delivery model for households and commercial applications, and procurement for institutional applications such as for rural health and education facilities.

Independent grid networks may also be suitable in some areas. However, this is not expected to be a major option given the extensive reach of the existing grid network in the country.

IIIa) Issue: Rural electricity network investments not returning rural development dividends

The electricity network in Swaziland already has an extensive reach. SEB maps of the network show that there are few areas in the country which are more than 15 km from a medium or low

voltage line. Although the mountainous terrain in some areas makes grid extension impractical, it would be reasonable to expect that such an extensive network would result in considerably higher than a 5% rural electrification rate, and would also catalyze some electricity-dependent rural enterprises. However, these developments are largely absent.

IIIb) Government Strategy: Link rural electrification planning and implementation to small and medium enterprise (SME) development efforts and to provision of health and education services

Government has created a Select Committee on Rural Electrification (SCORE) with the express objective of enhancing the impact of rural electrification investments by linking them to planning and implementation of other rural services such as health, education, water supply, and SME support (discussed below). Funding for implementation was partially provided through a Taiwanese grant program for electrification of schools and health clinics. However in many cases, lack of internal wiring for schools - not funded by the Taiwanese program - has resulted in lack of service and an unutilized network investment. The proposed operation will address not only grid extension, but it will also address barriers to connection by customers.

Telecom sector issues

IVa) Issue: Sector structure maintains structural inefficiencies and does not reflect current international best practice.

The Swaziland telecommunications sector has not undergone the same level of reforms as its neighbors in the South African Region. While the policy setting function in the sector rests with the Ministry of Tourism, Environment and Communications, the state owned Swaziland Posts and Telecommunications Corporation (SPTC) is the government owned operator and sector regulator. It is the monopoly provider for fixed-line services, participates in the provision of mobile and internet services and is also responsible for the regulatory functions of radio spectrum management and licensing of new network service providers. SPTC's involvement in both operations and regulations has resulted in a relatively inefficient sector, with limited private sector participation. SPTC as a state owned monopoly incumbent has also not responded adequately to the needs of customers. This is evidenced by the current (August 2002) waiting list for fixed lines which stands at 15,252 lines.

IVb) Government Strategy: Sector Restructuring.

The Government's strategy is to reform the telecom sector by (i) separating the postal and telecommunication operations of the SPTC; and (ii) transferring the telecom regulatory function from SPTC to a regulatory commission. This will also allow for the establishment of an institutional and regulatory framework that promotes public-private provision of rural ICT services.

In particular, the Cabinet approved a **draft telecommunications policy** in July 2002 which seeks to address this sector restructuring and achieve the following: (i) separate the roles of policy formulation, regulation and operations; (ii) unbundle the telecommunications and postal operations of SPTC; (iii) incorporate the incumbent telecommunications operator from a public

enterprise into a public limited company incorporated under the Companies Act; and (iv) establish the Swaziland Communications Commission (SCC) as an independent regulatory authority.

The Government will revise the draft policy to address specific gaps identified by the Bank. In particular, the draft policy will be revised to include: (i) a clear definition of the institutional structure of the sector, (ii) a timetable for policy implementation; (iii) definition of a market structure for the sector; (iv) adequate provisions for key regulatory policies for governing the sector; (v) prioritization of its objectives; and (vi) sufficient detail on the universal access program. Following closely on the adoption of the revised policy, Government will move to embody it in a legal framework. Specifically, the current draft telecommunications bill will be revised before end of 2003 to reflect the changes in policy, and would include provisions that articulate and provide for the following: (i) sector structure and role; (ii) establishment of an independent regulator; establishment of a licensing, interconnection and tariff regime; (iii) universal access; (iv) regulation of scarce resources, including spectrum, numbering; (v) provisions for transition.

Va) Issue: Limited access to telecommunications and internet services in rural areas.

The overall teledensity (both fixed line and mobile) in Swaziland of approximately 9.61 lines per hundred persons, considerably lags the lower middle income group average of 23.34 lines per hundred persons. Furthermore people in rural areas have limited access to the existing telecommunications infrastructure and the cost of telecommunication and internet services remains high.

Vb) Government Strategy: The Government established a Universal Service Obligation Fund under the license awarded to the cellular operator, Swazi MTN. The proceeds of the fund are to be utilized by Swazi MTN for the (i) installation and maintenance of payphones; (ii) implementing handset subsidies; and (iii) installation of base stations in four remote locations in the country. The Government has also approved the telecom policy which seeks to address sector restructuring and achieve (i) a separation in the Government's roles of policy formulation, regulation and operations; (ii) unbundling of the telecommunications and postal operations of Swaziland Post and Telecommunications Corporation; (iii) Commercialization of the incumbent telecommunications operator into a limited liability company ; and (iv) the establishment of the Swaziland Communications Commission (SCC) as an independent regulatory authority.

Cross-sectoral Issues - Small and Medium Enterprises (SMEs)

Vla) Issue: Enabling broad-based job creation and income generation driven by Small and Medium Enterprises (SMEs)

Swazi enterprises outside the Mbabane, Matsapha, Manzini area are mainly survivalist. These are characterized by self-employment enterprises with less than two employees operating in poor communities in the retail sector, and to a lesser extent transport and crafts. Those enterprises rely solely on their own financing, located on Swazi Nation Land (SNL) rather than title deed land. Some 20 government departments, as well as several banks and major private companies, are engaged in some way in supporting enterprise development. Nonetheless, MSME growth is weak, in the face of persistent policy constraints (especially issues of land titles and legal status of

women), and the weaknesses in access to credit and business development services (BDS).

There is a general dearth of credit services accessible by SMEs. Operations of the three foreign owned commercial banks (Nedbank, Standard Bank and First National Bank), including their leasing and hire purchase products, are targeted at formal sector, more established businesses and individuals with middle and high incomes and net worth. The other commercial bank, the statutory Swazibank, formerly the Swaziland Development and Savings Bank, is still completing a restructuring and is not yet in a position to provide significant services to micro and small enterprises. With slow economic growth, the commercial banks see few banking sector growth prospects and in recent years have reduced their branch networks. They have not made significant use of the Central Bank's Small Enterprise Guarantee Scheme, which extends only 50 – 100 loan guarantees per year, depending on requests presented by the commercial banks. First National Bank (FNB) has the highest exposure, which is estimated to be less than the equivalent of \$100,000. More broadly, the banking sector in Swaziland has high liquidity reflecting low lending levels (rather than high savings), with liquidity being absorbed by the public sector and transfers back to the South African main banks. Raising lending levels would face the issue of a liquidity mismatch between the sector's short term deposits base and the medium term credit requirements of many potential borrowers.

Credit services for SMEs are available from the Enterprise Trust Fund (ETF) and several NGOs, notably the Imbita Women's Trust, which is the main NGO microfinance organization with 5,000 members and 700 loans outstanding (mid-2002), mainly in urban and peri-urban areas. The estimated combined microfinance outreach is limited, on the order of 3,000 loan clients served directly or through intermediaries such as cooperatives. The NGO services also have a limited focus, for instance Imbita provides loans only to women entrepreneurs only for inputs for which its loans may be disbursed by direct payments to suppliers). The Inhlanyelo Fund provides loans only to entrepreneurs who have attained local political approval.

Savings and credit societies have considerable penetration. SASCCO, the apex credit union organization, has 35 member societies with about 25,000 individual members. The societies, however, are based on places of employment (e.g., workers of a particular company), and are not directly accessible to households whose income source is agriculture or micro and small business. The Swaziland Building Society and micro lenders and consumer finance businesses (the two main ones are South African owned) target their services at formally employed individuals with regular income. The two development finance companies, the Swaziland Industrial Development Corporation and Tibiyo Taka Ngwane (a trust fund operated by the royal family), also do not provide significant services to micro and small enterprises.

Business development services for SMEs are also limited, in spite of the reported lack of business skills among existing and potential entrepreneurs. Organizations that provide business development services, including management and accounting services and advice, production and technology information and skills training ,marketing training and services, investment and financial advice, service include SEDCO, Lulote, ETF, and the church group SECLOF. SEDCO, the Small Enterprise Development Company, is a parastatal that aims to assist Swazi entrepreneurs to take up business opportunities and facilitate their growth, although its main role

is reportedly providing business sites to small businesses. Private organizations provide some radio based instructional programs on business management targeted to beginning entrepreneurs. The scope of BDS provided by for-profit operators is unknown, but they are not likely to be extensive, as they would necessarily be targeted at the few enterprises that would have the size and capability to afford business support services. One connection between for-profit and other BDS services is that banking regulations require borrowers to have formal accounting records. Many SMEs do not have formal accounts and lack the skills to produce them.

The markets accessible to most SMEs are the low value ones of their local communities, which are poor and particularly vulnerable to natural events (e.g., drought). Unemployment, was reported as 15% and 25% in urban and rural areas in the 1995 Income and Expenditure survey. Since then economic growth rates have declined, with minimal expansion of wage employment. Unemployment, is now reported as high as 40% in rural areas, with the eastern lowveld and southern Shishelweni being particularly affected.

Women, the main group of entrepreneurs currently receiving SME financial services, have a legal status akin to minors. Married women do not have the right to contract, including to borrow, except with the approval of the husband and reportedly women entrepreneurs have failed because of contracts not being honored and the women not being able to effectively access contract enforcement mechanisms. This is a growing constraint given the increasing number of female-headed households, which is linked to the effects of AIDS (more than one-third of the population is HIV infected).

Weak credit discipline in rural and periurban areas, reportedly linked to experiences receiving loans from organizations backed by the king or political leadership groups, contributes to low interest by suppliers and financial organizations in these areas.

Most land cannot be used as collateral to leverage financial services As Swazi National Land, on which 70% of the population lives, cannot be used as collateral, SMEs do not have access to this resource in order to build an asset base. In most countries, SME access to mortgageable assets is an important factor in financing business growth from a survivalist, micro scale.

VIb) Government strategy: Along with the “Millennium Projects” , SMEs are recognized by the government as the major pathway to Swazi economic development. The project interventions will directly support the effective linking and bridging of credit and BDS services to assist SMEs realize business opportunities generated by the project. These impacts will be systematically and concretely targeted.

More specifically, the scale up of access to rural electrification and ICTs will open up prospects of increased jobs and incomes by micro, small and medium scale enterprises in both direct supply and increased productive uses market segments. Direct supplier opportunities will be created for services and production aimed at increasing local content in electrification - for example, construction, maintenance, production of components given scale provided by a national program - including PV sales and services businesses, and ICT services. An additional range of business

opportunities will be generated for productive applications of the electricity and ICT off takes by existing and new SMEs. These include increased out grower opportunities in sugar, transport and additional services, and some production, for instance in small scale food, furniture, crafts and other mainly consumer related products. Along with facilitating the modernization of service delivery in health, education and other sectors, increasing jobs and incomes through these direct supply services and productive uses are key entry points for achieving the development impacts from the project investments.

Education and Health Sector Issues

VIIa) Issue: Key educational and health services requires reliable electricity and telecom service to deliver on their rural service sectoral mandates

For Education the coverage of electricity is at present around 30% of all schools while the percentage with access to ICT isn't known. In the Education sectoral development plan the overall goal is to provide quality education to all citizens and ensure the graduates contribute to the development of both cultural and economic development of the country. In the National Education Policy Statement it is stated that MoE shall introduce and develop Information and Communication Technology in the school system as well as provide distance education. This can not happen without the schools having access to energy.

For Health it is the sector policy to ensure that all Clinics have access to energy although today 90% have access to these modern services. All higher level health facilities such as hospitals and health centers already have energy and telephone access. The draft National Health Policy on Health and Social Welfare focuses on high quality service to reach the goal of an efficient, effective national service in the sector by 2015. The Policy further states that the sector shall promote and give priority to investment in appropriate technology in order to support the essential clinical services. In addition to this MOH has explicitly identified ICT as a priority in the health sector in order to improve the referral system in the country.

The HIV/AIDS incidence is 36% and a serious threat to the countries development. The National Emergency Response Committee on HIV/AIDS (NERCHA), which is coordinating the activities under the recently awarded Global Fund grant for HIV/AIDS programs has a wide range of activities to be carried out in the fight against HIV/AIDS. Among those an initial program activity which has already provided 55 shipping containers, one for each *tinkhundla*, as offices and focal points for rural HIV/AIDS activities. To attract rural youth, a distance learning/interactive computer program, including internet access, is planned. This will serve the dual purpose of entertainment and dissemination of AIDS prevention information. Clearly, this program requires access to electricity and telecom service. However at present, only about a third of the installations have an electric grid connection, including some that are not connected despite nearby grid access.

VIIb) Government Strategy: Participation of Ministry of Education and Health in Select Committee on Rural Electrification

Currently the second phase of the Taiwanese supported rural electrification program is being

implemented. The target is unelectrified health clinics and schools on a national basis. A Select Committee on Rural Electrification (SCORE), consisting of representatives from Ministry of Works, Ministry of Natural Resources & Energy, Ministry of Health and Ministry of Education has the mandate to choose the areas that would benefit from the electrification. In most cases the areas connected are those located in the proximity to the grid while the more remote rural institutions remain unelectrified. The project extends the grid line to the facilities, while the connection and wiring are the responsibility of the concerned institutions. In the Ministry of health this seems not to cause any problems as the clinics are already equipped with wires when built. However, in the education sector this does not seem to be the case. As a consequence of a large number of schools remain unconnected despite the presence of a nearby line.

3. Sector issues to be addressed by the project and strategic choices:

The major focus of the project is on expanding rural access to power and telecom (issues (II and V)) and on enhancing the impacts of this expanded rural access (issue II). The project will provide both technical assistance as well as investment finance in support of Government's efforts in these areas. The project also will be a vehicle for continuation of the sector reforms described in issues I & IV above. Some reform activities will precede the project such as passage of key legislation as well as establishment of the Regulatory Authorities and Rural Access Fund. Further reform activities supported by the project include: support for the start-up and initial operation of these entities; support for initial independent power producer transactions in the form of technical assistance for framework creation; and technical assistance to SEB for pursuing rural electrification in a commercially-oriented manner. Broader support of SEB commercialization is beyond the scope of this project.

Strategic Choices:

The project design incorporates two primary strategic choices:

The *first* strategic choice is to combine both electricity and ICT in the same operation. Two key factors influenced this choice:

- i) The synergies in terms of rural development impact gained in combining the two infrastructure sectors. Power is needed for telecom operation, and access to both together opens considerably more development options than either one alone;
- ii) Swaziland is a very small country, and the associated power and ICT sectors are also small in absolute terms. Combining the function of subsidy provision into a single agency will reduce the administrative overheads and transaction costs of this function. This multi-sectoral approach is also under consideration for the regulatory function, although for now Government has elected to create separate power and telecom regulators. Technical assistance provided by the project also will be multi-sectoral in approach, with similar synergistic effects anticipated.

The *second* strategic choice is to link rural infrastructure access closely to Government's rural development priority. As discussed above, it is clear that access expansion is not in itself sufficient to achieve the development impact potential of rural infrastructure investments. For this reason, the project will include income generation promotion activities tied to the investments. In

addition, it will proactively assist education and health end-users in identifying and meeting their energy and ICT needs with a view towards improving their quality of service to better address their sectoral goals. In particular, links with the recently inaugurated HIV/AIDS program will facilitate Swaziland’s effectiveness in the fight against HIV/AIDS.

C. Project Description Summary

1. Project components (see Annex 1):

1. The project would build on the existing momentum towards commercially oriented service provision, including by the private sector, through support of existing actors such as the Swaziland Electricity Board (SEB), Swaziland Post and Telecom Corporation (SPTC), and MTN as well as encouraging new private sector participants. Project physical investments, summarized in Table 1.

A package of technical assistance and capacity building will also be delivered as part of the project to complement the physical targets in support of the project objectives. This package also is summarized in Table 1, with more detail provided in the Capacity Building/Technical Assistance component below. These technical assistance activities include a strong emphasis on development and support of SME which relate to energy and telecom either as suppliers or as consumers. For example, support will be provided to SEB to identify local sources of supply for equipment and services, and to the local suppliers in becoming competitive in providing such services. An Enterprise Growth and Empowerment task, undertaken by the Enterprise Trust Fund (ETF), will assist SMEs in determining how best to use energy and ICTs to grow their businesses. Business development services will be provided under ETF to service suppliers, including to mini-grid project sponsors as well solar PV suppliers to assist local companies in addressing the remote electrification market. Similar services will also be provided to customers with the potential of using the electricity or ICT services for productive uses.

Once the primary legislation discussed in Section B.2 above is enacted, the secondary legislation required to implement the legal and regulatory framework will be needed. For example, the introduction of a licensing regime in the power sector will also require the preparation of draft licenses for generation, transmission, distribution, sales and for the system operator. These will be supported by the ERT project. Other activities needed for sector reform, but not related to rural access expansion, such as the due diligence and valuation of SEB required for the corporatization process, will be undertaken outside of the scope of the project

Table 1: Proposed Investments and Technical Assistance

Component	Description
<i>Investments</i>	
1. Grid based Electricity Access Expansion	<ul style="list-style-type: none"> About 32,000 new connections installed by SEB (or other qualified enterprise)*
2. Renewable Energy	
Main Grid Renewable Energy	<ul style="list-style-type: none"> 40-50 MW of new capacity installed by commercial enterprises
Off Grid Renewable	<ul style="list-style-type: none"> About 2,000 new customers including public sector, private sector

Energy	and households. Service provided from private sector solar PV suppliers and mini-grids installed by private, community, or other (non-SEB) actors*
3. Expansion of ICT Access	SPTC or MTN investments in: <ul style="list-style-type: none"> • Network investments to achieve 90% cellular and fixed line coverage; • 5-7 new rural internet points of presence; • increase in high-speed internet
4. Capacity Building & Technical Assistance	
4.a Sector Reform & Restructuring	Assistance to MNRE and to MTC to implement reforms, develop renewable energy framework; Start-up support to regulator(s) and to Rural Access Fund
4.b. SME Development Support	Consultant assistance channeled through ETF for enterprise growth and empowerment
4.c Cross-Sectoral Energy & Telecom Implementation Support	Assistance to cross-sectoral ministries, parastatals and private sector for rural service extension (grid/network & off-grid/remote) service provision. Capacity Building to local enterprises for supply of services and equipment including off-grid renewables
4.d Renewable Energy Capacity Building	Assistance to public and private sector for development of an enabling environment for renewable energy development, and growth of the market, focusing on grid and off-grid service provision.
4.e Monitoring and Evaluation	Monitoring to identify key project impacts & benefits and to enable periodic project review and revision

* Includes Cross Sectoral Investment in connection/wiring to bring total to:

- 100% Health Facilities
- 100% Secondary Schools
- 75% of Primary Schools
- 100% NERCHA HIV/AIDS containers

Special emphasis will be placed on connection of health, education, and other rural service facilities which do not yet have electricity service. This will include both investments and capacity building for rural service providers such as health and education institutions. Connections of these facilities will be through the most cost-effective means (grid extension, mini-grid, or solar PV) and therefore will be included in the components described below as appropriate. With regard to investments, the ERT project will build on the achievements of the ongoing Taiwanese supported electrification project. The Taiwanese project is supporting grid extension to schools and health facilities, and is expected to raise the electrification rate to 90% for the Health sector, 40% for the primary schools and 80 % for secondary schools. The proposed ERT project will complete the electrification of rural health and secondary schools, and raise the primary school electrification rate to 75%. These will include additional grid extension where feasible. However, the previous investments are already focusing on the grid-connectable sites, so the use of renewable energy - primarily solar PV but also including mini-grids - will be an important aspect of these investments. In addition, these facilities will

benefit from the project's investments toward universal telephony access as well as expanded high-speed internet coverage. Moreover, ERT will finance the backlog of school wiring, not covered by the Taiwanese project, but necessary to reap the benefits of the newly installed electrification network.

The Swaziland National AIDS Program (SNAP), recently inaugurated by the National Emergency Response Committee on HIV/AIDS (NERCHA), will also benefit under the project. In particular, SNAP is in the process of deploying shipping containers, one for each of the 52 Tinkhulndlas, with windows and other amenities, to act as activity centers and storage facilities for rural outreach. A primary target group for this outreach are youths in the 13-18 age-range. Electricity and telecom service to these NERCHA centers, facilitated through the ERT project, will be critical in providing the computers and internet access which are a big attraction to this age range.

Technical assistance in support of cross-sectoral investments is described in 4.c below.

Component 1: Grid-Based Electricity Access Expansion (IBRD \$11.4 million, Private Sector \$7.0 million)

The **project aims to double electricity access to rural and peri-urban customers** through grid extension, independent grid networks, and solar PV. This implies connection of about 34,000 new customers over the four year project life, more than quadrupling SEB's current annual consumer connection rate. SEB would undertake the majority of the new electricity connections (about 32,000) through a structured program of rural electrification. The program provides for SEB to prepare Priority Rural Electrification Packages (PREPs) which define specific rural electrification subpackages. The PREPs will be identified and delineated by a team led by SEB and including representatives from the ministries of Natural Resources & Energy, Health, Education, Water, and Enterprise Development. The existing SCORE committee may be reconstituted for this function. Ministry representatives will ensure that sector priorities and up-to-date data are incorporated on a real-time basis in identification and detailing of the PREPs. Each PREP will provide a full analysis of the proposed investment – covering technical design, commercial costing, market assessment, including customer willingness to pay, financial impact on SEB, additional requirements for management, operation & maintenance, customer servicing, etc. SEB will implement projects based on an assessment of commercial viability, once the subsidies provided through the Rural Access Trust Fund are taken into account. PREPs are to be implemented in areas where electricity will have the greatest development impact. As the primary agency involved in rural electrification, SEB is responsible for preparing the PREPs. SEB has prepared a draft PREPs for the first year of the project, providing approximately 9,000 new connections, which will be finalized by project appraisal.

The PREPs will be eligible for subsidy support from a Rural Access Trust Fund (RATF). This subsidy support will buy-down the initial investment cost to the point where the balance of the investment, as well as ongoing operation, maintenance, and upgrades can be undertaken on a fully commercial basis by SEB or any other interested, capable entity. Subsidy support, in the form of a performance-based grant, will be provided by the Rural Access Trust Fund (RATF) after a due-diligence review of the SEB proposal. The review will consider a variety of factors,

including cost efficiency, expected development impacts, performance of previous projects, Southern Africa regional experience, etc. The RATF subsidy will cover the “non-commercial” portion of the capital costs determined on the basis of an agreed rate of return for SEB investments. The balance of the investment will be from SEB resources or commercial debt. The RATF will closely monitor SEB performance, including the actual rate of return on approved projects. Initial start-up of the Rural Access Trust Fund would be a condition of presentation of the project to the World Bank board. Passage of the legislation establishing the legal mandate for the RATF would be sought by appraisal.

SEB has indicated that there is sufficient contracting capability in the country to meet the aggressive targets proposed by the project. However, some capacity building will still be needed, for example to ensure adherence to new technical and management standards as well as some new electrification methods and technologies to be introduced through the project.

The adoption of a more commercially oriented approach is expected to improve the financial performance of SEB, especially with regard to the rural network which in many cases does not currently provide sufficient revenue to cover operating expenses. Active promotional efforts for addition of new customers, and load promotion activities among existing customers, will serve to increase income and efficiency of use for the hundreds of kilometers of under-utilized assets.

Component 2: Renewable Energy

2.a Main Grid Renewable Energy Investments

Renewable energy power generation investments will also be facilitated by the project. By developing local generation, these commercially attractive investments, will support Government’s objective of increasing the country’s security of energy supply. Approximately 40 MW of new capacity will be financed through private investments with additional support from the Prototype Carbon Fund (PCF) or other sources of Clean Development Mechanism (CDM) financing. Generation and energy efficiency investments in the Swazi pulp & paper industry as well as the sugar industry are under development for potential inclusion in the project. The planned 19 MW hydro plant at Maguga, being developed by an SEB-led consortium, is also a good prospect for PCF support, but in light of its size and complexity, will be developed as a separate, stand-alone operation. As described in Component 4d below, GEF support will be used to build the necessary capacity to sustainably undertake renewable energy investments beyond those to be supported by the project.

2.b Off Grid Renewable Energy Investments

Given Swaziland’s limited geographic size, it is expected that the majority of the electricity access expansion will be from the national grid. However, for isolated clusters of consumers, independent mini-grids such as those serving sugar and pulp plant company towns could be developed. These may be powered with excess generation using captive biomass wastes from the manufacturing facilities, conventional diesel gensets, or possibly from renewable energy

resources such as mini-hydro. In addition, for small, remote energy needs of household, commercial, or institutional services, commercial provision of solar PV is the most economically viable electricity source. Cofinancing support from the Global Environment Facility will be sought for the incremental costs associated with initial demonstration off-grid renewable energy investments. Thereafter, subsidy funds would be through the normal RATF channel. With regard to delivery mechanisms for these mini-grid and solar PV investments, the project will adopt a neutral stance. Any proposed delivery mechanism, such as private sector, cooperative, community ownership with management contract, etc. will be considered based on its merits. Projects which meet criteria including soundness of business plan, cost efficiency, financial and institutional sustainability, and technical design review, will be eligible for support.

A per-Wp subsidy will be provided for solar PV investments to address the twin barriers of consumer willingness and ability to pay and the need to establish a functional rural sales and service network. The design of the subsidy and the structure for its provision are drawn from successful experience with similar projects elsewhere such as Sri Lanka, Uganda, Bangladesh, etc. In particular, project suppliers will be required to adhere to a code of practice including provision of qualified equipment, warranty support, and local sales-and-service. Subsidies will be provided using an output-based-aid approach in which installation certifications, signed by customer and installer will be required for subsidy release. Field verification will be undertaken to protect against gaming and to ensure that installation quality standards are maintained. Initially, the subsidy will be provided by GEF, however, an important element of GEF support is ensuring sustainability of the program once GEF funds are no longer available. With this in mind, the RATF will take over renewable energy subsidy provision during the course of the project.

The project also will support development of a solar water heating market in Swaziland to improve efficiency in energy use by taking advantage of the plentiful solar resource available in the country. The potential market for solar water heating exists for institutional, commercial, and household applications. For example, there are more than 200 Government facilities such as hospitals, health clinics, and correctional facilities which have significant hot water demand currently served by coal or electric geysers. In addition, Government staff housing, for police, correctional officers, nurses, etc. add another 2000 electric geysers for which Government is currently paying the utility bill. Moreover, the more than 400,000 bed-nights provided annually by Swazi hotels results in substantial baseload of water heating (in-room usage, laundry, etc.) in the tourism sector. Applications, such as restaurants and other commercial/institutional facilities, and some households also contribute to the overall solar water heating market in Swaziland. Despite this potential market, there has been very little activity to date due to an overwhelming lack of knowledge on the part of potential customers, and a corresponding lack of ability of private suppliers to create the needed market demand. To address this issue, the project will support a solar water heating program which provides technical assistance and capacity building, as well as cofinancing support for about 30 demonstration sites. The TA/capacity building will be in the form of assistance to the MNRE for program promotion and management, and support through the ETF for business development services to potential suppliers. The overall program will aim at establishing a market, as well as an efficient Swazi-based supply response. This will include linkages with suppliers in South Africa and

elsewhere

Component 3: Expansion of Information and Communications Technology Access

The project will accelerate expansion of telephony coverage to the remaining 10% of the country which is currently unserved and also support implementation of regulatory reform. This support of the telecom sector in the project offers strong synergies with the proposed energy investments both because energy is required for telecom operation, and also because access to both energy and telecom increases the development potential of both.

Access expansion will be facilitated through the support of the Rural Access Trust Fund. In the same way as for electricity, rural telecom providers will be given grant support to buy-down the non-commercial portion of their rural access expansion investment. The balance of project costs would be raised from commercial sources, and the investment would be operated on a commercial basis. Like the PREPs, the Rural Access Trust Fund will package these new telephony license areas for bidding to private sector operators on a minimum subsidy basis. It is expected that renewable energy systems will be used in support of some of the ICT applications, including for remote transmission/repeater stations. Renewable energy systems may also be used to support productive uses of telecommunications systems.

Component 4: Capacity Building and Technical Assistance

Capacity building and technical assistance activities to be supported through the project are aimed at: i) maximizing the project development impact and benefit; and ii) increasing capacity of all stakeholders with a view toward sustainability of the programs and investments supported by the project. These activities are summarized in Table 2 below by implementing agency. Detailed terms of reference for these activities are being developed and will be included in the Project Implementation Plan. Procurement for the near-term, high priority activities will commence early with a view toward immediate start-up upon effectiveness.

4.a Sector Reform and Restructuring

The enactment of the legal framework for restructuring of the energy and ICT sectors, to be completed during the preparation phase, is only the first step in sector reform and restructuring. Operationalization of the new framework will require establishment of new entities, (the sectoral regulators and the Rural Access Trust Fund); changes in ministerial functions, particularly in MNRE and MTC; continued progress toward a more commercial orientation by SEB; restructuring and commercial orientation for SPTC; and support to key private sector actors - in particular financial institutions - to understand the scope of the reform and opportunities for their participation. The project will support technical assistance and capacity building in support of these efforts. In particular, this will emphasize start-up support for the regulators and the RATEF; support to MNRE and MTC for information and outreach programs; and private sector capacity building, including to the financial sector.

4.b SME Development Support

The project will support Enterprise Growth And Development activities that link entrepreneurs

in both the direct supply and productive uses segments with existing financial intermediaries, Business Development Service (BDS) providers, and higher value markets. The delivery will be in a commercially oriented manner and the enterprises to benefit will be private sector based.

On the customer side of the meter, the Enterprise Trust Fund (ETF) will be supported to serve as a BDS facilitator with services delivered by NGOs and private providers in the targeted areas. The aim is to provide time limited, intensive services to assist potential entrepreneurs to take advantage of the new opportunities afforded by the electrification and ICT investments. The program will provide limited support to strengthen ETF capabilities as BDS facilitator and to strengthen selected providers based on an assessment that ETF would conduct of BDS needs and provider capabilities. The program anticipates and will support a close working partnership between SEB and the ETF, with advance teams identifying high response areas for the rural electrification investments and supporting them with necessary SME related interventions.

The BDS services will link SMEs in the target communities with providers of enterprise finance, which in many cases will be the ETF and existing NGO microfinance organizations. For high potential enterprises, coaching and mentoring will be provided to assist them with business-to-business linkages into higher value markets. The project's interventions would include support to strengthen the capabilities of for-profit BDS providers to provide these services on a commercial basis to SMEs.

These are catalytic, bridging interventions to accelerate the response to the project investments. They are not aimed at establishing new, non-sustainable support structures. The project's interventions in this area would build upon the technical assistance activities of the EU. SME development has been a focus of recent EU support in Swaziland, including assistance with the development of the SME unit and the national SME policy and support for a study of business linkages opportunities.

Business development services will assist in linking micro enterprises to existing Micro Finance Institutions (MFIs). These organizations will receive some support under the project to strengthen their capabilities, on a sustainable basis, in recently electrified areas.

On the service provision side of the meter, ETF also will provide support for entrepreneurs, communities or others planning to enter or expand the off-grid service market. In particular, this will include: a Solar PV Development activity, which will focus on provision of business development services to solar PV suppliers, and also support for development by private actors, community groups or other interested parties, of independent mini-grid networks. ETF also will provide similar business development services for solar water heating business development. This assistance will take the form of cost-shared support for consultant assistance in business plan development, access to finance, or other business development support services.

Additional capacity building efforts will be undertaken by SEB in support of: i) capacity building for the newly constituted Rural Electrification Unit, focusing on a commercial orientation for rural electrification, including cost effective technical designs – both in terms of initial and operating costs – a more market based focus, including collaboration with the ETF on load

promotion, and closer links with social sector customers; ii) Introduction of best practices for rural electrification operation and maintenance, including design aspects, service efficiency, and quality monitoring; iii) facilitation for local suppliers to capitalize on rural electrification business opportunities, including training seminars and twinning arrangements and more detailed contractor and electrician training and certification on SEB-approved procedures and techniques.

4.c Cross-Sectoral Energy and Telecom Implementation Support

During project preparation, an assessment of the energy and ICT needs for health and education facilities has been carried out. The focus of this work was to identify interventions for which energy/ICT provision will make a marked, positive impact on meeting that ministry's mandate. For example, solar PV systems at rural health clinics can facilitate improved service not only by providing safe, convenient, and reliable lighting for nighttime medical services, but also to enhance staff retention in rural areas, where lighting and small appliance (radio or television) use greatly improves the quality of life. The next step, to be undertaken through the ERT Project will be the final design, procurement/installation, operation/maintenance, and monitoring/evaluation, of the needed investments. The project will provide capacity building support for these efforts. Cofinancing for these investments will be included in the respective investment component (i.e. Component 1 for grid extension to these rural service providers, Component 2 for mini-grid or solar PV service.)

Assistance also will be provided to the Ministry of Tourism, Environment, and Communications in support of corporatization of the Swazi Post and Telecom Corporation, and in strengthening its newly formed ICT department. In addition, the ERT investments in telephony and ICT will highlight the untapped opportunities for dissemination of high impact information on health (e.g. HIV/AIDS), economic development (e.g. business opportunities including business development programs), and other current issues. Support will be provided through MTEC for development of suitable information content.

4.d Renewable Energy Capacity Building and Technical Assistance

GEF support in the proposed project would be aimed at development of key renewable energy market areas, including grid-connected renewables and off-grid renewables including solar PV and solar water heating. The program is summarized here, with additional details in the incremental cost section (Annex 4):

Renewable Energy Power Development Framework would include creation of an initial framework for development and implementation of renewable energy projects, including both structural requirements and training/capacity building for stakeholders. In particular, this activity will support the preparation by MNRE of a long-term renewable energy development policy building on the 1997 Renewable Energy Action Plan and other relevant efforts. This will clearly define the outlines of an enabling framework for renewable energy development. Amendments to the energy legislation are not expected to be required to implement the policy, but if needed, preparation of such amendments

will be supported by the project. Assistance will also be needed for development of a pro-forma power purchase agreement, between the private supplier and SEB. Further development of the enabling framework will include support to: a) MNRE for information and outreach to both the public and private sector on the policy, its benefits and implications; market promotional efforts, in collaboration with the Renewable Energy Association of Swaziland (REASWA) and/or other relevant partners; as well as for development and implementation of a monitoring and verification system for carbon emission reductions; b) The Energy Sector Regulator, for development of regulations consistent with the renewable energy policy as well as training and capacity building for their implementation; c) Other key actors in both public sector (e.g. Ministry of Finance) and private sector (e.g. local financial institutions) for training and capacity building as needed to facilitate adoption of the framework.

Cross-Sectoral Use of Renewable Energy Cross sectoral ministries (e.g. Ministry of Health, Ministry of Education, Department of Works, etc.) would retain project-supported consultant assistance for appropriate incorporation of renewable energy in their ongoing programs.

Solar PV Market Development - The project will provide a package of assistance to support the expansion of the solar PV market based on service provision by commercial entrepreneurs, modeled on experience in Uganda, Sri Lanka, Bangladesh, etc. This package will include (i) strengthening the local PV capabilities in business, finance and technical areas through direct assistance, supplier support, linkages between the institutional and consumer market segments, and encouraging additional investors and entrepreneurs to enter the sector; (ii) increasing the access of PV businesses to financial institution credits and customer access to end-user microfinance; (iii) increasing consumer awareness and confidence; (iv) increasing access to best price sourcing opportunities, including possibly the local production of some components; (v) establishing a sound market framework in terms of tax and duty treatment and technical standards. These will complement the per Wp subsidy to reduce first costs and enable PV to extend sales and service networks, improve product and service quality, and strengthen their financial and business capabilities.

Technical assistance support will be provided for use of solar PV in off-grid institutional, commercial, and household applications. In particular, coordination with the recently inaugurated HIV/AIDS program, other health sector initiatives, as well as education and water sectors, and productive uses will be emphasized;

Renewable Energy Mini-Grid Market Development - Technical assistance will be provided through the ETF to assist potential mini-grid developers in preparing the necessary feasibility studies, technical designs, business plans, financing packages etc. for project implementation. Given the small-scale and remote nature of these systems, local social issues, including who will contribute to the project, who will benefit, tariff levels, service levels, connection policies, etc. will be very important to address at the initial stages of project development. With this in mind, the provided support will include staff with social science skills along with the technical and business assistance that will be required for adequate development of such projects. Financing for the renewable energy

portion of the investment will be supported by the project sponsor, including sweat equity of the project beneficiaries. In addition, GEF resources will be applied on an incremental cost basis, and additional support will be provided through the RATF. While loan funds will be sought even for the initial projects, financial intermediaries may be unwilling to participate until mini-grid projects are demonstrated in Swaziland.

Solar Water Heating Market Development – Technical assistance support will be provided through the ETF for use of solar water heating, emphasizing institutional applications such as hospitals, other Government facilities with high hot water usage, and commercial/industrial applications. This support will include information, and promotional, activities, supported through the MNRE as well as support for business development services through the ETF for market development activities for both institutional and domestic markets.

4.e. Monitoring and Evaluation

Project M&E will include two separate and parallel paths, both administered by the Rural Access Agency. At the Project level, the Rural Access Agency (RAA) will prepare quarterly Project Reports in the Banks Financial Monitoring Report (FMR) format. In particular, this report is divided into three sections, one each for: i) Implementation Progress (describing investment, TA, Capacity Building, etc. in the context of the agreed project performance indicators); ii) Financial Management Reporting; and iii) Procurement Reporting. The report covers the prior quarter, and provides a projection over the future two quarters. The Project Reports are submitted to the Bank in fulfillment of the periodic reporting requirements, and also as the basis for replenishment of the Special Account(s). These reports, along with periodic project supervision, the Mid-Term Review, and the Implementation Completion Report provide a comprehensive monitoring and evaluation package at the project level. This information, combined with close monitoring of related renewable energy investments also will permit monitoring of global environmental impacts, as well as progress toward elimination of barriers to renewable energy development in Swaziland.

The Project Report will be supplemented by a second M&E activity focusing on project Impacts. In particular, project objectives in areas such as rural employment, and quality of life improvements are not easily tracked through simple implementation progress monitoring. This Impact M&E will take the form of baseline and follow-up surveys, to assess impact in project areas as well as control areas. Results from the Impact M&E will feed directly into the ongoing project supervision, to identify strengths which should be capitalized on as well as weaknesses to be addressed before they become serious impediments to reaching project objectives.

As mentioned above, MEMD monitoring and verification of carbon emission reductions will also be supported.

Credit Support Facility

Financial institutions have indicated a willingness to consider support for the private sector

investments included in the project. At the same time, however, they expressed concerns in lending into rural areas. Also, lending terms of local banks, which are typically less than 24 months, do not match the requirements for infrastructure investments, which typically require loan terms of 5-10 years. There may therefore be a need for a Credit Support Facility which help local banks to bridge these gaps. A Credit Support Facility could provide for liquidity extension, partial risk guarantees, or other appropriate provisions. The cost estimate includes provision for a Credit Support Facility, but the need for such a facility, and its detailed design must be developed during project preparation.

Table 2: ERT Capacity Building and Technical Assistance Activities by Implementing Agency

Implementing Agency	Related Project-Financed Capacity Building
Swaziland Electricity Board	<ul style="list-style-type: none"> • RE Unit Capacity Building (including future PREPS) • Introducing Best Practices in RE Operation and Maintenance • Facilitation of local supplier business opportunities in RE • Local RE Contractor & Electrician Training and Capacity Building
Enterprise Trust Fund	<ul style="list-style-type: none"> • Enterprise Growth and Empowerment • Off-grid service supplier business development services, including Solar PV Development support to private sector SMEs • Solar water heating market development support • Energy/ICT-related enterprise growth and empowerment
MNRE	<ul style="list-style-type: none"> • Information and outreach on new energy policy and restructured sector • Renewable energy information and dissemination system and upstream project development • Renewable Energy Policy and Program Development • Institutional solar water heating demonstration program
Energy Regulatory Authority	<ul style="list-style-type: none"> • Startup and initial implementation support to Regulator • Preparation of regulations and operating rules(including for renewable energy)
Telecom Regulatory Authority	<ul style="list-style-type: none"> • Startup and initial implementation support to Regulator • Preparation of regulations and operating rules
MTEC	<ul style="list-style-type: none"> • SPTC Corporatization support • Assessment and development of high impact information content for dissemination through ICT
Rural Access Board and Agency	<ul style="list-style-type: none"> • Startup and initial implementation support to Board, and to newly created Rural Access Agency • Development of operating policies and procedures • Development and implementation of a Monitoring and

	Evaluation Program
MEPD	• Credit Support Facility creation and start-up
Cross-Sectoral Ministries	• Cross-sectoral implementation support

- Notes: a) Ministry of Economic Planning and Development (MEPD) will provide overall project coordination, and may require some capacity building, technical assistance support for this.
b) MNRE – Ministry of Natural Resources and Energy
c) MTEC - Ministry of Tourism, Environment, and Communications

Project Cost and Financing Plan

1. A preliminary cost estimate and financing plan is given in Table 3. The plan provides for a total project cost of about \$118 million, including \$18.6 million IBRD loan, \$8 million Prototype Carbon Fund (PCF) “carbon emission reduction” purchase, and \$3.1 million Global Environment Facility (GEF) grant. Rural electrification investments are estimated to cost a total of \$17 million, of which \$10 million would be on-granted by Government to SEB from the IBRD loan – representing the subsidy portion of the investment - and \$7 million would be raised by SEB debt. There may be a need to consider including this additional \$7 million in the IBRD loan should the Government so request. The proposed flow of funds from the Bank (IBRD, PCF, and GEF) is depicted in Figure 1.

Table 3 Project Cost Estimate and Financing Plan

Component/Activity	Private	Govt.	IBRD	PCF	GEF	Donors	Total
1. Grid Based Electricity Access Expansion	7.0 ¹		11.4 ²				18.4
2. Renewable Energy							
a. Main Grid Renewable Energy	70.8			8.0 ³			78.8
b. Off-Grid Renewable Energy	2.3				1.2	1.6	5.1
3. Telecom	0.5		2.0				2.5
4. Capacity Building & TA		2.7	3.6		1.9	2.0	10.2
Credit Support Facility			3.0				3.0
Total	80.6	2.7	20.0	8.0	3.1	3.6	118.0

¹ Commercial debt required for SEB. Should Government decide to borrow this amount from IBRD, it would be on-lent to SEB.

² Borrowed by Government and on-granted to the RATEF. RATEF will provide as a capital grant to SEB, SPTC, MTN, and other qualified sponsors of priority rural electrification and ICT projects to buy down the non-commercial portion of service extension. Includes connections and/or wiring costs of approximately 420 schools and clinics that have access but no connection and/or wiring.

³ Provided directly by PCF to sponsors of projects that successfully conclude an emissions reduction purchase agreement (ERPA) with the PCF.

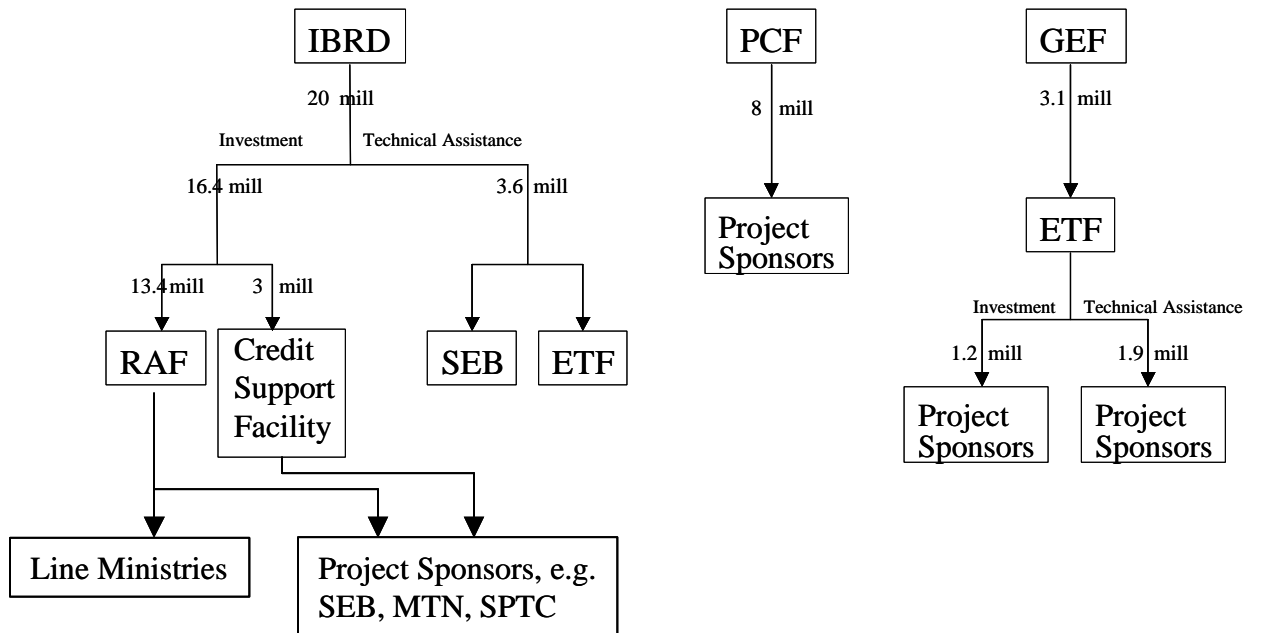


Figure 1: Proposed Flow of World Bank Funds and Estimated Funding Amounts

IBRD – International Bank for Reconstruction and Development (i.e. World Bank)
 PCF – Prototype Carbon Fund/or syndications
 GEF – Global Environment Facility
 RATF – Rural Access Trust Fund
 SEB – Swaziland Electricity Board
 ETF – Enterprise Trust Fund
 MTN – Private Sector Cellular Phone Service Operator

Component	Indicative Costs (US\$M)	% of Total	Bank financing (US\$M)	% of Bank financing	GEF financing (US\$M)	% of GEF financing
Investments		0.0	0.00	0.0	0.00	0.0
Grid-Based Electricity Access Expansion	18.40	15.6	11.40	57.0	0.00	0.0
Main Grid Renewables	78.80	66.8	0.00	0.0	0.00	0.0
Off-Grid Renewables	5.10	4.3	0.00	0.0	1.20	38.7
Telecom	2.50	2.1	2.00	10.0	0.00	0.0

Capacity Building & TA	10.20	8.6	3.60	18.0	1.90	61.3
Credit Support Facility	3.00	2.5	3.00	15.0	0.00	0.0
Total Project Costs	118.00	100.0	20.00	100.0	3.10	100.0
Front-end fee	0.00	0.0	0.00	0.0	0.00	0.0
Total Financing Required	118.00	100.0	20.00	100.0	3.10	100.0

2. Key policy and institutional reforms to be sought:

As described in Section B.2 above, Government is currently preparing legislation for reform of both the power and telecom sectors. The ERT project is predicated on the finalization of the related policy documents (Energy Sector Policy and Telecom Policy - both completed) as well as the enactment of the related legislation. The Government has agreed to enact the enabling legislation by no later than June 2004, and has agreed that establishment of Regulators as well as the Rural Access Fund are necessary conditions of appraisal.

3. Benefits and target population:

The benefits of the project are:

- For *rural households*, there will be direct and indirect benefits of increased access to electricity and ICT services, both of which will improve the quality of lives. Direct benefits will accrue to households which are directly connected in the form of improved quality and convenience of service, enhanced opportunities for cottage industry, increased ability of student's to study, etc. The indirect benefits will arise from the improved service provided by rural public institutions - health, education and water as well as the HIV/AIDs outreach centers - resulting from their increased access to electricity and ICT services.
- For *rural enterprises*, the benefits of increased productivity and income arising from electricity and ICT access -- with technical assistance provided to accelerate switch over to electricity and uptake of ICT service. In particular, the improved access to telephones and Internet is expected to: (i) increase the ability of rural enterprises to select between and coordinate with upstream suppliers thereby reducing the costs of doing business, and (ii) improve the linkages with downstream markets, helping entrepreneurs to identify suitable markets and to obtain the best prices for their produce.
- Reductions in greenhouse gases, which has global environmental benefits.

4. Institutional and implementation arrangements:

As indicated in Figure 1, several actors will be involved in project implementation. A brief description of implementation roles is given below. The project is designed so that stakeholders take on roles which are consistent with their current responsibilities. In this sense, the project seeks to the maximum extent feasible, to embed the implementation arrangements within existing institutions and structures. However, there will be a need for overall project coordination, especially in the early stages. The Rural Access Agency, described below, will fill the role of project coordinator, with sectoral oversight from the relevant line ministries - MNRE and MTEC.

Rural Access Board/Agency/Trust Fund – As described in Section C.1 above, the Rural Access Trust Fund (RATF) will be the primary vehicle for disbursing grant support for rural infrastructure investments. Within the ERT Project, the RATF will provide grant support for both grid electrification and telecom investments. The RATF will be overseen by a Rural Access Board, which will bear fiduciary responsibility for fund usage. The Board will be served by a Rural Access Agency, which will undertake day-to-day operation of the RATF. Disbursements will be made through a Trust Agent, which will most likely be a local bank selected competitively.

Experience in other countries with similar multi-sectoral funding agencies points to the need to ensure that sector-specific funding allocations are provided, and that intermingling of sectoral allocations be avoided. Conflicts in fund management will be largely abated from the clear funding streams of the two initial sectors: power & telecom. The legal agreements for IBRD funds will be clearly define the funding available for each sector, local funding will derive from separate levies on the current sector customers.

Baseline funding for the RATF will be maintained through provision of a levy on the current electricity and telecom customers. These funds will be sufficient to maintain the institution and undertake a limited number of investments annually. However, additional funds, from Government budgetary allocations as well as donors, will be required to maintain the level of investment established through the ERT project. Bilateral and multilateral donors have expressed an interest in participating in the RATF, but seek to assess the initial performance of the fund before making firm commitments. Actively seeking additional funding will be an important function of the Rural Access Agency.

For the most part, the partners and agents in the project will have distinct roles and responsibilities and undertake activities independently. However, many activities are complementary and, in some cases, interdependent. Therefore, cooperation and collaboration among the project partners and agents will be necessary for effective implementation. Ensuring adequate coordination will be the responsibility of the Rural Access Agency. In this regard, the RAA will assume the following roles:

- (i) Manage the consolidated progress monitoring and reporting of ERT activities by the partners and agents. This will include:
 - a. convene progress review meetings of the implementing partners and agents
 - b. receive and review quarterly reports from the partners and agents with a view to ensuring completeness and compliance with agreed reporting arrangements;
 - c. prepare consolidated ERT financial quarterly and annual reports;
 - d. prepare consolidated ERT quarterly and annual progress reports as well as other reports for the Government of Swaziland on ERT (for the Minister of Natural Resources and Energy, Parliament and any other organs of Government as shall be required).
- (ii) Develop and pro-actively provide information and support to ERT's implementation partners and agents, as well as other potential collaboration partners to capture specific

opportunities for collaboration. This will include entities involved with GEF or other climate change/carbon abatement activities, rural employment and economic development, relevant cross-sectoral initiatives, rural electrification, and rural telecommunications.

(iii) Generate, compile and feedback to the implementation partners and agents information on ERT progress and achievements. This information will be in a form that will enable all the participants to see the overall implementation of ERT. This would be separate from the consolidated reports that are necessary for more formal reporting.

(iv) Identify implementation issues and bottlenecks and, in consultation with the partners and agents, develop viable solutions. This will include, when necessary, follow-up discussions with key leaders of the partners and agents to agree measures to improve implementation coordination and performance.

(v) Provide guidance to the partners and agents on the preparation of work plans, procurement plans and such other planning tools as shall be required in ERT implementation. This includes advice on World Bank guidelines on financial management and procurement and on the reporting requirements as agreed with the World Bank.

(vi) Coordinate the activities of the partners and agents for the mid-term and full-term reviews of ERT. This includes agreeing schedules and formats for the submission of necessary reports and other inputs by the partners and agents.

(vii) Liaise with other organizations and projects to ensure adequate information flow between ERT and those entities.

(viii) Participate in public information activities to assist in communicating ERT approach, objectives and activities.

(ix) Carry out such other activities as are necessary for the good of the project in consultation with the Ministry of Natural Resources and Energy and Mineral Development, and the World Bank. This will include liaison with the World Bank's operational ERT staff and consultants to facilitate implementation.

Ministry of Natural Resources and Energy (MNRE) - MNRE will continue its monitoring and oversight role for the power sector, and in this capacity it will continue to be the Government's developer and custodian of sectoral policy. It will be assisted in its monitoring activities through the rural electrification information provided by the Rural Access Agency. MNRE also will take primary responsibility under the project for development and dissemination of the renewable energy information that is a prerequisite for private sector development of these resources. In addition, MNRE will take a lead role in the initial market demonstration activities for solar water heating, as well as the investigation and program development of other promising renewable energy sources such as mini-hydro and biomass. On this latter work, MNRE will closely

collaborate with the Renewable Energy Association of Swaziland.

Ministry of Tourism, Environment, and Communications (MTEC) - In the same way as MNRE for the power sector, MTEC will continue its monitoring and oversight and policy development role for the telecommunications sector, with inputs as needed from the Rural Access Agency.

Ministry of Education and Health - The line ministries will be responsible for the implementation of cross-sectoral aspects of the project. This will mean participating in the rural electrification committee and providing information regarding priority areas to be targeted by the PREPS. Additional activities include development of energy and ICT guidelines within their respective ministries as well as ensuring that the appropriate funds are available for the recurrent cost expenses.

Energy & Telecom Regulatory Authorities - These Authorities will execute their duties as envisioned under the relevant enabling legislation. The ERT Project will provide assistance for initial start-up support and capacity building.

Credit Support Facility – The need for a Credit Support Facility appears likely at this point, but must be confirmed during project preparation. This facility would serve to facilitate access by project sponsors to commercial credit through such means as liquidity extension support and possibly a partial risk guarantee. The operator for the facility would most likely be a private entity contracted by the Government and selected competitively.

Swaziland Electricity Board – As the primary electrification agency in Swaziland, SEB will be the implementing agent for most of the Priority Rural Electrification Projects supported under ERT. In addition, SEB will undertake capacity building activities for its staff and suppliers in the areas described in Table 2 above.

Enterprise Trust Fund – The Enterprise Trust Fund (ETF) will focus on the solar PV and SME support aspects of the project, as well as grant disbursement and supervision for off-grid renewable energy investments. Development of the solar photovoltaic market is a separate and distinct activity from development of grid extension. Successful solar PV distribution involves a network of rural sales & service agents, selling to groups and individuals on a commercially oriented basis. This contrasts with the more centrally organized approach to grid-based electrification. Given its current experience in working with local entrepreneurs, the ETF is viewed as the best entity to implement this component. In this role, it will administer an output-based grant scheme for solar installations as well as the TA associated with this component. ETF also has considerable expertise and track record in SME development, and will be tasked with applying those same development skills to assist businesses on both the equipment and service supply side of the energy business, as well as the demand side, where businesses may need assistance in utilizing the newly available energy to its best advantage. With regard to off-grid investments, ETF also will undertake the disbursement and supervision of the GEF grant in close collaboration with the RAA.

SPTC and MTN - Both of these entities will be involved in implementation of the rural ICT access expansion. They will operate on a commercially-oriented basis, after taking account of the buy-down of the non-commercial portion of the investment from the RATF.

Project Sponsors – Electrification and telecom investments will be undertaken by a variety of entities, who will have the responsibility for investment, construction, operation, and maintenance of the systems under relevant regulatory control. In the area of electrification, these will include SEB (mentioned above) for the bulk of the grid extension and possibly other private entities for selected grid extension or mini-grid investments. For solar PV, existing Swazi businesses will be the primary implementers, with the possibility of additional firms, both local and international (especially South African) entering the business as the program becomes established. Telecom investments are expected to be undertaken by SPTC, MTN, and perhaps other operators.

D. Project Rationale

1. Project alternatives considered and reasons for rejection:

Several alternatives were considered for project design as described below:

SIL vs. APL - The project scale and scope considerably exceed the parameters for a LIL, but are potentially applicable for either a SIL or an APL. The SIL instrument was selected over the APL since this is the Bank's first engagement in the Swazi energy sector, and the Task Team did not feel there was a sufficient track record available to adequately design a longer-term APL program. Moreover, the project seeks to make a significant contribution to expanding access. It is expected that the Swazi rural development terrain will be considerably improved at the conclusion of the project. There is not sufficient clarity at this time as to the contours of that terrain to develop a programmatic lending approach.

GEF subsidy funding for TA, solar, and mini-scale renewables, PCF for larger grid connected renewables vs. single source for renewable energy support - The project is designed to utilize two sources of funds for renewable energy activities - the Global Environment Facility (GEF) and the Prototype Carbon Fund (PCF). GEF support is proposed for market barrier removal activities, which are consistent with the GEF mandate. These include capacity building, and initial market development of smaller-scale renewable energy systems such as solar PV and solar water heating. PCF finance of carbon trading transactions is the preferred vehicle for the longer-term support needed to ensure sustainability of the larger grid connected renewable energy transactions supported by the project.

Combined Rural Electrification Fund and Rural Telecom Fund vs. separate funds - While Government had originally envisioned separate subsidy funds to support rural access of electricity and telecom, it was agreed that there are important synergies and scale economies to be gained in combining the two. Given the small size of the country, the correspondingly small size of each sector, and the limited expertise available to staff these subsidy mechanisms, it is clear that combining the two functions will result in reduced administrative and transaction costs and greater

consistency in Government policy across infrastructure sectors. There are also synergies to be gained in light of the similarities in the subsidy provision and oversight mechanism in the two sectors.

Proactive support for SMMEs and public service facilities as agents for rural development and anchor customers for rural electricity network vs. access expansion alone - The proposed project design incorporates a strong emphasis on linking provision of electricity and telecom infrastructure with enterprise development and enhanced public service provision. This is in sharp contrast to the more conventional "build it and they will come" approach of focusing predominantly on the supply networks, and allowing the development impact to arise through other actors. The proactive support approach was selected based on the poor track record of the conventional approach as it has been practiced in Swaziland and elsewhere in the world.

2. Major related projects financed by the Bank and/or other development agencies (completed, ongoing and planned).

Sector Issue	Project	Latest Supervision (PSR) Ratings (Bank-financed projects only)	
		Implementation Progress (IP)	Development Objective (DO)
Bank-financed - Grid-based Rural electrification, - Rural Access Subsidy Funding, - Renewable Energy Development, - Incorporation of Rural Access in Sector Restructuring, - Cross-sectoral energy applications Grid-based Rural Electrification Under Preparation	Uganda Energy for Rural Transformation (P069996)	S	S
	Sri Lanka: Renewable Energy for Rural Economic Development	S	S
	Sri Lanka: Energy Services Delivery (P039965)	HS	HS
	Bangladesh: Rural Electrification and Renewable Energy Development (P071794)	S	S
	Ethiopia: Energy II South Africa Renewable Energy Market Transformation Tanzania: Energizing Rural Transformation Bolivia:	S	S
Other development agencies USAID Development of Telecom policy and assistance in developing legislation	Technical Assistance Program		

IP/DO Ratings: HS (Highly Satisfactory), S (Satisfactory), U (Unsatisfactory), HU (Highly Unsatisfactory)

3. Lessons learned and reflected in proposed project design:

Grid-based rural electrification

Overall, the "first generation" of rural electrification programs in the 1970s and 1980s did not lead to the expected development impact. Further, these programs usually proved to be very expensive, which had a crippling effect on many of the State-owned utilities that undertook them. Thus, the subsidies given for rural electrification not only did not result in any significant benefits to the intended beneficiaries but also often impeded the normal functioning of the power utilities, thereby effectively blocking expansion of access to the excluded population.

An OED review - *Rural Electrification: A Hard Look at Costs and Benefits*, OED Precis No. 90, May 1995 - of Asian RE programs noted that most of them had higher costs and yielded fewer benefits than expected. Among the review's recommendations were:

- “project appraisal needs to focus more attention on identifying the economic limits of extensions to the grid and on the economic potential of alternative energy sources, particularly solar energy.”

The project design fully incorporates this approach to cost reduction, in addition to the introduction of lower-cost technologies and processes. In particular, due diligence on the PREPs will include a complete review of the investments, including financial, technical, administrative, etc.

- “RE reduces rural poverty only through a general rise in income obtained by productive uses.”

Consistent with this, and based on the experience of the Rural Business Services program of the Indonesia Second Rural Electrification Project, this project will assist suitable SMMEs in enhancing productivity and incomes by switching over to electricity and identifying business applications of telephone and internet.

- “a rational system of cost recovery is a key policy ingredient of any RE project.”

This project calls for a system of transparent and explicit subsidies along with an emphasis on cost recovery *via* commercially-oriented rural electrification.

More recent reviews and reports of selected country experiences with rural electrification – Ghana, Uganda, Thailand, Costa Rica, Indonesia, Chile, Mexico, Cote d’ Ivoire, South Africa, the Philippines, and Bangladesh – provides a broader, more diverse base for understanding what makes RE programs successful. While the various countries used a variety of institutional models and approaches, and there are no fixed blueprints to follow, there are some common guiding principles:

- Decentralization of decision-making, with demand-driven selection criteria for service expansion rather than top-down “RE Master Plans”

- RE should be set up on a commercially viable basis. While some subsidies are generally required, recurrent cost subsidies undermine sustainability and should be avoided.
- Viable rural electrification businesses can be developed by locally based entrepreneurs
- Development impact can be increased by subsidizing access, (i.e., low connection charges) instead of consumption, cost-recovery based tariffs, and working with rural enterprises to enhance their productivity.
- Reduce costs by promoting low-cost equipment and technical specifications.

Solar PV

A recent review *World Bank Solar Home Systems Projects: Experiences and Lessons Learned 1993-2000* - of the Bank's experience with solar home systems projects derives some lessons from the early implementation experience.

- The initial pace of implementation is likely to be slow, as it takes time to develop and fine tune effective business models (operations, servicing and financing) for operating a solar PV business in rural areas. Some of the ways to accelerate implementation are to: (i) provide flexibility in project design in terms of delivery mechanisms/model and technical specifications about size and nature of systems supported, (ii) focus initially on cash sales, as credit collection can be costly and risky, (iii) introduce systems of various sizes, so that consumers have a choice of models, (iv) and provide business development assistance to solar PV dealers.
- Adequate after-sales service, including consumer education in proper maintenance and operating procedures, is important for consumer satisfaction, minimizing maintenance costs and enhancing overall system reliability.
- A sales and service network extending beyond the urban centers and closer to the rural customers is key to effective consumer service, but rural service centers require sufficient business to remain viable.
- While marketing campaigns are important, in order to enlarge the market, consumer awareness must be combined with other factors such as affordability, demonstrations, opinions of neighbors, and service presence. The nature of marketing campaigns should be carefully tailored to the local conditions, but, in any case, should be sure to include potential consumers, and not just local leaders or business developers.
- Consumer credit is key to expanding the market beyond cash sales.

ICT sector

Following the recent joint OED/OEG review of the Bank Group's experience with ICT, the Bank's new Sector Strategy Paper has identified universal access as a major new strategic

direction and has broadened the concept of access to include the Internet. The ERT project fully embraces this view.

Increasingly, Bank projects offer support for the creation of rural telecommunications funds. Initially, this support was confined to technical assistance (Peru, Guatemala and Mauritania), it has now expanded (Nicaragua, Nepal, Bolivia) to provide seed-finance for the subsidized component of rural investments, while a new project in Guatemala involves the creation of a network of telecenters in rural areas targeted at small businesses. The Uganda, Energy for Rural Transformation Project is among the first Bank-supported projects providing substantial capitalization of a rural telecom access fund. The proposed ERT project will utilize this approach through the multi-sectoral Rural Access Trust Fund.

The promotion of auctions for minimum subsidy concessions in these operations draws on the approach successfully pioneered by Chile in 1994, and subsequently been adopted or being considered by about twenty countries around the world.

4. Indications of borrower and recipient commitment and ownership:

The Government has been consistent in its commitment to the project, and has promptly provided responses to the Bank in this regard. Most recently, in June 2003, the P.S. Finance provided a letter to the Bank strongly endorsing the project and expressing an interest in Bank and GEF support. The letter pointed out the strong link between access to power and telecom infrastructure and rural development. It clearly states the high priority that Government attaches to such development.

The PS Finance commitment to the project is entirely consistent with the views expressed by all the entities so far involved in project discussions. These include the Ministries of: Finance, Budget, and Economic Affairs; Economic Planning and Development; Tourism, Environment, and Communications; and Natural Resources and Energy. Each of these ministries, along with ministries in charge of Health, Education, and Water as well as the SEB are participating on the ERT Coordination Committee which is spearheading project preparation. In addition, the Swaziland Electricity Board has also demonstrated support by initiating the preparation of the first Priority Rural Electrification Projects to be financed by the project. The GEF focal point has confirmed his support of the project and an intention to prepare a suitable endorsement letter in due time.

Additional supportive stakeholders, some of which are currently involved in project preparation, include the Enterprise Trust Fund, local banks, manufacturing firms – especially in the sugar and pulp & paper industries, and local entrepreneurs currently marketing solar PV.

5. Value added of Bank and Global support in this project:

The Government sees the Bank operation as helping address the following key constraints to making a transformational change in the lives of its rural and peri-urban area citizens:

- a sense that despite substantial support from several donors over the years, the results are not very visible on the ground and do not match the expectations in results and time, and that the proposed Bank operation could provide a more comprehensive development framework for all interested donors to work together to make a difference on the ground and in a timely manner.

- recognition of the benefit of Bank policy advice and its ability to bring to bear knowledge of best practices that is urgently needed to finalize and implement the requisite policy, institutional and financing framework in place for leveraging private investment through public-private partnerships that are key for achieving the desired development objectives;
- limited finance from its own resources and donors, that the Government can make available for investment for rural electrification for income generation and meeting essential community needs, has effectively constrained these programs and constrained them to delivery at an unacceptable pace; and the recognition that the Bank is uniquely positioned to facilitate significant amounts of carbon finance (GEF and PCF) for Swaziland to help deliver on the desired developmental goals;

E. Issues Requiring Special Attention

1. Economic

Summarize issues below To be defined None

Economic evaluation methodology:

- Cost benefit
- Cost effectiveness
- Incremental Cost
- Other (specify)

A cost benefit analysis will be conducted during project preparation

2. Financial

Summarize issues below To be defined None

A financial assessment of SEB will be undertaken as part of project preparation. Special attention will be paid to ensure that project investments undertaken by SEB will have a positive, or at worst neutral impact on SEB's overall financial condition.

3. Technical

Summarize issues below To be defined None

While the project will introduce "low cost technology" to Swaziland, this will be in the form of transfer of commercially proven, conventional practices and technologies which are used elsewhere, but not currently in use in Swaziland. South Africa is a rich source of such low cost technology and practice.

4. Institutional

Project preparation will include a focus on establishing workable institutional approaches which put stakeholders in their natural roles. Thus the ministries overseeing Energy and Communications will continue in their oversight and policy making roles. SEB, SETC, and MTN will be the main implementers of access expansion investments, with inputs from "customer" sectors such as health and education. Grid connected renewable energy investments will be undertaken by the related corporate entity. Enterprise development will be supported by the Enterprise Trust Fund, which is guided by the Ministry of Enterprise Development. Financial institutions will provide debt financing, and the newly created Rural Access Trust Fund will channel the subsidy support. Regulation of the sectors will be under the newly created Regulatory Authorities.

4.1 Executing agencies:

In terms of access expansion investments, the primary executing agencies will be SEB, SPTC, and MTN. Each of these has ongoing experience in project implementation. While each will require assessment during preparation, and some capacity building requirements may be identified, these are generally capable institutions with satisfactory track records. The same is true of the corporations which will undertake the grid connected renewable energy investments.

The project will support the operationalization of three new entities: the Rural Access Trust Fund, the Energy Sector Regulatory Authority, and the Telecom Sector Regulatory Authority. In addition, the need to create a Credit Support Facility will be determined during project preparation. The details of these entities, and the plans and schedule for their operationalization will require attention during preparation.

4.2 Project management:

4.3 Procurement issues:

A procurement assessment of agencies undertaking procurement will be completed during project preparation.

4.4 Financial management issues:

A financial assessment of implementing agencies operating project accounts will be undertaken during project preparation.

5. Environmental

5.1 Summarize significant environmental issues and objectives and identify key stakeholders. If the issues are still to be determined, describe current or planned efforts to do so.

In general, there are no major negative environmental issues expected. However, the project can be

expected to contribute to environmental *improvement* in several ways:

- Use of renewable energy (primarily cogeneration, and solar water heating, but also possibly including small & mini-hydro and wind) will displace generation which otherwise would have been fossil-fuel based. This would result in local and global environmental benefits from reduction of atmospheric emissions of SO_x, NO_x, particulates, and carbon.

- Improved and extended cogeneration of industrial waste products such as bagasse from sugar mills, wood waste from saw mills, or black liqueur from paper mills will provide for controlled and more efficient combustion and disposal of these materials

However, there are some *concerns*:

- Construction and operation of the renewable energy generation plants, as well as electricity and telecom distribution systems, will have some potential for adverse environmental impacts on the biophysical environment, including habitat disturbance, vegetation change, biodiversity loss, soil degradation/erosion/siltation, and air and water pollution.
- Management, recycling, disposal, and of batteries for PV systems requires attention, particularly when the industry growth accelerates over time. Regional recycling, education and buy-back plans are the options that will be investigated to mitigate this concern.

5.2 Environmental category and justification/rationale for category rating: **B - Partial Assessment**

None of the subproject investments are anticipated to result in significant, cumulative and/or irreversible impacts in one or more safeguard areas. However, there are expected to be some level of impact. Therefore, the project is rated environmental category B. Since not all of the transactions to be supported by the project are known in advance an Environmental and Social Management Framework (ESMF) will be developed prior to project appraisal. A review of the existing Swazi Environmental and Social Safeguard regulations and procedures is currently underway. Initial indications are that these are broadly consistent with Bank Safeguard Policies. However an analysis to identify possible gaps between the Bank's requirements and the existing framework is included in the current review. Based on this review, a document describing the ESMF will be submitted for ASPEN clearance. The Framework will describe existing procedures as well as supplementary requirements as determined from the gap analysis, and a separate resettlement policy framework will be included as a separate document if further assessment of subprojects shows that it is necessary or advisable to have one. . This will include requirements for ASPEN review of selected subprojects - especially the larger-scale renewable energy subprojects.

5.3 For Category A and B projects, timeline and status of EA

EA start-up date:

Date of first EA draft:

Expected date of final draft: October 31, 2003

5.4 Determine whether an environmental management plan (EMP) will be required and its overall scope, relationship to the legal documents, and implementation responsibilities. For Category B projects for IDA funding, determine whether a separate EA report is required. What institutional arrangements are proposed for developing and handling the EMP?

ESMF to be developed. See 5.2 above

5.5 How will stakeholders be consulted at the stage of (a) environmental screening and (b) draft EA report on the environmental impacts and proposed EMP?

With regard to individual subprojects, the environmental assessment and stakeholder consultation

will be undertaken in accordance with the ESMF, and the project will be screened, categorized, and evaluated. Public consultation will be done on an ongoing basis, including consultation during project conceptual design, preparation - especially during the social impact assessment, and implementation. If deemed necessary by the Swaziland Environment Authority, public hearings on subprojects may also be organized.

5.6 Are mechanisms being considered to monitor and measure the impact of the project on the environment? Will the indicators reflect the objectives and results of the EMP section of the EA? To be determined, based on specific provisions of the ESMF.

6. Social

6.1 Summarize key social issues arising out of project objectives, and the project's planned social development outcomes. If the issues are still to be determined, describe current or planned efforts to do so. The project will support infrastructure investments aimed at expanding rural access, and intended to catalyze rural development. The project is expected to produce both direct and indirect benefits on rural communities as described in Section C.3 above. In addition, the project will support commercial provision of solar PV and ICT services in rural areas, increasing access to energy and telecommunications to the entire rural population. A study in Bangladesh of the impact of rural electrification found a disproportionately high *positive* impact for poorer households. This was attributed to the fact that wealthier households who wanted increased access had the means to acquire it, and therefore derived less of an incremental benefit from the increased access. Poorer households, however, were only able to benefit once the access was provided through the program. An important benefit to poorer households was access for the first time, to television. TV programming in Bangladesh includes a significant amount of educational material. While it is unwise to extrapolate these results too closely to the Swazi context, it is reasonable to assume that a similar trend would come to light through the proposed program.

6.2 Participatory Approach: How will key stakeholders participate in the project? Stakeholder consultation in each subproject will be governed by the provisions of the ESMF.

6.3 How does the project involve consultations or collaboration with NGOs or other civil society organizations? This will take place as part of the ESMF.

6.4 What institutional arrangements are planned to ensure the project achieves its social development outcomes? Several institutional arrangements will contribute to maximizing the social benefits of the project. These include the representation of the social service ministries -health, education, etc. - on the ERT Steering Committee, to ensure that rural schools and health clinics receive service. The efforts of the Enterprise Trust Fund, which will support SMME development through access to electricity and telecom services, will also contribute to social benefits. In addition, the development of specific educational programming targeted at the rural population will contribute to the social benefits of the project.

6.5 What mechanisms are proposed to monitor and measure project performance in terms of social development outcomes? If unknown at this stage, please indicate TBD.
TBD

7. Safeguard Policies

7.1 Do any of the following safeguard policies apply to the project?

Policy	Applicability
Environmental Assessment (OP 4.01, BP 4.01, GP 4.01)	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> TBD
Natural Habitats (OP 4.04, BP 4.04, GP 4.04)	<input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> TBD
Forestry (OP 4.36, GP 4.36)	<input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> TBD
Pest Management (OP 4.09)	<input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> TBD
Cultural Property (OPN 11.03)	<input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> TBD
Indigenous Peoples (OD 4.20)	<input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> TBD
Involuntary Resettlement (OP/BP 4.12)	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> TBD
Safety of Dams (OP 4.37, BP 4.37)	<input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> TBD
Projects in International Waters (OP 7.50, BP 7.50, GP 7.50)	<input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> TBD
Projects in Disputed Areas (OP 7.60, BP 7.60, GP 7.60)*	<input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> TBD

7.2 Project Compliance

(a) Describe provisions made by the project to ensure compliance with safeguard policies which are applicable.

(b) If application is still to be determined, describe current or planned efforts to make a determination. ESMF to be prepared.

8. Business Policies

8.1 Check applicable items:

- _ Financing of recurrent costs (**OMS 10.02**)
- _ Cost sharing above country 3-yr average (**OP 6.30, BP 6.30, GP 6.30**)
- _ Retroactive financing above normal limit (**OP 12.10, BP 12.10, GP 12.10**)
- _ Financial management (**OP 10.02, BP 10.02**)
- _ Involvement of NGOs (**GP 14.70**)

8.2 For business policies checked above, describe issue(s) involved.

F. Sustainability and Risks

1. Sustainability:

The project-supported investments have high prospects for sustainability due to the confluence of several factors. During subproject preparation, all investments will be subject to rigorous reviews from: i) the project sponsor, who will include a substantial amount of equity and also incur debt; ii) lenders for the subproject; who will complete their own due diligence prior to accepting the commercial risk; iii) for the larger project sponsors (e.g. SEB) and the larger subprojects (e.g. bagasse cogeneration), the Bank supervision team will also conduct a review; iv) for carbon trading projects, the carbon purchaser (i.e. PCF) will conduct a due diligence review; and v) for projects seeking support from the RATF, the Rural Access Agency also will ensure that sufficient due diligence is completed prior to approving and disbursing the subsidy. During subproject implementation, there will be commercial pressures and incentives, within the restructured power and telecom sectors, which should serve to keep the subprojects on-track. In addition, normal supervision activities by the Rural Access Agency, commercial lender(s), and by the World Bank project supervision team will seek to identify and resolve subproject-specific and sector-wide issues before they seriously threaten subproject sustainability.

Sustainability of the restructured sector frameworks and new institutions such as the Rural Access Trust Fund will depend in large measure on the level of independence they are given in pursuing their mandate, as well as the quality of the staff. The quality of consultant assistance provided to these new institutions, especially in the early phases of their development, will also have a strong impact on their sustainability. These factors: independence, staff quality, consultant quality, are an important focus of project preparation activities, and have been adequately incorporated into the draft bill and advance planning for the Fund. In particular, Government already has agreed to a trust fund arrangement for the RATF, which is specifically intended to bolster independence, and to this end has prepared draft legislation to be considered by Parliament during the project preparation period. An important element of this legislation is the provision for a rural access levy on current electricity customers which will provide a sustainable funding source for the Rural Electrification window of the RATF to complement the donor funds from IBRD and elsewhere. This approach, which is already in place with regard to the Telecommunications Universal Access Fund, demonstrates Government commitment to a long-term rural electricity subsidy program. It is envisioned that these funds will be used to substitute for GEF subsidy resources over the course of the project, thus providing for a phase-out of GEF support while maintaining the subsidy assistance needed to promote access. It is envisioned that donor support for the fund will continue to be sought to enhance the baseline funds provided through the levy. With regard to staffing, by combining several sectors in a single institution, the RATF will be better positioned to recruit highly qualified local staff than would have been the case if it had to compete with single-sector subsidy entities. Also, southern Africa has a wealth of high quality consultants to draw from, in addition to a broader pool of international consultants with whom the work will be advertised.

1a. Replicability:

This project replicates several key aspects of other ongoing or pending projects as given in

Section D.2 above. These include the use of "smart subsidies" to promote commercially oriented rural access expansion, explicit links to SMME development and "cross-sectoral" applications, bundling power with telecom to enhance the development impact of each, and incorporating renewable energy investments. A unique aspect of this project is the application in a small country. Thus the project design does not emphasize a high degree of competition in the power sector, but instead emphasizes commercial operation in a regulated environment to promote efficiency. Also, the small size of Swaziland facilitates the use of a multi-sector rural access trust fund. These latter aspects will be useful precedents for replication in appropriate circumstances.

2. Critical Risks (reflecting the failure of critical assumptions found in the fourth column of Annex 1):

Risk	Risk Rating	Risk Mitigation Measure
From Outputs to Objective		
Increased access to electricity and telecom does not catalyze development	M	SMME business development assistance included in project
Improvements in infrastructure do not facilitate improvements in health, education, and water supply service	M	Cross-sectoral support provided to health, education, and water for design, implementation, monitoring, and evaluation. ICT content development is also included in project.
Outside factors, in particular HIV/AIDS, seriously erode project impacts	M	Project will support HIV/AIDS program
From Components to Outputs		
Sufficient implementation capacity and resources not available	N	Implementation capacity and resources can be drawn from Swaziland and its neighbors. Project supports building of local capacity.
Regulatory and rural access funding frameworks do not function satisfactorily	M	Careful attention to institutional design during project preparation. Technical assistance and capacity building to these institutions provided during project.
Local financial institutions unwilling to participate	M	Transparent sector structure and stable benefit stream (e.g. tariff regime, power purchase arrangements) should increase lender confidence. Credit Support Facility will be included if needed to increase lender participation.
Policy & regulatory environment do not promote renewable energy	M	Energy policy explicitly encourages renewable energy; Electricity Bill provides for private generation; Prototype Carbon Fund interested in supporting investments
Budget for recurring costs of supply,	S	Commercial sector structure provides for

operation, and maintenance not sufficient for rural health and education facilities		incentives to pay for service. Government commitment for recurring costs will be sought during project preparation.
SPTC corporatization does not proceed	M	Progress on sector reform is a condition of inclusion of component
Overall Risk Rating	M	

Risk Rating - H (High Risk), S (Substantial Risk), M (Modest Risk), N (Negligible or Low Risk)

G. Project Preparation and Processing

1. Has a project preparation plan been agreed with the borrower (see Annex 2 to this form)?

Yes - date submitted: 03/07/2003 No - date expected:

2. Advice/consultation outside country department:

- Within the Bank:
 Other development agencies:
 External Review

3. Composition of Task Team (see Annex 2):

Task Team Leader - Mac Cosgrove-Davies

Team Members- Bank Staff

Arun Sanghvi
Karen Rasmussen
Tenzin Norbhu
Subhash Dhingra
Iraj Talai

Team Members - Consultants

Wolfgang Mostert
James Finucane
Trine Refsbaek
Robert Chronowski

4. Quality Assurance Arrangements (see Annex 2):

For the nature and scope of the investments and TA, the quality assurance will be provided by the peer, GEF and PCF reviews. For all other issues, such as environmental and social safeguards, procurement, disbursement, etc., the quality assurance will be provided by specialized Bank staff identified above who will approve the arrangements. In addition, the peer reviewers, Philippe Durand, Vijay Iyer are regarded within the Bank and internationally as experts in rural/renewable energy and infrastructure financing respectively.

An initial review of the draft PCD was conducted at a meeting jointly sponsored by AFTEG and the Energy/Poverty Thematic Group in April 03. The group endorsed the project, finding it well conceived and the initial design sound, and at the same time provided specific recommendations for quality enhancement. These recommendations have been incorporated in the current document.

5. Management Decisions:

Issue	Action/Decision	Responsibility

Total Preparation Budget: (US\$000) **Bank Budget:** **Trust Fund:**

Cost to Date: (US\$000)

GO **NO GO**

Further Review [Expected Date]

Malcolm Cosgrove-Davies

Team Leader

Yusupha B. Crookes

Sector Manager

Fayez S. Omar

Country Manager

Annex 1: Project Design Summary
SWAZILAND: Energizing Rural Transformation

Hierarchy of Objectives	Key Performance Indicators	Data Collection Strategy	Critical Assumptions
<p>Sector-related CAS Goal: Promote rural & peri-urban employment and quality of life improvement</p>	<p>Sector Indicators: Rural employment levels, access to social services</p>	<p>Sector/ country reports:</p>	<p>(from Goal to Bank Mission) Directly supports Millennium Development Goals</p>
<p>GEF Operational Program: Greenhouse gas emissions reduced</p>	<p>Outcome / Impact Indicators: 4,770,000 tons of atmospheric carbon avoided over lifetime of investments catalyzed by project</p>	<p>Monitoring and verification protocol for carbon transactions. Also, project quarterly reports for off-grid renewable energy.</p>	
<p>Project Development Objective: Rural income generation and quality of life improved through provision of rural & peri-urban electricity and telecom</p>	<p>Outcome / Impact Indicators: Employment/economic gain due to SME participation in project (number of new jobs)</p>	<p>Project reports: Borrower's Quarterly Report, Supervision Mission Report, Mid-Term Review</p>	<p>(from Objective to Goal) The combination of improved access to electricity & telecommunications, and business assistance TA will support increased rural income generation and improved quality of life</p>
<p>Global Environmental Objective: Barriers to renewable energy development overcome in Swaziland</p>	<p>Number of people benefiting from improved delivery of health, education, and water services. (increase to at least 95%)</p> <p>Renewable energy capacity increase from 40.5 MW to at least 80 MW</p> <p>PV based electricity access complements grid electricity to achieve coverage of at least 98% of unconnected health and secondary school facilities, and 75% of primary</p>	<p>Qualitative M&E report</p> <p>Quarterly progress report</p>	<p>Improved infrastructure will promote higher quality health, education, and water supply services</p> <p>Outside factors such as HIV/AIDS pandemic do not critically undermine project impact</p> <p>Private developers receptive to renewable energy development</p> <p>Government maintains support and creates enabling environment</p>

	schools.		
Output from each Component:	Output Indicators:	Project reports:	(from Outputs to Objective)
1. Grid Based Electricity Access Expansion	32,000 new customers	Borrower's Quarterly Report	Sufficient implementation capacity and resources can be mobilized Regulatory and rural access funding frameworks operate as designed Local financial institutions are willing to participate
2. Renewable Energy			
2a. Main Grid Renewable Energy	40 MW of renewable energy capacity additions	Borrower's Quarterly Report	Policy & regulatory environment promotes renewable energy development Carbon trading funding is sufficient to establish financial viability
2b. Off Grid Renewable Energy	2000 new off-grid customers 30 institutional solar water heating systems	Borrower's Quarterly Report	Rural customers willing and able to pay for services SME support program enhances mini-grid customer base institutional customers accept the use of solar water heating
3. Telecom (Rural telephony access)	98% of households within 3 km of public phone service	Borrower's Quarterly Report	Policy, Regulatory, and Rural Access Funding mechanisms are sufficient to promote commercial service provision
(Rural internet access)	At least 5 new rural internet points		
(Increase in high-speed internet access)	% of population with access to high-speed internet access (TBD)		
4. Capacity Building and TA	RAA & Regulatory Agency Management & staff hired and trained, detailed rules & procedures defined, initial	Borrower's Quarterly Report, Supervision Mission reports	RAA and Regulator start-up process is rapid enough to ensure maintenance of project momentum

	<p>investment cases adequately addressed</p> <p>Number of productive and social-use connections (TBD but expected to be in 500-1000 range)</p> <p>Expanded participation of local equipment suppliers in rural electrification and telecom</p> <p>At least 2 main-grid or mini-grid renewable energy projects implemented within new framework</p>		<p>SMEs and health, education, & water supply applications are able to meet connection and recurrent costs of service</p> <p>Local suppliers can increasingly reduce costs to competitive levels</p> <p>renewable energy framework responds adequately to existing barriers</p>
Credit Support Facility	Local financial institutions support at least 2 investments	Borrower's Quarterly Report, Supervision Mission reports	Features of facility address true concerns of local banks
<p>Project Components / Sub-components:</p> <p>1 Grid Based Electricity Access Expansion</p> <p>2 Renewable Energy</p> <p>2a. Main Grid Renewable Energy</p> <p>2b. Off Grid Renewable Energy</p> <p>3. Telecom</p>	<p>Inputs: (budget for each component)</p> <p>\$11.4 million (IBRD)</p> <p>\$1.2 million (GEF)</p> <p>\$2.0 million (IBRD)</p>	<p>Project reports:</p> <p>Borrower's Quarterly reports Supervision mission reports Disbursement reports Audit reports</p> <p>Borrower's Quarterly reports Supervision mission reports Disbursement reports Audit reports</p> <p>Borrower's Quarterly reports Supervision mission reports Disbursement reports Audit reports</p> <p>Borrower's Quarterly reports Supervision mission reports Disbursement reports</p>	<p>(from Components to Outputs)</p> <p>Regulatory and Rural Access Fund mechanisms work adequately</p> <p>Sufficient number of project sponsors participate</p> <p>Local banks willing to participate</p> <p>Customers willing and able to pay</p> <p>Tariff policy is fair and equitable and promotes commercial provision</p> <p>Strong project sponsors willing and able to participate</p> <p>Rural institutions able to provide adequate and timely maintenance</p>

4. Capacity Building and Technical Assistance	\$3.6 million (IBRD); \$1.9 million (GEF)	Audit reports Borrower's Quarterly reports Supervision mission reports Disbursement reports Audit reports	Enterprise Trust Fund works effectively SMEs respond to business assistance activities
Credit Support Facility	\$3.0 million (IBRD)	Borrower's Quarterly reports Supervision mission reports Disbursement reports Audit reports	Local financial institutions respond to incentives provided by Credit Support Facility

Annex 2: Project Preparation Plan
SWAZILAND: Energizing Rural Transformation

A. Core Project Preparation Team

Name	Bank Unit	Borrower Agency	Role/Responsibility
Malcolm Cosgrove-Davies	AFTEG		Team Leader, Senior Energy Specialist
Arun Sanghvi	AFTEG		Lead Energy Specialist
Tenzin Norbhu	CITPO		ICT Specialist
Rebecca Sekse	EASEG		Financial Analyst
Trine Refsbaek	Consultant		Cross-sectoral Specialist
Robert Chronowski	Consultant		Renewable Energy Specialist
Wolfgang Mostert	Consultant		Sector Reform Specialist
James Finucane	Consultant		Business Development & Solar PV Specialist
John Ambrose	Consultant		Environmental/Social Safeguard Specialist
Tobile Dlamini		Ministry of Planning (MEPD)	
Sobongile Nsibande		Ministry of Planning (MEPD)	
Thabsile Mlangeni		Ministry of Finance (MOF)	
Dudu Sihlingonyane		Ministry of Communications (MTEC)	
Henry Shongwe		Ministry of Energy (MNRE)	
Harry Nkambule		Swazi Electricity Board (SEB)	
Wilmoth Shongwe		Swazi Post & Telecom (SPTC)	
Dumisani Msibi		Enterprise Trust Fund (ETF)	
Jamison Vilakati		MTEC	

B. Project Preparation Activities

Key Outputs	Prepared by	Responsibility	Cost	Appraisal Requirement	Target Date
Feasibility Studies First Year Priority Rural Electrification Packages	SEB	SEB		yes	May 2004
Environment Assessment Environmental & Social Management Framework	MTEC	MTEC		yes	May 2004
Social Assessment see above					
Institutional Assessment Procurement Assessment Financial Management Assessment	World Bank World Bank	Task Team Task Team			May 2004 May 2004
Project Implementation Plan (PIP)	ERT Steering Committee	MOF		yes	September 2003 (Draft) June 2004 (Final)

--	--	--	--	--	--

C. Specialist Tasks

Specialist Area	Level of analysis /Tools	Skills Needed	Key Output Document	Bank Review Target Date

**Annex 3: Project Processing Timetable
SWAZILAND: Energizing Rural Transformation**

Project ID: P077179 Timetable step	Key Dates		
	Original	Plan	Actual
Concept Review	15-Mar-02	28-Aug-03	28-Aug-03
RVP/ROC/OC Sign-off	-	-	-
PID to Infoshop	15-Mar-02	27-Oct-03	27-Oct-03
ISDS to Infoshop	-	-	-
PID Received by Infoshop	-	-	27-Oct-03
ISDS Received by Infoshop	-	-	-
Begin Preparation	-	01-Sep-03	-
Decision Meeting	15-Oct-02	24-Jun-04	-
Auth Appr/Negs (in principle)	15-Oct-02	09-Jul-04	-
Updated PID to Infoshop	-	-	-
Updated ISDS to Infoshop	-	-	-
Updated PID Received by Infoshop	-	-	-
Updated ISDS Received by Infoshop	-	-	-
EA Received in Infoshop	-	20-May-04	-
Begin Appraisal	15-Jan-02	12-Jul-04	-
Send Notice/Issue Inv't Neg	15-Jan-03	-	-
Begin Negotiations	03-Feb-03	04-Oct-04	-
Obtain Clearance of Docs	-	-	-
Bank Approval	18-Mar-03	10-Jan-05	-
Completion Note	-	-	-

Project ID: P077158 Timetable step	Key Dates		
	Original	Plan	Actual
GEF Eligibility Confirmation	-	23-Jun-03	23-Jun-03
Concept Review	15-Mar-02	28-Aug-03	28-Aug-03
RVP/ROC/OC Signoff	15-Mar-02	04-Oct-04	-
PID to Infoshop	15-Mar-02	27-Oct-03	27-Oct-03
ISDS to Infoshop	15-Mar-02	30-Mar-04	-
PID Received by Infoshop	-	-	-
ISDS Received by Infoshop	-	-	27-Oct-03
GEF Council Approval	15-May-02	30-May-04	-
Decision Meeting	15-Oct-02	24-Jun-04	-
Auth Appr/Negs (in principle)	15-Oct-02	09-Jul-04	-
Updated PID to Infoshop	-	-	-
Updated ISDS to Infoshop	-	-	-
Updated PID Received by Infoshop	-	-	-
Updated ISDS Received by Infoshop	-	-	-
EA Received in Infoshop	15-Nov-02	20-May-04	-
Begin Appraisal	15-Nov-02	12-Jul-04	-
Send Notice/Issue Invt Neg	15-Jan-03	16-Sep-04	-
Begin Negotiations	03-Feb-03	04-Oct-04	-
GEF CEO Endorsement	10-Mar-03	24-Dec-04	-
Board Approval	18-Mar-03	10-Jan-05	-

Annex 4: Incremental Cost Analysis SWAZILAND: Energizing Rural Transformation

Introduction

The Government of Swaziland has requested Bank support for a proposed Energizing Rural Transformation Project, with the objective of substantially expanding rural and peri-urban access to electricity, telephone, and internet on a commercial basis in order to enhance the climate for rural development and job creation. The operation will have a specific focus on providing electricity and telecommunication to Small and Medium Enterprises (SMEs) for increased income generation in rural and peri-urban areas. It will also contribute to enhancement of quality of life for rural Swazis by reducing their isolation and modernizing rural social service such as health and education through access to energy and ICT services.

The global objective of the project is to contribute to global environmental protection through reductions in greenhouse gas emissions from fossil-fired energy systems. Within this context, the project will support development of a market for renewable energy, including grid connected systems primarily in the sugar, pulp & paper, and lumber industries; solar PV for productive/institutional uses as well as for lower income households; and solar water heating for institutional/industrial applications.

Swaziland's substantial indigenous and clean renewable energy power generation potential can be quickly and cost effectively developed to help enhance the nation's energy supply security, by reducing its overwhelming dependence on electricity imports, and importantly also contributing to the global environmental agenda. In the year 2000, over 75 percent of the electricity sales to end-users (732 GWH), and over 85 percent of the maximum demand (155+MW), were met by power imports from a single source – ESKOM, South Africa, which produces 68% of its electricity from coal. Yet, Swaziland has substantial and unexploited potential for electricity generation that can help reduce this extreme dependence on imports. Available information indicates substantial economic potential for and strong interest in bagasse cogeneration in the sugar industry (over 40 MW). In addition, there is reported potential for; (i) wood waste fired power (20MW); (ii) mini-hydro generation – a resource inventory of 37 possible sites has identified a cumulative generation capacity potential of 18 MW, and 8 MW at one site alone, though pre-feasibility studies remain to be done; and (iii) power generation at the Maguga hydro dam that has already been built for irrigation and flood control purposes, though there may be trans-national issues associated with this prospect, as well as the need to ascertain compliance with the environment social safeguards framework.

Bagasse cogeneration in the sugar industry can quickly and cost effectively provide upwards of 40 MW of indigenous and renewable energy generation, helping diversify the country's supply sources, and in an environmentally friendly manner. The sugar industry is a major source of export revenues, employment for over 12000 workers, income for several thousand private sugar outgrowers (about 25,000 hectares of sugar cultivation under Company lands and about 10,000 hectares of sugar cultivation by outgrowers), and income for ancillary service providers. The sugar industry is an efficient, vibrant and competitive industry by world standards and with solid potential for growth. Expanded access to electricity in rural areas will directly support the

industry's ability to expand production, supported by expanded outgrower acreage under sugar cultivation - for which irrigation pumping is a major constraint. Further, the cost of purchase power to SEB is low (under 2 cents per unit at 400 kV), and with the economic cost of supply at medium voltage is estimated at about 3 to 3.5 cents per unit, marginal investment in cogeneration will not be commercially viable. However, such a project can be structured to be commercially attractive if it can receive payments for carbon emissions reductions.

Solar PV systems represent the least cost service option for a sizeable segment of the rural unserved. However, efforts to date have not been successful in laying the foundations for a market framework that can catalyze an efficient supply response at the scale needed and feasible to make solar PV a real option for Swaziland and to realize the potential.

Out of the 150,000 unserved households today, pending further study, it is estimated that for about 30,000+ today the least cost supply option would be solar PV based systems. Yet, today there are well under 1,000 systems installed, and the leading solar dealer sells only about 100 system per year. The sales comprise a mix of 10 Watt-peak (Wp) systems – which can power one light and a radio – priced at about \$50, and 40 Wp systems – sufficient to light four lights, one radio and one black and white TV – priced at about \$500.

Barriers to Renewable Energy Development and Barrier Removal Strategy

Renewable energy development in Swaziland is significantly constrained by several factors. These include:

- **Low Cost of Conventional Electricity** – At about US\$0.02/kWh the unit cost of the primarily coal-fired electricity purchased from South Africa is the lowest in the world. At these unit rates, renewable energy systems will continue to have difficulty in competing. However, despite the low *unit* (i.e. the kWh charges) costs, the *peak demand charges* (i.e. capacity charges) included in the electricity bill are quite high. This presents a window of opportunity for grid-connected renewable energy generators which reduce peak demand.

More specifically, the demand charge is R9.31 per kW based on the 30 minute peak of the month. With regard to time of day charges, the following 2003 data was used in the analysis for this project (note that the South African Energy Regulator granted an increase of about 7% since these were published). This is based on Eskom's good customer MegaFlex tariff rates, assumed also to apply to SEB. The energy charges are broken up into 3 periods and for 2 seasons:

June - August Rand cents per kWh

Peak	51.86
Standard	14.95
Off-peak	8.85

September - May

Peak	15.87
Standard	10.50
Off-peak	7.91

The key issue for Swazi is the high season peak power.

- Low Affordability in Rural Areas** – About two-thirds of the Swazi population lives on under \$1 per day, and 80% of the population lives in rural areas. As a result, there is considerable poverty in rural areas, a problem which is significantly exacerbated by the fact that about one-third of the working population is infected with HIV/AIDS. The proposed project seeks to support and catalyze efforts on employment promotion for addressing rural poverty, as well as improved provision of social services. The project will also support the major HIV/AIDS program which was recently initiated by ensuring that Tinkundla-level outreach centers have access to electricity and telecom service.
- Lack of Conducive Policy & Regulatory Framework** – The Electricity Act currently in force in Swaziland was promulgated in 1963. It provides for a sector dominated by a single parastatal: the Swazi Electricity Board intended to serve the entire country. Recognizing the need to update the sector structure to reflect recent developments such as private sector participation, more explicit provisions for rural electrification, and oversight by an independent regulator, MNRE has developed a new sectoral policy which is embodied in a suite of legislative bills now before Parliament. These bills are aimed at: i) restructuring the sector to reflect current best practices, ii) commercializing SEB, and iii) establishing an energy regulator. Legislation is also in an advanced stage to create a Rural Access Fund which will provide one-time capital subsidies for electricity and telecom access in unserved areas. As a result, the policy and regulatory environment which today hinders renewable energy development through lack of transparency, high transaction costs, and scarcity of needed subsidy funds, is in transition. The project will help to solidify the new sector structure, explicitly incorporating renewable energy where appropriate.
- Financing Constraints**- Rural electrification in Swaziland is not only constrained by limited financing, but also by a financing framework that is inefficient. The financing of rural electrification relies almost exclusively on: (i) up front consumer payment of connection costs; or (ii) up front donor funding provided for 100% of the investment costs. This effectively limits scale up of access on account of affordability barriers and scarce donor funds. While the SEB does contribute a small portion of its retained earnings from time-to-time towards rural electrification, this is an insignificant amount in relation to the job ahead.
- Limited capacity to implement renewable energy project** – Swaziland has undertaken only a handful of renewable energy projects in the recent past, which means that the capacity for identification, development, and implementation of such projects is limited. A nascent Renewable Energy Association of Swaziland (REASWA) serves as a nucleus of interested individuals. This group, which is supported by MNRE, as well as others for example in the sugar and paper industries, are likely to be the initial renewable energy project implementers. The realization of the initial projects will provide both an incentive and a training ground for new project implementation capacity.

In addition to these barriers which impact all renewable energy technologies, the key technology-specific barriers are:

Solar PV

- Current market is focused on institutional sales which are unpredictable and procurement oriented. This means that most sales are on a batch-basis, with the emphasis on provision of goods, not on follow-up service. This severely limits the prospects for development of sustainable business lines by local entrepreneurs.
- At present, potential commercial customers are not acquainted with the potential benefits of solar PV for their business and thus the market is limited to the very few innovative "early adopters" of new systems. This further limits the rural market, leaving it without "anchor" customers such as institutional or commercial clients

Solar Water Heating

A potential market for solar water heating exists for institutional, commercial, and household applications. For example, there are more than 200 Government facilities such as hospitals, health clinics, and correctional facilities which have significant hot water demand currently served by coal or electric geysers. In addition, Government staff housing, for police, correctional officers, nurses, etc. add another 2000 electric geysers for which Government is currently paying the utility bill. Moreover, the more than 400,000 bed-nights provided annually by Swazi hotels results in substantial baseload of water heating (in-room usage, laundry, etc.) in the tourism sector. Applications, such as restaurants and other commercial/institutional facilities, and some households also contribute to the overall solar water heating market in Swaziland. Despite this potential market, there has been very little activity to date due to an overwhelming lack of knowledge on the part of potential customers, and a corresponding lack of ability of private suppliers to create the needed market demand. Moreover, as the largest single customer, the Government's lead in taking up this technology is key. At present, Government lacks focus on energy conservation in general, and solar water heating in particular. In addition, the high up-front cost and the high risk of initial marketing efforts is a serious deterrent to market development

Main-Grid-based renewable energy

- Up until very recently, SEB has lacked a strong commercial focus, which has resulted in weak interest in pursuing alternative generation options
- Based on international experience, the initial transactions for main-grid renewable energy will require a considerable amount of attention, resulting in a relatively high transaction cost compared to the size of the transaction.
- Many of the most attractive renewable energy power generation projects are cogeneration based, in sugar mills and wood pulp plants. While the concerned Swazi firms are commercially savvy, power generation is not their core business. Some effort is required for them to adopt this

new business area.

Mini-grid-based renewable energy

- The proximity of the SEB grid in most areas limits the economic potential of mini-grid systems to difficult-to-reach locations, limiting the pool of potential sites locations
- There is a lack of local experience in mini-grid development, including social issues, technical, financial, and institutional (e.g. management, admin, tariff setting, etc.)
- Site selection is further constrained by the need for sufficient load density to make a mini-grid financially and operationally viable. Optimal sites will include several commercial customers with sufficient daytime energy needs to balance the evening load of household customers and provide a more dependable revenue stream.

Baseline

The primary renewable energy resources in Swaziland are hydro, biomass, and solar. While each of these resources is being used to some extent, there remains considerable room for increased use of each. SEB operates three hydroelectric plants with a combined capacity of 40.5 MW. The sugar and pulp/paper industries are also making limited use of their biomass waste for power and steam production, although this is currently supplemented by coal. A 1997 Action Plan for Utilization of Renewable Energy prepared with support from the Commonwealth Secretariat, presented a program for renewable energy development focusing on rural and small-scale systems, but very few implementation activities have been undertaken since then. Current renewable energy activities in Swaziland are driven largely by donor initiatives, such as the Mphaphati Solar Village which was developed with a \$30,000 grant from UNESCO. The project provided solar to a primary school, street lights, water pump, and teacher's housing. This village so far has not been replicated. The few private sector firms involved in renewable energy are primarily focused on solar, either as retail vendors linked to suppliers in South Africa, or supplying the institutional market based on infrequent bulk procurements. A Renewable Energy Association of Swaziland (REASWA) has been formed by private sector and other actors to promote renewables, and has developed an updated action plan building on the 1997 work.

The baseline or "without GEF" case for Swaziland would be characterized by the continued expansion of the electricity network with a commensurate expansion in the import of coal-generated electricity from South Africa. Grid connected renewable energy generation would be limited to the existing hydroelectric plants operated by SEB. Swazi entry into the international carbon market would be unlikely in the next several years. Mini-grid systems would be infrequent or nonexistent. Rural institutions and micro, small, and medium enterprises without electricity service would continue to use their current energy sources, which are dominated by fossil-fired generation, with some use of solar PV mainly in health clinics. Solar water heating would remain virtually unknown despite significant water heating loads from key institutions such as police and hospitals which are inefficiently served today by electricity.

Alternative

The GEF alternative is the proposed ERT Project, which is divided into four project components, with subcomponents as given below:

- 1) Grid Based Electricity Access Expansion
- 2) Renewable Energy;
 - 2.a) Main Grid Renewable Energy Investments (*supported by private investments, with CDM financing*)
 - 2.b) Off-Grid Renewable Energy Investments (*supported by local investment, the Rural Access Trust Fund, and GEF*)
- 3) Expansion of Information and Telecommunications Technology Access
- 4) Capacity Building and Technical Assistance.
 - 4.a) Sector Reform and Restructuring
 - 4.b) SME Development Support
 - 4.c) Cross-Sectoral Energy and Telecom Implementation Support
 - 4.d) Renewable Energy Capacity Building and Technical Assistance (*supported by GEF*)
 - 4.e) Monitoring and Evaluation

GEF support is to be incorporated as appropriate within these components, with the primary focus on Components 2b and 4d. GEF participation in these components is described below:

Incremental Cost Summary

The baseline and GEF alternative are described below for the relevant ERT project components. Overall the program would require \$3.1 million in GEF cofinancing as well as \$8 million in funds from a CDM source such as PCF or more likely the Community Development Carbon Fund (CDCF), resulting in total costs of \$11.1 million. The program of support is expected to result in renewable energy investments which would result in emissions reduction of about 4.7 million tons of CO₂ over the lifetime of the investments. This equates to ~\$2.33 of carbon cofinancing per ton CO₂. It is important to note that the CDM funds will be made available on the basis of the individual carbon transactions, and only confirmed at the time of signing of the Emissions Reduction Purchase Agreement. Moreover, the availability of the carbon funds will be a key element to facilitate the specific renewable energy power generation options, which are unlikely to proceed in the near term without such financing. At this point, all potential parties to the initial renewable energy project (Simunye Sugar Mill), including potential carbon financiers, have indicated a continued interest in pursuing the project. However it should be noted that in the unlikely event of failure to come to closure of any or all of these renewable energy subprojects, this will have no impact on other ERT Project components, including the development of a renewable energy policy and off-grid renewable energy development.

ERT Project Component 2b) Off-Grid Renewable Energy Investments

Solar PV

Baseline: In the absence of GEF support, the solar PV market would continue on its current path, with sales of about 26 kWp per year, mostly for retail sales of PV modules. There would be no incentive to improve quality, and in particular, no incentive to provide low-cost, integrated systems designed to give extended service with adequate protection so that batteries are not prematurely exhausted. Sales for institutional and productive uses would continue as in the past, with occasional bulk purchases for institutional (e.g. health & education) applications, with specifications based on donor recommendations. Consistency among the various donor-supplied systems would continue to vary, and system operations & maintenance would continue to be largely neglected. PV would be used for productive applications based solely on the initiative and ingenuity of individual entrepreneurs, with little guidance, assistance, or support for system design, installation, usage, or upkeep.

Alternative: GEF support for the project would provide for the integration of solar PV into institutional programs where appropriate. Solar PV procurements, cofunded by GEF, would: i) be for clustered installations; ii) require that the supplier maintain a local (rural) sales and service presence; and iii) include an extended warranty and maintenance period. This approach is aimed at the dual benefits of ensuring quick service response when required and also providing sales outlets closer to potential commercial and household customers. Cofinancing support would also be provided for PV sales for commercial and household uses. Supplier eligibility for this program would depend on compliance with system specifications as well as installation and warranty requirements. The subsidies provided for PV support would be taken over by the Rural Access Fund during the course of the project, thus ensuring phase-out of GEF support and sustainability of the subsidy regime after project close. This will take the form of a declining GEF Wp grant after total sales volume milestones are met toward the total 200,000 Wp sales volume. The support provided through the Enterprise Trust Fund (ETF) for SME productivity enhancements through the use of modern energy would include solar PV as well as other renewables. As described in *Capacity Building and TA* above, ETF would also provide support to solar entrepreneurs seeking to enter the program. This support would include business development assistance, linkages to regional and international suppliers, etc. Overall, the program would be designed to support development of a more coherent solar PV market in Swaziland, incorporating relevant lessons learned in Sri Lanka, Uganda, South Africa, and other countries with similar programs.

An average shop-owner or small business customer which would be a potential solar PV system spends about \$3.40 per month on kerosene and batteries which could be displaced by solar. This implies a 15 year net present value of costs of about \$300. The 15 year net present value of a 20W solar home system is estimated at \$350, implying an incremental cost of \$50 per system, or \$2.50 per Wp. The program would support installation of systems in a range of sizes, for example from 10 Wp single-light systems, to 500 Wp or greater health clinic installations. Overall the program would provide about 2000 systems over the 4 year project life, with a total installed capacity of about 200,000 Wp. Although the lower usage factor for larger systems implies a higher incremental cost, it is planned to provide the flat \$2.50 per Wp subsidy to all systems. This implies a total GEF cofinancing grant of \$500,000.

Mini-Grids

Baseline: Baseline: The baseline for renewable energy mini-grid development would see little or no activity in this area. Therefore, the baseline would be a diesel powered mini-grid system. Based on a 200 kW system, operated in rural Swaziland, the estimated 15 year NPV including capital cost, operation and maintenance (including periodic overhauls) fuel and lubricating oil, comes to \$2500 per kW of capacity.

Alternative: GEF support would provide the necessary technical assistance (described in Section 4.d below) as well as limited cofinancing support to develop micro-hydro or other renewable energy mini-grids. This package of support (both capacity building and cofinancing support) is based on successful principles demonstrated in GEF-supported projects incorporating mini-grids in Sri Lanka, Laos, Bolivia, and elsewhere.

Financing for the renewable energy portion of the investment will be supported by: i) project sponsor equity, including sweat equity of the project beneficiaries; ii) subsidy support from the RATF for the non-renewable energy portion of the subproject (i.e. the “poles and wires”) provided as cofinancing investment support based on Output-Based-Aid (OBA) principles; iii) GEF cofinancing support to cover the incremental cost of the renewable energy investment, also provided on an OBA basis. While loan funds will be sought even for the initial projects, financial intermediaries are unlikely to be willing to participate until mini-grid projects are demonstrated in Swaziland. The estimated 15 year NPV of the mini-grid system ranges from \$3000 - \$3500 per kW of capacity depending on the renewable energy resource characteristics and other parameters (e.g. customer usage patterns). This results in an average incremental cost of about \$700 per kW implying a total GEF incremental cost of about \$400,000 for the approximately 600 kW of capacity planned for the project. During the course of the project, the need for these GEF resources is expected to diminish due to: i) cost reductions which arise from increasing local experience of local suppliers and creation of an efficient supply chain for equipment and services; and ii) willingness of financial intermediaries to participate. If necessary at the end of the project, the RATF will take over investment support of the generation asset as well.

Solar Water Heating

Baseline: In the baseline scenario, hot water usage by Government would continue to follow wasteful and inefficient practices, using electricity and coal for hot water production, and paying scant attention to usage. Businesses and industry using significant amounts of hot water would remain unaware of the solar option for the foreseeable future. Baseline expenses for a 10,000 liter per day institutional water system water heating system (e.g. for a hospital) result in an NPV of about \$37,800.

Alternative: The project also will support development of a solar water heating market in Swaziland to improve efficiency in energy use by taking advantage of the plentiful solar resource available in the country. The project will address the key barriers identified above as follows:

Government as market leader: a solar water heating demonstration program for high-profile Government buildings will be undertaken. In particular, systems would be installed on a cost-shared basis in sites ranging from a hospital (larger system) to police or correctional facility houses (smaller systems). These

demonstrations will include sufficient instrumentation to ensure that the value of the installations can be clearly established. Information dissemination, with a view to establishing solar water heating as a standard feature in Government buildings, will be covered under Component 4.d) below.

Introduction to commercial market: The demonstration effect of the Government program is expected to provide an incentive for commercial uptake of solar water heating. However, the initial commercial installations still are expected to meet resistance as a result of initial capital costs of solar water heating in comparison to conventional alternatives. Thus an incentive program is planned which will offer a small cofinancing grant of \$14/m² for the first 3000 m² of collector area installed outside of the Government program. This amounts to a modest 5% cofinancing grant for the initial systems. The need for this incentive program is expected to drop quickly from the market scale initially driven by the Government demonstration program and the associated creation of local supply chains. This demonstration effort is expected to accelerate penetration of SWHs and build the foundation for a sustainable market in Swaziland.

It is expected that the demonstration program would include about 20 systems, ranging in size from 60 – 200, and the incentive program would include a similar number of systems, probably with larger average size. Based on these figures, the incremental cost of this program is estimated at \$300,000. Please note that the breakout between ‘demonstration’ and ‘incentive’ systems may vary somewhat from these initial estimates based on implementation progress.

ERT Project Component 4.d) Renewable Energy Capacity Building and Technical Assistance

Renewable Energy Power Development Framework,

Baseline: Without GEF support it is unlikely that a near-term effort would be made in Swaziland to develop a framework for renewable energy development. In particular, development of power purchase arrangements for the initial transactions are likely to be quite costly and pose a significant barrier to entry for third party power producers. Also, efforts to enter the international carbon emission reduction trading market would be based largely on personal initiative of interested individuals within and outside of government. As a result, there would be little if any additional renewable energy capacity added to the power grid with the possible exception of the Maguga hydropower station (which itself is dependent on carbon finance funds for financial viability). The baseline expenses are estimated at \$0.2 million.

Alternative: The GEF alternative would support creation in Swaziland of the capacity for a more systematic approach to renewable energy development. This would include creation of an initial framework for development and implementation of renewable energy projects, including both structural requirements and training/capacity building for stakeholders. In particular, this activity will support the preparation by MNRE of a long-term renewable energy development policy. This will clearly define the outlines of an enabling framework for renewable energy development. Amendments to the energy legislation are not expected to be required to implement the policy, but if needed, preparation of such amendments will be supported by the project. Assistance will also be needed for development of a power purchase agreement, between private suppliers and SEB. Further development of the enabling framework will include support to: a) MNRE for information and outreach to both the public and private sector on the policy, its benefits and

implications; market promotional efforts, in collaboration with the Renewable Energy Association of Swaziland (REASWA) and/or other relevant partners; as well as for development and implementation of a monitoring and verification system for carbon emission reductions; b) The Energy Sector Regulator, for development of regulations consistent with the renewable energy policy as well as training and capacity building for their implementation; c) Other key actors in both public sector (e.g. Ministry of Finance) and private sector (e.g. local financial institutions) for training and capacity building as needed to facilitate adoption of the framework.

As the lead agency for energy development in the country, MNRE will be the focal point for this activity, in collaboration with the RATF, and the Energy Sector Regulator, as well as key non-government groups such as REASWA and the Enterprise Trust Fund. Capacity building will emphasize the steps required to incorporate in a practical manner renewable energy into the overall development of the Swazi energy sector. This will include:

- Consultant support for updating and expanding the 1997 Renewable Energy Action Plan in light of the need to expand it to grid-connected applications, and also taking account of the more recent REASWA proposals.
- Creation of a facility for public access to renewable energy resource information (likely to be web-based).
- Review of the legal and policy framework and modification as necessary to promote both grid-connected, and off-grid renewables. This will include development in collaboration with the energy sector regulator of a pro-forma PPA for grid sales, a policy on stranded assets (i.e. how to address the financial and ownership issues that arise when the grid overtakes a mini-grid), and other relevant legal issues.
- Design and implementation of an outreach and promotional program aimed largely at commercial, institutional, and industrial uses of renewable energy.
- Due diligence on government-supported renewable energy projects.
- Design and implementation of a Monitoring and Evaluation program including for carbon emissions reductions.

The cost of the GEF alternative would be \$1,100,000, which results in a GEF incremental cost of \$900,000.

Cross Sectoral Support and Market Development for Solar PV, Mini-Grids, and Solar Water Heating

Baseline: Ad-hoc Institutional usage of renewable energy would continue based largely on funding and direction from donors. The focus of this funding would be on the provision of systems, with little emphasis on development of a sustainable supply chain. Local capacity for development and expansion of off grid renewables, and other initiatives would develop only in a piecemeal manner,

dependent on generally small donor grants. The estimated baseline expenses for technical assistance needed to build sustainability into the market are \$0.

Alternative: GEF support in this area would have two related areas of emphasis: i) ***Assistance to cross-sectoral ministries in incorporating renewable energy***. During project preparation, an assessment of the energy and ICT needs for health and education facilities has been carried out. The focus of this work was to identify interventions for which energy/ICT provision will make a marked, positive impact on meeting that ministry's mandate. For example, solar PV systems at rural health clinics can facilitate improved service not only by providing safe, convenient, and reliable lighting for nighttime medical services, but also to enhance staff retention in rural areas, where lighting and small appliance (radio or television) use greatly improves the quality of life. The next step, to be undertaken through the ERT Project will be the final design, procurement/installation, operation/maintenance, and monitoring/evaluation, of the needed investments. The project will provide capacity building support for these efforts. Cofinancing for these investments will be included in the respective investment component (i.e. Component 1 for grid extension to these rural service providers, Component 2 for mini-grid or solar PV service.); ii) ***Business development support*** will be channeled through the Enterprise Trust Fund for cost-shared assistance to private sector, NGOs, and/or community groups in development of renewable energy related business opportunities. This will include both businesses involved in supply of equipment and services as well as customers seeking to develop productive uses of energy. On an application specific basis, the assistance will be as outlined below:

Solar PV - The project will provide a package of assistance through the ETF to support the expansion of the solar PV market based on service provision by commercial entrepreneurs, modeled on experience in Uganda, Sri Lanka, Bangladesh, etc. This package will include (i) strengthening the local PV capabilities in business, finance and technical areas through direct assistance, supplier support, linkages between the institutional and consumer market segments, and encouraging additional investors and entrepreneurs to enter the sector; (ii) increasing the access of PV businesses to financial institution credits and customer access to end-user microfinance; (iii) increasing consumer awareness and confidence; (iv) increasing access to best price sourcing opportunities, including possibly the local production of some components; (v) establishing a sound market framework in terms of tax and duty treatment and technical standards. These will complement the per Wp subsidy to reduce first costs and enable PV to extend sales and service networks, improve product and service quality, and strengthen their financial and business capabilities.

Technical assistance support will be provided for use of solar PV in off-grid institutional, commercial, and household applications. In particular, coordination with the recently inaugurated HIV/AIDS program, other health sector initiatives, as well as education and water sectors, and productive uses will be emphasized;

Renewable Energy Mini-Grids - Technical assistance will be provided through the ETF to assist potential mini-grid developers in preparing the necessary feasibility studies, technical designs, business plans, financing packages etc. for project implementation. Given the small-scale and remote nature of these systems, local social issues, including

who will contribute to the project, who will benefit, tariff levels, service levels, connection policies, etc. will be very important to address at the initial stages of project development. With this in mind, the provided support will include staff with social science skills along with the technical and business assistance that will be required for adequate development of such projects. Financing for the renewable energy portion of the investment will be supported by the project sponsor, including sweat equity of the project beneficiaries. In addition, GEF resources will be applied on an incremental cost basis, and additional support will be provided through the RATF. While loan funds will be sought even for the initial projects, financial intermediaries may be unwilling to participate until mini-grid projects are demonstrated in Swaziland.

Solar Water Heating – Technical assistance support will be provided for use of solar water heating, emphasizing institutional applications such as hospitals, other Government facilities with high hot water usage, and commercial/industrial applications. This support will include information, and promotional, activities, supported through the MNRE as well as support for business development services through the ETF for market development activities for both institutional and domestic markets. The promotional campaign would emphasize the financial impact of inefficient energy use for water heating and related applications, as well as appropriate mitigation strategies including but not limited to solar. Due to its highly complementary nature, a related energy conservation promotional campaign for the institutional, commercial, and light industrial sectors as well as a capacity building strategy based on experiential (e.g. on-the-job) learning will also be included.

The cost of this GEF alternative is estimated at \$1 million, which is therefore the incremental cost.

Incremental Cost Matrix

	Baseline	Alternative	Increment
Domestic Benefits	<p>Little or no new grid-based generation (possible exception of Maguga hydro);</p> <p>institutional and industrial coal usage continues unabated;</p> <p>Rural businesses, institutions, communities, and households which are outside of grid areas will continue to have few energy choices beyond 19th century fuels such as wood and kerosene</p>	<p>New power generation based on indigenous renewable energy reduces electricity imports;</p> <p>Reduced coal consumption results in positive environmental benefits (but could have employment impacts);</p> <p>Extension of ERT program to areas without grid access; costs for PV and possibly other renewable energy systems reduce, with a concomitant increase in quality & service</p>	<p>Barriers to renewable energy development removed.</p> <p>Reduced coal consumption by 44,000 tons per year</p> <p>Employment, quality of service, and quality of life benefits to off-grid population</p>
Global Benefits	Carbon emissions from 40 MW of imported coal-fired power, and	Displacement of imported electricity and coal with renewable	4,770,000 tons of

	44,000 tons of coal burned at the sugar mills	energy (programmatic effect).	atmospheric carbon emissions avoided
Cost by Component			
Renewable Energy Capacity Building and Technical Assistance	<p>In the absence of GEF support for establishing a renewable energy development framework, there is only a modest potential for consummating a grid-connected renewable energy project in the foreseeable future. High likelihood of piecemeal approach for other renewable energy development based on available donor support. <i>Baseline expenses on Framework development: \$0.2</i></p> <p>Ad hoc energy design and usage in cross sectoral ministries, HIV/AIDS program, rural businesses would continue. <i>Baseline expenses: \$0</i></p>	<p>GEF support for establishment of initial renewable energy development framework, PPA development, etc, resulting in 40-50 MW of grid-connected renewable energy capacity. Support to MNRE, REASWA, private sector developers, and financial intermediaries in renewable energy market development initiatives and monitoring & evaluation. <i>Alternative expenses: \$1.1 million</i></p> <p>Support to cross-sectoral ministries, HIV/AIDS program, rural businesses for targeted, high-impact usage of renewable energy for social and productive applications. <i>Alternative expense: \$1.0 million</i></p>	\$1.9 million
Off Grid Renewable Energy (Solar PV and Mini-grids)	No increase in solar PV market, resulting in flat sales of 26 kWp annually (104 kWp over project lifetime). Rural households continue to use kerosene and batteries for household lighting and small appliances. No new renewable energy mini-grid investments. <i>Baseline expenses of \$1.3 million.</i>	Expanded use of PV, especially for productive & institutional uses and to lower income households (200 kWp over project lifetime). Additional renewable energy mini-grid investments in areas unlikely to receive grid service (600 kW) <i>Alternative expenses: \$2.2 million.</i>	\$0.9 million
Off-Grid Renewable Energy (Solar Water Heating)	Continued use of electricity and coal as primary water heating fuels. Virtually no use of solar water heating despite a favorable solar resource. Continuation of wasteful and inefficient practices in large-scale (e.g institutional) water heating systems. <i>Baseline expenses: \$0.</i>	Creation of a solar water heating through removal of key barriers in market related to local knowledge (potential, availability, usage, design) and supply; establishment of solar water heating market and supply response. <i>Alternative expenses: \$0.3 million.</i>	\$0.3 million
GEF Incremental Cost			\$3.1 million

**Annex 5: STAP Roster Technical Review
SWAZILAND: Energizing Rural Transformation**

7

**STAP Roster review on Swaziland ERT PCD
Anjali Shanker – November 2003-11-28**

General

The time frame of the project is not clear. Given its stage of stage of the PCD, there are clearly a number of preparation activities still needed, which are not presented in the document.

Is the intention to request for a PDF? in which case the activities should be developed as an annex to this document?

RESPONSE: Appraisal is scheduled for first quarter FY05. The level of detail provided is consistent with the Project Concept Stage, but the team anticipates conducting additional preparation activities will continue up to appraisal as outlined in the Project Preparation Plan (Annex 2). A PDF request is not anticipated.

Funding table

- See comment in the incremental cost analysis regarding the PCF: when will the funds be available? When are they needed to reach financial closure?

RESPONSE: PCF funds would be available in accordance with the Emissions Reduction Purchase Agreement (ERPA). In general the ERPA would provide for payment on delivery of the Emission Reduction Credits although a small portion may be made available up-front if needed to secure financial closure. The private sector projects would use the ERPA to strengthen the financial performance of the investment and thus facilitate the availability of commercial financing. This may mean that ERPA signing will be needed before closure of commercial financing. (Incremental cost comments are addressed in that section.)

- Are we sure that there is no conflict between the PCF and GEF support?

RESPONSE: The project team is very aware of the issue of potential "double dipping" and has addressed this in project design with a clear distinction between GEF supported activities and Carbon Finance through CDM mechanisms following the natural role of each funding source. In particular, GEF funds would be used to establish the framework for renewable energy transactions (i.e. for barrier reduction activities), but not in support of any specific carbon transaction. Funds for the carbon purchase transaction would be sourced from the PCF or other CDM participant. This approach is consistent with other ongoing projects involving both GEF and CDM funds.

- If only one of the two is available, what would the fall back be?

RESPONSE: If one of the funding sources were unavailable, the use of renewable energy in Swaziland would be greatly reduced. The fallback would be greater reliance on imported

(coal-fired) power from South Africa.

A.1

- At the outset, the project aims at addressing rural *and peri-urban issues*. The document then describes the issues in rural areas but there is nowhere a specific analysis of peri-urban issues: how do they differ from the problems of rural areas?
 - The socio-economic characteristics and needs are probably different from those of rural areas? Some components are probably not applicable: power generation and possibly SHS? Which leaves only the SWH and ICT components?

RESPONSE: Peri-urban market issues will be analyzed in the context of the preparation of the Priority Rural Electrification Packages (PREPS) which serve such areas, and a description of key peri-urban issues will be provided as appropriate in the final PAD. With regard to renewable energy, it is correct that PV support is unlikely in peri-urban areas and that solar water heating and ICT are likely to be more pronounced here. Local benefits of renewable power generation will be primarily in rural areas, but network impacts will be felt by all consumers.

- Will the implementation really be SME based? Or will it not much more be based on local “*associations de quartiers*” or NGOs? Often, the social fabric and issues related to youngsters are widely different in peri-urban and rural areas.

RESPONSE: Project implementation will not be SME-based, but rather will be undertaken by the key project stakeholders as described in Section C4. Key implementing agents include the Rural Access Agency, SEB, SPTC, MTN and the Enterprise Trust Fund (ETF). However, it is true that the role of the ETF will include support for Micro, Small, and Medium Enterprises in making productive use of electricity, and in this sense, SMEs are an important project stakeholder. SMEs may also play a role in implementation of mini-grids which will be undertaken by local entities, possibly including SMEs, community groups, cooperatives, etc.

B.2.I.b

- The Regulatory authority has a crucial role to play. Have the members of the Board been identified? Will it realistically be endowed with the needed powers and competence?

RESPONSE: The current version of the Electricity Regulatory Authority Bill, now before Parliament, endows the Authority with sufficient autonomy (i.e. independent funding through a levy on customers, reporting directly to Parliament, etc.). Since the Bill has not been enacted, Board members and staff have not been identified. However, satisfactory progress on enacting and operationalizing this legislation is likely to be a condition of Board presentation or sooner.

- The actual achievement of the bagasse cogeneration investments are a key feature of the project and it is stated that they will not take place without additional income from carbon credits. How far are we to achieving this? Is a PID available? A PDD? Is there a commitment from the PCF? Would some of the payments be made upfront?....

RESPONSE: A PID has been submitted to PCF for one project, however, this requires revision.

The project development has not reached the PDD stage. Formal PCF commitment is only given at the signing of the ERPA, which has not been reached. A decision on up front payments has not been made, but if included these are unlikely to be large. Project preparation will continue to require nurturing due to its first-of-a kind nature, and closure is expected in the second year of the ERT Project.

- RATF: multisectoral: multisectoral funds have to be examined with particular caution as the little experience available tends to show that the advantages of economies in management costs are often outweighed by a paralysis due to conflicts in priorities and management of the fund. (see below)

RESPONSE: We agree that great care must be taken with this approach. Conflicts in fund management such as those encountered in Mauritania will be largely abated from the clear funding streams of the two initial sectors: power & telecom. IBRD funds will be divided by sector within the Development Credit Agreement (Schedule 1), local funding will derive from separate levies on the current sector customers.

B.2.II.a

- In order to better assess the benefits of having access to ICT, has an assessment of needs been done? The benefits re the AIDs programme are very clear. But has a survey been done in the targeted areas regarding possible needs? Literacy levels? Education level? Contacts with the ministry of education remote teaching programmes?

RESPONSE : A preliminary ICT needs assessment has been conducted and revealed that health facilities down to the clinic level have electricity and fixed line telephone access, though they often suffer the general problems with poor reliability, for instance caused by neglected solar-powered switching equipment. A typical health center in Sithobela, which has 42 beds, has no working computer, and all administrative and secretarial work is done by hand and by typewriter (for that matter, their telephone doesn't work well either). Having internet-connected computers will increase the efficiency of communication between centers and with the hospitals, and it will enable a gradual shift to electronic records keeping. Currently, records and statistical material is on paper, and tends to be filed away locally and never put to any use. Moving to an electronic form allows this data to be communicated efficiently and brought into use. The Ministry of Education aims to equip all schools with computer labs, and is about halfway to achieving this goal at the high-school level. However, the labs are rarely networked, and even more rarely internet connected, so they focus on teaching basic computer skills and standard applications. It is important that the standard computer curriculum be broadened to cover the use of email and the world-wide-web, which has the added benefit of providing a greater sense of participation to the rural areas, which are otherwise very disconnected from the world at large. Beyond the health and education sectors, there are currently no internet points of presence in rural areas. This initial assessment concluded that demand for Multipurpose Telecommunication Centers serving civil society at large would be highest in peri-urban areas, and it is therefore expected that the expansion path would begin in such areas before moving to deeper rural settings.

B.2.II.b

- Reducing connection costs: not only the opportunities from simplified standards should be looked into, but also benefits linked to alternative procurement routes, which can, in certain countries lead to cost reductions of 30 to 50%.

RESPONSE: This suggestion is also being adopted.

B.2.IV.b

- The adoption of the revised policy and embodiment in a legal framework is on the critical path of the project. In some countries, this process has been known to take several years (eg Madagascar). Suggestion is to develop a scenario wherein the policy framework is not in place; 2 attitudes are possible:
 - Wait for the legal framework, which can take years;
 - To start implementing some schemes, given the tremendous benefits in these countries of “learning by doing”.

RESPONSE: While we acknowledge that consideration of this approach may be necessary, the borrower appears to be in a good position to enact the required legislation in a reasonable timeframe.

B.2.V.b

- Are numbers available regarding the Universal Service Obligation Fund? Will the expected income be of the order of magnitude required to meet all the planned utilisation?

RESPONSE: Under the terms of the Universal Service Obligation Fund, established under the license awarded to Swazi MTN, they are obliged to contribute 34.30 million emalangenzi by the end of its tenth year in operation, in addition to 0.1% of its net operating income towards the fund. This is not expected to be sufficient to achieve universal coverage, thus the need for additional donor funds.

B.2.VI.a

- Is an inventory / description of the activities of these SMEs available, so that scenarios can be worked out regarding their energy needs and development patterns?

RESPONSE: An inventory is not available. However, relevant experience, such as that in a South African community in the Nkomazi region of Mpumalanga bordering Swaziland convincingly illustrated the benefits of electrification in rural areas. Since the reorganization of the power service provider in 1995 to provide for significant community ownership and participation, the system has expanded to reach about 75% of potential customers, including a wide range of viable SMEs which require electricity service. These include auto repair, welding, grain milling, tailoring, etc. While conditions are not identical in Swaziland, it is clear that similar opportunities for catalyzing development with electricity provision are possible.

B.2.VI.b

- The local opportunities for employment through local construction activities are clear, link of ICT with public services are also. Could the link between ICT and business opportunities be detailed?

RESPONSE: Business ICT use for access to market information is well documented in the development literature and a clear initial benefit of increased rural access. In particular, use of telephone to call for market prices instead of the more traditional (as well as more costly and risky) approach of travelling to market is a clear business benefit of ICT. Another common early usage is the telephone kiosk, providing public telephone service to the broad community. As the market develops, ICT will address more sophisticated business information needs including, participation in a variety of service sectors, links to regional and international markets, etc.

B.2.VII.a

- Education: besides the policy statement, what is the tangible content of ICT component of MoE? The example of the RSA PV schools project has illustrated the serious flaws of lack of coordination in this respect. (also refers to § 6.1 and 6.4)

RESPONSE: The focus of the program is on ICT provision. This will be supported by solar PV where appropriate. The ICT component will provide internet connectivity to schools in support of the expansion of computer education as described in the policy.

- Health: Of the 90% Clinics which have access to modern services, what percentage has own generation? Of the balance, what is their track record in terms of payment? Are they satisfied by the quality of service being provided to them?

RESPONSE: Virtually all of the health clinics with electricity are grid connected. Of these, the payment track record is quite simple, those who are seriously in arrears are disconnected. Quality of service complaints arise mostly from those which are disconnected.

B.3 – Introduction:

see B.2.IV.b above

Strategic choices

- There surely are a lot of economies of scale in coordinating design and implementation of ICT / energy – eg EDF and GEF (electricity and gas services in France).
- There are serious risks in combining the function of subsidy provision. Chances are that there will competition over limited resources available by the two line Ministries; there will be a considerable power play in deciding who of the two “lobbies” will have the actual power in the fund allocations. The World Bank experience in Mauritania with the creation of the APAUS is a very eloquent illustration of these potential tensions.

RESPONSE: We recognize the potential for difficulties as well as the significant scale economies in a multisectoral subsidy fund. On balance, it was determined to retain this approach, and address difficulties through design as well as close supervision, especially in the early years of

the fund (i.e. the ERT Project period). The two key design parameters expected to reduce the magnitude of this problem are the creation of the Fund as a Trust through an Act of Parliament, thus limiting the influence of the sectoral ministries to their policy and sectoral oversight roles, and provision of funding sources (customer levies) which are independent of the ministerial budget mechanisms.

C: project description summary

C.1.1 Table 1 and “component 2”

- Grid based renewable energy: 40 – 50 MW capacity. What is the global potential in Swaziland? How many potential sites are there? What percentage of the potential market do these 40 to 50 MW represent? Are these sound agro-industries which will easily reach financial closure?

RESPONSE: The proposed capacity is a conservative estimate of the available resource at the proposed sites, which are associated with some of the largest and best established industries in the country. The industries are sound businesses with the capability of readily reaching financial closure. The bigger issue for financial closure is establishing a favourable environment for project development – which the project seeks to address. The total theoretical renewable energy potential in Swaziland is estimated at 1400GWh/year from bagasse and hydro alone(200 – 400 MW, depending on capacity factor).

- What financial incentives are available for these activities?

RESPONSE: The financial incentive for private sector renewable energy development is largely displacement of the capacity charge assessed to large commercial customers. This displacement, augmented by the Emissions Reduction cash flow stream produces a financially viable transaction. A description of this has been added to the “Barriers” discussion in the incremental cost annex.

- Given the very general statements at this stage, it would be useful to have a detail of further preparation activities ongoing or planned – related or not to a PDF request.

RESPONSE: Please see PCD Annex 2 for a description of the preparation activities.

Component 4

SME related project interventions

- Include training of financial intermediaries

RESPONSE: Agree, this will be included in project TA.

- As a number of SMEs have no collateral, specific attention should be given to the issue of providing loans / support to very small and unstructured companies. The development of specific “micro credit” or guarantee instruments should be considered early on and waiting for the second or third year of the project seems very late (as it would probably take a couple of years at least from beginning of study of facility to get something going)

- Issues related to providing credit for PV and mini grids / captive agro industry based renewable energy generation are very different in nature and should be differentiated.

RESPONSE: While we agree that microfinance will be important to SMEs, the project seeks to link and facilitate existing micro finance channels for energy-related SME development rather than create any new micro finance facilities.

Cross sectoral Investments

- Is there any data available as to:
 - The share of “public service” customers in sales in the rural areas?
 - The tariff structure and whether they benefit from subsidies?
 - Their track record in terms of payment?

RESPONSE: Public sector customers are subject to the standard tariff schedule. Where payment record is poor, they are disconnected.

Project Cost and Financing Plan

- PCF: 8M\$ is a significant amount of the financing plan. More information on the status and modalities / conditions / time frame of PCF commitment would be useful

RESPONSE: See response to B.2.I.B above.

Institutional and Implementation arrangements

- Past experience shows tremendous difficulties in having a Rural Access Agency across more than one sector and being overseen by more than line Ministry: this leads to a competition as to what sector is going to have the leadership, particularly as funding is at stake. Much as we recommend aiming at economies of “organisation” at the implementation level, envisioning this type of coordination at the funding level should be extremely closely examined and further substantiated (see example of Mauritania) – also refers to **D.1.§2**

RESPONSE: Please see response to B.2.IV.b above.

- The modalities of the credit support facility vz grid connected renewables needs to be carefully detailed. The case of no “double support” from GEF and PCF has to be explicitly made – also refers to **D.1.§3**

RESPONSE: Please see response to Funding Table above.

- The profile of the project sponsors should be examined in detail at the project *preparation* stage, a risk analysis undertaken so as to ensure that the support envisioned is tailored to the needs of the sponsors.

RESPONSE: A financial analysis of SEB and SPTC will be conducted by the Bank team prior to

appraisal to assess financial soundness of these institutions and ensure that the project will not negatively impact their financial position. With regard to private sector project sponsors (e.g. for renewable energy investments) due diligence including analysis of financial, technical, and other elements of the business plan for the investment is required by the investor (e.g. PCF or other CDM participant as well as the lending institution) prior to investment.

D. Project Rational

D.3. ICT Sector

- Experience of other cross sector coordination approaches at the funding level should be closely examined, such as in Mauritania, where tensions have led to considerable slowing down of activities. At the level of the CILSS, where in effect, one component took the overriding place;
- **Lessons learnt in the Solar Hot Water component**
There have been a number of SHW programmes across the board which would deserve close examination: India, ongoing UNDP GEF in Tunisia, ... As the Concept seems to imply that there would be strong links with South Africa, a review of the South African market and expected linkages would be useful.
- **Lessons learnt on the peri urban component?**

RESPONSE: The team will carefully examine the experience in Mauritania, India, Tunisia, and South Africa to assess applicable lessons learned.

STAP Review Comments on

Incremental Costs and Global Environmental Benefits

Introduction

The Government of Swaziland has requested the Bank to support a proposed Energizing Rural Transformation Project, with the objective of substantially expanding rural and peri-urban access to electricity, telephone, and internet on a commercial basis in order to enhance the climate for rural development and job creation. The operation will have a specific focus on providing electricity and telecommunication to Small and Medium Enterprises (SMEs) for increased income generation in rural and peri-urban areas. It will also contribute to enhancement of quality of life for rural Swazis by reducing their isolation and modernizing rural social service such as health and education through access to energy and ICT services.

The global objective of the project is to contribute to global environmental protection through reductions in greenhouse gas emissions from fossil-fired energy systems. Within this context, the project will support development of a market for renewable energy, including grid connected systems primarily in the sugar, pulp & paper, and lumber industries; solar PV for productive/institutional uses as well as for lower income households; and solar water heating for institutional/industrial applications.

Swaziland's substantial indigenous and clean renewable energy power generation potential can be

quickly and cost effectively developed to help enhance the nation's energy supply security, by reducing its overwhelming dependence on electricity imports, and importantly also contributing to the global environmental agenda. In the year 2000, over 75 percent of the electricity sales to end-users (732 GWH), and over 85 percent of the maximum demand (155+MW), were met by imports of coal generated power from a single source – ESKOM, South Africa. Yet, Swaziland has substantial and unexploited potential for electricity generation that can help reduce this extreme dependence on imports. Available information indicates substantial economic potential for and strong interest in bagasse cogeneration in the sugar industry (over 40 MW). In addition, there is reported potential for; (i) wood waste fired power (20MW); (ii) mini-hydro generation – a resource inventory of 37 possible sites has identified a cumulative generation capacity potential of 18 MW, and 8 MW at one site alone, though pre-feasibility studies remain to be done; and (iii) power generation at the Maguga hydro dam that has already been built for irrigation and flood control purposes, though there may be trans-national issues associated with this prospect, as well as the need to ascertain compliance with the environment social safeguards framework.

I do not know much about power generation in Southern Africa, but I was under the impression that RSA imported a lot of very cheap hydro power from Mozambique. Is the fact that we are substituting 100% coal absolutely not contestable from an electrical power systems' point of view?

RESPONSE: *The assessment does not assume 100% coal consumption. Instead, a figure of 68% is used, based on coal consumption and electricity production figures provided in ESKOM's annual report.*

In how many production units is the bagasse / wood waste potential distributed? What percentage of production units are we aiming at mobilizing? How financially sound are these agro industries (probability of closure)?

RESPONSE: *The assessment is based on the two sugar mills which are most likely to proceed first. An additional wood waste facility and hydro facility brings the number of potential near-term projects to four. Financial soundness of the facilities is not an issue. The larger issue, to be addressed within the project, is the attractiveness of the investment.*

Bagasse cogeneration in the sugar industry can quickly and cost effectively provide upwards of 40 MW of indigenous and renewable energy generation, helping diversify the country's supply sources, and in an environmentally friendly manner. The sugar industry is a major source of export revenues, employment for over 12000 workers, income for several thousand private sugar outgrowers (about 25,000 hectares of sugar cultivation under Company lands and about 10,000 hectares of sugar cultivation by outgrowers), and income for ancillary service providers. The sugar industry is an efficient, vibrant and competitive industry by world standards and with solid potential for growth. Expanded access to electricity in rural areas will directly support the industry's ability to expand production, supported by expanded outgrower acreage under sugar cultivation - for which irrigation pumping is a major constraint. Further, the cost of purchase power to SEB is low (under 2 cents per unit at 400 kV), and with the economic cost of supply at medium voltage is estimated at about 3 to 3.5 cents per unit, marginal investment in cogeneration will not be commercially viable. However, such a project can be structured to be commercially

attractive if it can receive payments for carbon emissions reductions.

Solar PV systems represent the least cost service option for a sizeable segment of the rural unserved. However, efforts to date have not been successful in laying the foundations for a market framework that can catalyze an efficient supply response at the scale needed and feasible to make solar PV a real option for Swaziland and to realize the potential.

Out of the 150,000 unserved households today, pending further study, it is estimated that for about 30,000+ today the least cost supply option would be solar PV based systems. Yet, today there are well under 1,000 systems installed, and the leading solar dealer sells only about 100 system per year. The sales comprise a mix of 10 Watt-peak (Wp) systems – which can power one light and a radio – priced at about \$50, and 40 Wp systems – sufficient to light four lights, one radio and one black and white TV – priced at about \$500.

Barriers to Renewable Energy Development and Barrier Removal Strategy

Renewable energy development in Swaziland is significantly constrained by several factors. These include:

- **Low Cost of Conventional Electricity** – At about US\$0.02/kWh the unit cost of the primarily coal-fired electricity purchased from South Africa is the lowest in the world. At these unit rates, renewable energy systems will continue to have difficulty in competing. However, despite the low *unit* (i.e. the kWh charges) costs, the *peak demand charges* (i.e. capacity charges) included in the electricity bill are quite high. This presents a window of opportunity for grid-connected renewable energy generators which reduce peak demand.
Are the numbers available?

RESPONSE: To be more complete, please note that it is the time of day energy charging plus the "demand" charge for capacity which both will be impacted by a peak demand reduction. The demand charge is R9.31 per kW based on the 30 minute peak of the month. With regard to time of day charges, the following 2003 data was used in the initial analysis (note that the South African Energy Regulator granted an increase of about 7% since these were published). This is based on Eskom's good customer MegaFlex tariff rates, assumed also to apply to SEB. The energy charges are broken up into 3 periods and for 2 seasons:

June - August Rand cents per kWh

<i>Peak</i>	<i>51.86</i>
<i>Standard</i>	<i>14.95</i>
<i>Off-peak</i>	<i>8.85</i>

September - May

<i>Peak</i>	<i>15.87</i>
<i>Standard</i>	<i>10.50</i>

The key issue for Swazi is the high season peak power.

- **Low Affordability in Rural Areas** – About two-thirds of the Swazi population lives on under \$1 per day, and 80% of the population lives in rural areas. As a result, there is considerable poverty in rural areas, a problem which is significantly exacerbated by the fact that about one-third of the working population is infected with HIV/AIDS. The proposed project seeks to support and catalyze efforts on employment promotion for addressing rural poverty, as well as improved provision of social services. The project will also support the major HIV/AIDS program which was recently initiated by ensuring that Tinkundla-level outreach centers have access to electricity and telecom service.

- **Barriers in peri urban areas?**

RESPONSE: Peri-urban market issues will be analyzed in the context of the preparation of the Priority Rural Electrification Packages (PREPS) which serve such areas, and a description of key peri-urban issues will be provided as appropriate in the final PAD. With regard to renewable energy, it is correct that PV support is unlikely in peri-urban areas and that solar water heating and ICT are likely to be more pronounced here. Local benefits of renewable power generation will be primarily in rural areas, but network impacts will be felt by all consumers.

- **Lack of Conducive Policy & Regulatory Framework** – The Electricity Act currently in force in Swaziland was promulgated in 1963. It provides for a sector dominated by a single parastatal: the Swazi Electricity Board intended to serve the entire country. Recognizing the need to update the sector structure to reflect recent developments such as private sector participation, more explicit provisions for rural electrification, and oversight by an independent regulator, MNRE has developed a new sectoral policy which is embodied in a suite of legislative bills now before Parliament. These bills are aimed at: i) restructuring the sector to reflect current best practices, ii) commercializing SEB, and iii) establishing an energy regulator. Legislation is also in an advanced stage to create a Rural Access Fund which will provide one-time capital subsidies for electricity and telecom access in unserved areas. As a result, the policy and regulatory environment which today hinders renewable energy development through lack of transparency, high transaction costs, and scarcity of needed subsidy funds, is in transition. The project will help to solidify the new sector structure, explicitly incorporating renewable energy where appropriate.

- **Financing Constraints-** Rural electrification in Swaziland is not only constrained by limited financing, but also by a financing framework that is inefficient. The financing of rural electrification relies almost exclusively on: (i) up front consumer payment of connection costs; or (ii) up front donor funding provided for 100% of the investment costs. This effectively limits scale up of access on account of affordability barriers and scarce donor funds. While the SEB does contribute a small portion of its retained earnings from time-to-time towards rural electrification, this is an insignificant amount in relation to the job ahead.

- **Limited capacity to implement renewable energy project** – Swaziland has undertaken only a handful of renewable energy projects in the recent past, which means that the capacity for identification, development, and implementation of such projects is limited. A nascent Renewable Energy Association of Swaziland (REASWA) serves as a nucleus of interested individuals. This group, which is supported by MNRE, as well as others for example in the sugar and paper industries, are likely to be the initial renewable energy project implementers. The realization of the initial projects will provide both an incentive and a training ground for new project implementation capacity.
- Solar thermal specific barriers?

RESPONSE: Barriers to solar water heating are an overwhelming lack of knowledge on the part of potential customers, and a corresponding lack of ability of private suppliers to create the needed market demand. Moreover, as the largest single customer, the Government's lead in taking up this technology is key. At present, Government lacks focus on energy conservation in general, and solar water heating in particular. In addition, the high up-front cost and the high risk of initial marketing efforts is a serious deterrent to market development.

Baseline

The primary renewable energy resources in Swaziland are hydro, biomass, and solar. While each of these resources is being used to some extent, there remains considerable room for increased use of each. SEB operates three hydroelectric plants with a combined capacity of 40.5 MW. The sugar and pulp/paper industries are also making limited use of their biomass waste for power and steam production, although this is currently supplemented by coal. A 1997 Action Plan for Utilization of Renewable Energy prepared with support from the Commonwealth Secretariat, presented a program for renewable energy development focusing on rural and small-scale systems, but very few implementation activities have been undertaken since then. Current renewable energy activities in Swaziland are driven largely by donor initiatives, such as the Mphaphati Solar Village which was developed with a \$30,000 grant from UNESCO. The project provided solar to a primary school, street lights, water pump, and teacher's housing. This village so far has not been replicated. The few private sector firms involved in renewable energy are primarily focused on solar, either as retail vendors linked to suppliers in South Africa, or supplying the institutional market based on infrequent bulk procurements. A Renewable Energy Association of Swaziland (REASWA) has been formed by private sector and other actors to promote renewables, and has developed an updated action plan building on the 1997 work.

The baseline or “without GEF” case for Swaziland would be characterized by the continued expansion of the electricity network with a commensurate expansion in the import of coal-generated electricity from South Africa. Grid connected renewable energy generation would be limited to the existing hydroelectric plants operated by SEB. Swazi entry into the international carbon market would be unlikely in the next several years. Mini-grid systems would be infrequent or non-existent. Rural institutions and micro, small, and medium enterprises without electricity service would continue to use their current energy sources, which are dominated by fossil-fired

generation, with some use of solar PV mainly in health clinics. Solar water heating would remain virtually unknown despite significant water heating loads from key institutions such as police and hospitals which are inefficiently served today by electricity.

If my reading is correct, this is the only place (incl. PCD) where there is a very brief analysis of SWH: would be good to expand: what is the market we are looking at? Private? Institutional? Commercial? What is its size? Is the potential in the existing buildings or in new constructions? What are we substituting?

RESPONSE: See PCD Section C.1 (Project Description) for an expanded description and also the revised Incremental Cost Annex for additional information. The initial potential market is institutional, with demonstrations anticipated in high-profile Government institutional applications such as hospitals, residential facilities for police, etc. Additional potential exists in other existing institutional and commercial applications. The residential market is expected to develop more slowly. The solar water heating systems would substitute electric as well as coal-fired water heaters.

Alternative

GEF support in the proposed project would be aimed at development of key renewable energy market areas, including grid-connected renewables and off-grid renewables including solar PV and solar water heating. A two-part program of GEF support for the project is summarized here, with additional details in the incremental cost section below:

i) Renewable Energy Power Development Framework, Capacity Building, and Technical Assistance—This activity would be divided into two subcomponents as follows:

Renewable Energy Power Development Framework would include creation of an initial framework for development and implementation of renewable energy projects, including both structural requirements (e.g. policy, legal framework, etc.) and training/capacity building for stakeholders.

Capacity Building & Technical Assistance Under this activity assistance would be provided to cross sectoral ministries for appropriate incorporation of renewable energy in their ongoing programs. This activity also would provide cofunding on the business development support to be provided through the Enterprise Trust Fund. In particular, GEF support would be used for cost-shared assistance to entrepreneurs developing renewable energy businesses and also to customers who seek to develop productive uses of renewable energy.

ii) Off-Grid renewable energy development – this will include two subactivities:

Solar PV - Programmatic and investment support will be provided for use of solar PV in off-grid institutional, commercial, and household applications. In particular, coordination with the recently inaugurated HIV/AIDS program, other health sector initiatives, as well

as education and water sectors, and productive uses will be emphasized;

Solar Water Heating – Programmatic and investment support will be provided for use of solar water heating. The investment support will emphasize institutional applications such as hospitals, other Government facilities with high hot water usage, and commercial/industrial applications. Programmatic support will include information, promotional, and market development activities for both institutional and domestic markets.

Could you please explain what is meant by “programmatic” here?

RESPONSE: Programmatic refers to activities which are related to the program, but not directly supporting investments. Essentially this is Capacity Building and Technical Assistance. Note that the language has been modified to remove this reference.

Incremental Cost Summary

The baseline and GEF alternative are described below by project component. Overall the program would require \$3.1 million in GEF cofinancing, resulting in programmatic carbon emissions reduction of about 4.7 million tons of CO₂ over the lifetime of the investments. Programmatic emission reductions are expected to arise through implementation of at least 40 MW of renewable energy generation. This equates to ~\$0.65 of GEF cofinancing per ton CO₂.

I have a question here: it seems to me that the GEF is now open to considering it can finance supporting / enabling activities for CDM transactions, but that paying “twice” is to be avoided. Here we clearly say that given the current price of power, renewable energy generation requires income from sale of carbon – and this is going to be sought in project financing. In this case, can we really take these emissions into account in the GEF incremental cost analysis?

I am quite involved with the GEF sec on these issues and would be happy to discuss it with them if useful.

RESPONSE In response to the review comment, the analysis has been modified to reflect the two funding sources for the carbon. The total carbon abatement of 4,770,000 tons divided by the combined carbon funds of \$11.1 million (GEF \$3.1 million, CDM \$8 million) results in a cost of \$2.33 per ton CO₂.

Baseline: Without GEF support it is unlikely that a near-term effort would be made in Swaziland to develop a framework for renewable energy development. In particular, efforts to enter the international carbon emission reduction (Clean Development Mechanism, or CDM) trading market would be based largely on personal initiative of interested individuals within and outside of government. As a result, there would be little if any additional renewable energy capacity added to the power grid with the possible exception of the Maguga hydropower station (which itself is dependent on CDM funds for financial viability).

Alternative: The GEF alternative would support creation in Swaziland of the capacity for a more systematic approach to renewable energy development. As the lead agency for energy development in the country, MNRE will be the focal point for this activity, in collaboration with key non-government groups such as REASWA and the Enterprise Trust Fund. Capacity building will emphasize the steps required to incorporate in a practical manner renewable energy into the overall development of the Swazi energy sector. This will include:

- ***Consultant support for updating and expanding the 1997 Renewable Energy Action Plan in light of the need to expand it to grid-connected applications, and also taking account of the more recent REASWA proposals.***
- ***Creation of a facility for public access to renewable energy resource information (likely to be web-based).***
- ***Review of the legal and policy framework and modification as necessary to promote both grid-connected, and off-grid renewables. This will include ensuring an adequate policy and legal basis for carbon emission reduction trade, development in collaboration with the energy sector regulator of a pro-forma PPA for grid sales, a policy on stranded assets (i.e. how to address the financial and ownership issues that arise when the grid overtakes a mini-grid), and other relevant legal issues.***
- ***Training for the climate change focal point, especially with regard to government responsibilities, including legal aspects of participation in emission reduction transactions, and government's role in monitoring & verification. Please clarify: in some countries, the GEF focal point is different from the UNFCCC focal point which again is different from the DNA (Designated National Authority) who has to approve projects for carbon transactions: what is the institutional situation in Swaziland?***

RESPONSE: The GEF focal point has been named as the Director of Environment within the Ministry of Tourism, Environment, and Communications. However, the UNFCCC focal point has not been named. We take the point that capacity building must be targeted to the appropriate focal authorities.

- ***Design and implementation of an outreach and promotional program aimed largely at***

commercial, institutional, and industrial uses of renewable energy.

- *Due diligence on government-supported renewable energy projects.*
- *Design and implementation of a Monitoring and Evaluation program .*

Capacity Building and Technical Assistance

Baseline: Ad-hoc Institutional usage of renewable energy would continue based largely on funding and direction from donors. Local capacity for development and expansion of off grid renewables, and other initiatives would develop only in a piecemeal manner, dependent on generally small donor grants.

Alternative: GEF support in this area would have two related areas of emphasis: i) ***Assistance to cross-sectoral ministries in incorporating renewable energy.*** This assistance would be provided to each ministry (HIV/AIDS, health, education, etc.) and based on a technology neutral energy needs assessment, followed by development and adoption of standardized technology appropriate designs. Cofinancing support for solar PV investments is described below.; ii) ***Business development support*** will be channeled through the Enterprise Trust Fund for cost-shared assistance to private sector, NGOs, and/or community groups in development of renewable energy related business opportunities. This will include both businesses involved in supply of equipment and services as well as customers seeking to develop productive uses of energy.iii) ***training of financial intermediaries***

RESPONSE: Agree.

Solar PV

Baseline: In the absence of GEF support, the solar PV market would continue on its current path, with sales of about 26 kWp per year, mostly for retail sales of PV modules. There would be no incentive to improve quality, and in particular, no incentive to provide low-cost, integrated systems designed to give extended service with adequate protection so that batteries are not prematurely exhausted. Sales for institutional and productive uses would continue as in the past, with occasional bulk purchases for institutional (e.g. health & education) applications, with specifications based on donor recommendations. Consistency among the various donor-supplied systems would continue to vary, and system operations & maintenance would continue to be largely neglected. PV would be used for productive applications based solely on the initiative and ingenuity of individual entrepreneurs, with little guidance, assistance, or support for system design, installation, usage, or upkeep.

Alternative: GEF support for the project would provide for the integration of solar PV into institutional programs where appropriate. Solar PV procurements, cofunded by GEF, would: i) be for clustered installations; ii) require that the supplier maintain a local (rural) sales and service presence; and iii) include an extended warranty and maintenance period. This approach is aimed at the dual benefits of ensuring quick service response when required and also providing sales

outlets closer to potential commercial and household customers. Cofinancing support would also be provided for PV sales for commercial and household uses. Supplier eligibility for this program would depend on compliance with system specifications as well as installation and warranty requirements. It is anticipated that the subsidies provided for PV support would be taken over by the Rural Access Fund during the course of the project, thus ensuring phase-out of GEF support and sustainability of the subsidy regime after project close. The support provided through the Enterprise Trust Fund (ETF) for SME productivity enhancements through the use of modern energy would include solar PV as well as other renewables. As described in *Capacity Building and TA* above, ETF would also provide support to solar entrepreneurs seeking to enter the program. This support would include business development assistance, linkages to regional and international suppliers, etc. Overall, the program would be designed to support development of a more coherent solar PV market in Swaziland, incorporating relevant lessons learned in Sri Lanka, Uganda, South Africa, and other countries with similar programs.

What is the anticipated level of required subsidy for SPV? To what proportion of the Rural Access Fund (which is also to subsidize a number of other activities) does this amount?

RESPONSE: Solar PV will be provided a cofinancing grant of \$2.50 per Wp, based on an incremental cost assessment (see revised Incremental Cost Annex). The project will support approximately 200,000 Wp of installations which implies GEF support of \$0.5 million.

Solar Water Heating

Baseline: In the baseline scenario, hot water usage by Government would continue to follow wasteful and inefficient practices, using electricity and coal for hot water production, and paying scant attention to usage. Businesses and industry using significant amounts of hot water would remain unaware of the solar option.

Refer to above remark

Many Government institutions are currently in arrears on their electricity bill. Electric water heating only serves to increase this debt. Especially for institutions such as hospitals, police (which includes residential facilities for officers), and prisons, water heating is a significant contributor to energy bills. Other government facilities, such as office buildings and health clinics also could benefit from use of solar water heating.

This would probably need to be further expanded and analyzed in the PCD.

RESPONSE: Point taken. The revised Incremental Cost Annex includes a more complete discussion.

Alternative:

The project would provide first for a market survey of water heating use in Swaziland, I suggest this be done **before** the project but during the project preparation phase, as the market survey may lead to the conclusion that the segment is insignificant or huge; understanding of the dynamics of this potential market would help in project design.

RESPONSE: An initial market assessment has been undertaken, indicating a substantial solar

water heating market. In particular, a potential market for solar water heating exists for institutional, commercial, and household applications. For example, there are more than 200 Government facilities such as hospitals, health clinics, and correctional facilities which have significant hot water demand currently served by coal or electric geysers. In addition, Government staff housing, for police, correctional officers, nurses, etc. add another 2000 electric geysers for which Government is currently paying the utility bill. Moreover, the more than 400,000 bed-nights provided annually by Swazi hotels results in substantial baseload of water heating (in-room usage, laundry, etc.) in the tourism sector. Applications, such as restaurants and other commercial/institutional facilities, and some households also contribute to the overall solar water heating market in Swaziland.

confirmation of specific high priority market segments, identification of a suitable set of institutional demonstrations (e.g. on the Government hospital in Mbabane, and/or a subset of police residential facilities), and detailed design of the demonstration program emphasizing participation of local Swazi firms. This initial study also would include detailed design of an energy conservation promotional campaign for the institutional, commercial, and light industrial sectors as well as a capacity building strategy based on experiential (e.g. on-the-job) learning. The promotional campaign would emphasize the financial impact of inefficient energy use for water heating and related applications, as well as appropriate mitigation strategies including but not limited to solar.

The demonstration and promotional campaign would be complemented by the cofinancing of the institutional solar water heating demonstration, as well as more limited cofinancing of initial government/commercial/institutional solar water heating installations. The overall program will aim at establishing a market, as well as an efficient Swazi-based supply response. This will include linkages with suppliers in South Africa and elsewhere

Incremental Cost Matrix

	Baseline	Alternative	Increment
Domestic Benefits	<p>Little or no new grid-based generation (possible exception of Maguga hydro);</p> <p>institutional and industrial coal usage continues unabated;</p> <p>Rural businesses, institutions, communities, and households which are outside of grid areas will continue to have few energy choices beyond 19th century fuels such as wood and kerosene</p>	<p>New power generation based on indigenous renewable energy reduces electricity imports;</p> <p>Reduced coal consumption results in positive environmental benefits (but could have employment impacts);</p> <p>Extension of ERT program to areas without grid access; costs for PV and possibly other renewable energy systems reduce, with a concomitant increase in quality & service</p>	<p>Barriers to renewable energy development removed.</p> <p>Reduced coal consumption by 44,000 tons per year</p> <p>Employment, quality of service, and quality of life benefits to off-grid population</p>
Global Benefits	Carbon emissions from 40 MW of imported coal-fired power, and	Displacement of imported electricity and coal with renewable	1,240,000 tons of atmospheric

	44,000 tons of coal burned at the sugar mills	energy (programmatic effect).	carbon emissions avoided
Cost by Component			
Renewable Energy Power Development Framework	No grid connected renewable energy project will be viable without some form of carbon finance. In the absence of GEF support for establishing an initial framework for carbon trade, there is only a modest potential for consummating a carbon trade agreement. <i>Baseline expenses on Framework development: \$0</i>	GEF support for establishment of initial renewable energy development framework, including carbon trade training and preparation, PPA development, etc, resulting in 40-50 MW of grid-connected renewable energy capacity. <i>Alternative expenses: \$0.6 million</i>	\$1.9 million
Capacity Building & Technical Assistance	Ad hoc energy design and usage in cross sectoral ministries, HIV/AIDS program, rural businesses would continue. <i>Baseline expenses: \$0</i>	Support to cross-sectoral ministries, HIV/AIDS program, rural businesses for targeted, high-impact usage of renewable energy for social and productive applications. <i>Alternative expense: \$1.0 million</i>	
	High likelihood of piecemeal approach for other renewable energy development based on available donor support. <i>Baseline expenses: \$0.2 million</i>	Support to MNRE, REASWA, private sector developers, and financial intermediaries in renewable energy market development initiatives and monitoring & evaluation. <i>Alternative expenses: \$0.5 million</i>	
Solar PV	No increase in solar PV market, resulting in flat sales of 26 kWp annually (104 kWp over project lifetime). Rural households continue to use kerosene and batteries for household lighting and small appliances. <i>Baseline expenses of \$1.6 million.</i>	Expanded use of PV, especially for productive & institutional uses and to lower income households. <i>Alternative expenses: \$2.2million.</i>	\$0.6 million
Solar Water Heating	Continued use of electricity and coal as primary water heating fuels. Virtually no use of solar water heating despite a favorable solar resource. Continuation of wasteful and inefficient practices in large-scale (e.g institutional) water heating systems. <i>Baseline expenses: \$ million.</i>	Removal of key barriers for solar water heating market related to local knowledge (potential, availability, usage, design) and supply; establishment of solar water heating market and supply response. <i>Alternative expenses: \$ million.</i>	\$0.6 million
GEF Incremental Cost			\$3.1 million

Please provide the detailed calculation for the above highlighted figures.

RESPONSE: Given below is a sample analysis for one of the sugar mill investments:

Increase in Generating Capacity	MW	20
Capacity Factor		85%
Hours per Year	hours/year	8760
Current Steam Efficiency	Steam on Cane	55%
Target Steam Efficiency	Steam on Cane	45%
Imported Coal baseline	Tons/yr	37000
Imported Electricity baseline	MWh/yr	4000
Imported Coal alternative	Tons/yr	26000
Imported electricity Alternative	MWh/yr	0
Displacement of imported coal	Tons/yr	11000
Displacement of coal fired electricity	MWh/yr	148920
Fraction of elec which is coal based		68%
Annual Carbon displaced (coal)	Tons/yr	20649
Annual Carbon displaced (elect)	Tons/yr	90458
Total Carbon displaced	Tons/yr	111107
Life of Investment	years	20
Lifetime carbon displacement	Tons Carbon	2,222,134

Additional Annex 6: Project Description SWAZILAND: Energizing Rural Transformation

1. Project components (see Annex 1):

1. The project would build on the existing momentum towards commercially oriented service provision, including by the private sector, through support of existing actors such as the Swaziland Electricity Board (SEB), Swaziland Post and Telecom Corporation (SPTC), and MTN as well as encouraging new private sector participants. Project physical investments, summarized in Table 1.

A package of technical assistance and capacity building will also be delivered as part of the project to complement the physical targets in support of the project objectives. This package also is summarized in Table 1, with more detail provided in the Capacity Building/Technical Assistance component below. These technical assistance activities include a strong emphasis on development and support of SME which relate to energy and telecom either as suppliers or as consumers. For example, support will be provided to SEB to identify local sources of supply for equipment and services, and to the local suppliers in becoming competitive in providing such services. An Enterprise Growth and Empowerment task, undertaken by the Enterprise Trust Fund (ETF), will assist SMEs in determining how best to use energy and ICTs to grow their businesses. Business development services will be provided under ETF to service suppliers, including to mini-grid project sponsors as well solar PV suppliers to assist local companies in addressing the remote electrification market. Similar services will also be provided to customers with the potential of using the electricity or ICT services for productive uses.

Once the primary legislation discussed in Section B.2 above is enacted, the secondary legislation required to implement the legal and regulatory framework will be needed. For example, the introduction of a licensing regime in the power sector will also require the preparation of draft licenses for generation, transmission, distribution, sales and for the system operator. These will be supported by the ERT project. Other activities needed for sector reform, but not related to rural access expansion, such as the due diligence and valuation of SEB required for the corporatization process, will be undertaken outside of the scope of the project

Table 1: Proposed Investments and Technical Assistance

Component	Description
<i>Investments</i>	
1. Grid based Electricity Access Expansion	<ul style="list-style-type: none"> • About 32,000 new connections installed by SEB (or other qualified enterprise)*
2. Renewable Energy	
Main Grid Renewable Energy	<ul style="list-style-type: none"> • 40-50 MW of new capacity installed by commercial enterprises
Off Grid Renewable Energy	<ul style="list-style-type: none"> • About 2,000 new customers including public sector, private sector and households. Service provided from private sector solar PV suppliers and mini-grids installed by private, community, or other

	(non-SEB) actors*
3. Expansion of ICT Access	SPTC or MTN investments in: <ul style="list-style-type: none"> • Network investments to achieve 90% cellular and fixed line coverage; • 5-7 new rural internet points of presence; • increase in high-speed internet
4. Capacity Building & Technical Assistance	
4.a Sector Reform & Restructuring	Assistance to MNRE and to MTC to implement reforms, develop renewable energy framework; Start-up support to regulator(s) and to Rural Access Fund
4.b. SME Development Support	Consultant assistance channeled through ETF for enterprise growth and empowerment
4.c Cross-Sectoral Energy & Telecom Implementation Support	Assistance to cross-sectoral ministries, parastatals and private sector for rural service extension (grid/network & off-grid/remote) service provision. Capacity Building to local enterprises for supply of services and equipment including off-grid renewables
4.d Renewable Energy Capacity Building	Assistance to public and private sector for development of an enabling environment for renewable energy development, and growth of the market, focusing on grid and off-grid service provision.
4.e Monitoring and Evaluation	Monitoring to identify key project impacts & benefits and to enable periodic project review and revision

* Includes Cross Sectoral Investment in connection/wiring to bring total to:

- 100% Health Facilities
- 100% Secondary Schools
- 75% of Primary Schools
- 100% NERCHA HIV/AIDS containers

Special emphasis will be placed on connection of health, education, and other rural service facilities which do not yet have electricity service. This will include both investments and capacity building for rural service providers such as health and education institutions. Connections of these facilities will be through the most cost-effective means (grid extension, mini-grid, or solar PV) and therefore will be included in the components described below as appropriate. With regard to investments, the ERT project will build on the achievements of the ongoing Taiwanese supported electrification project. The Taiwanese project is supporting grid extension to schools and health facilities, and is expected to raise the electrification rate to 90% for the Health sector, 40% for the primary schools and 80 % for secondary schools. The proposed ERT project will complete the electrification of rural health and secondary schools, and raise the primary school electrification rate to 75%. These will include additional grid extension where feasible. However, the previous investments are already focusing on the grid-connectable sites, so the use of renewable energy - primarily solar PV but also including mini-grids - will be an important aspect of these investments. In addition, these facilities will benefit from the project's investments toward universal telephony access as well as expanded high-speed internet coverage. Moreover, ERT will finance the backlog of school wiring, not

covered by the Taiwanese project, but necessary to reap the benefits of the newly installed electrification network.

The Swaziland National AIDS Program (SNAP), recently inaugurated by the National Emergency Response Committee on HIV/AIDS (NERCHA), will also benefit under the project. In particular, SNAP is in the process of deploying shipping containers, one for each of the 52 Tinkhulndlas, with windows and other amenities, to act as activity centers and storage facilities for rural outreach. A primary target group for this outreach are youths in the 13-18 age-range. Electricity and telecom service to these NERCHA centers, facilitated through the ERT project, will be critical in providing the computers and internet access which are a big attraction to this age range.

Technical assistance in support of cross-sectoral investments is described in 4.c below.

Component 1: Grid-Based Electricity Access Expansion (IBRD \$11.4 million, Private Sector \$7.0 million)

The **project aims to double electricity access to rural and peri-urban customers** through grid extension, independent grid networks, and solar PV. This implies connection of about 34,000 new customers over the four year project life, more than quadrupling SEB's current annual consumer connection rate. SEB would undertake the majority of the new electricity connections (about 32,000) through a structured program of rural electrification. The program provides for SEB to prepare Priority Rural Electrification Packages (PREPs) which define specific rural electrification subpackages. The PREPs will be identified and delineated by a team led by SEB and including representatives from the ministries of Natural Resources & Energy, Health, Education, Water, and Enterprise Development. The existing SCORE committee may be reconstituted for this function. Ministry representatives will ensure that sector priorities and up-to-date data are incorporated on a real-time basis in identification and detailing of the PREPs. Each PREP will provide a full analysis of the proposed investment – covering technical design, commercial costing, market assessment, including customer willingness to pay, financial impact on SEB, additional requirements for management, operation & maintenance, customer servicing, etc. SEB will implement projects based on an assessment of commercial viability, once the subsidies provided through the Rural Access Trust Fund are taken into account. PREPs are to be implemented in areas where electricity will have the greatest development impact. As the primary agency involved in rural electrification, SEB is responsible for preparing the PREPs. SEB has prepared a draft PREPs for the first year of the project, providing approximately 9,000 new connections, which will be finalized by project appraisal.

The PREPs will be eligible for subsidy support from a Rural Access Trust Fund (RATF). This subsidy support will buy-down the initial investment cost to the point where the balance of the investment, as well as ongoing operation, maintenance, and upgrades can be undertaken on a fully commercial basis by SEB or any other interested, capable entity. Subsidy support, in the form of a performance-based grant, will be provided by the Rural Access Trust Fund (RATF) after a due-diligence review of the SEB proposal. The review will consider a variety of factors, including cost efficiency, expected development impacts, performance of previous projects, Southern Africa regional experience, etc. The RATF subsidy will cover the “non-commercial”

portion of the capital costs determined on the basis of an agreed rate of return for SEB investments. The balance of the investment will be from SEB resources or commercial debt. The RATF will closely monitor SEB performance, including the actual rate of return on approved projects. Initial start-up of the Rural Access Trust Fund would be a condition of presentation of the project to the World Bank board. Passage of the legislation establishing the legal mandate for the RATF would be sought by appraisal.

SEB has indicated that there is sufficient contracting capability in the country to meet the aggressive targets proposed by the project. However, some capacity building will still be needed, for example to ensure adherence to new technical and management standards as well as some new electrification methods and technologies to be introduced through the project.

The adoption of a more commercially oriented approach is expected to improve the financial performance of SEB, especially with regard to the rural network which in many cases does not currently provide sufficient revenue to cover operating expenses. Active promotional efforts for addition of new customers, and load promotion activities among existing customers, will serve to increase income and efficiency of use for the hundreds of kilometers of under-utilized assets.

Component 2: Renewable Energy

2.a Main Grid Renewable Energy Investments

Renewable energy power generation investments will also be facilitated by the project. By developing local generation, these commercially attractive investments, will support Government's objective of increasing the country's security of energy supply. Approximately 40 MW of new capacity will be financed through private investments with additional support from the Prototype Carbon Fund (PCF) or other sources of Clean Development Mechanism (CDM) financing. Generation and energy efficiency investments in the Swazi pulp & paper industry as well as the sugar industry are under development for potential inclusion in the project. The planned 19 MW hydro plant at Maguga, being developed by an SEB-led consortium, is also a good prospect for PCF support, but in light of its size and complexity, will be developed as a separate, stand-alone operation. As described in Component 4d below, GEF support will be used to build the necessary capacity to sustainably undertake renewable energy investments beyond those to be supported by the project.

2.b Off Grid Renewable Energy Investments

Given Swaziland's limited geographic size, it is expected that the majority of the electricity access expansion will be from the national grid. However, for isolated clusters of consumers, independent mini-grids such as those serving sugar and pulp plant company towns could be developed. These may be powered with excess generation using captive biomass wastes from the manufacturing facilities, conventional diesel gensets, or possibly from renewable energy resources such as mini-hydro. In addition, for small, remote energy needs of household, commercial, or institutional services, commercial provision of solar PV is the most economically

viable electricity source. Cofinancing support from the Global Environment Facility will be sought for the incremental costs associated with initial demonstration off-grid renewable energy investments. Thereafter, subsidy funds would be through the normal RATF channel. With regard to delivery mechanisms for these mini-grid and solar PV investments, the project will adopt a neutral stance. Any proposed delivery mechanism, such as private sector, cooperative, community ownership with management contract, etc. will be considered based on its merits. Projects which meet criteria including soundness of business plan, cost efficiency, financial and institutional sustainability, and technical design review, will be eligible for support.

A per-Wp subsidy will be provided for solar PV investments to address the twin barriers of consumer willingness and ability to pay and the need to establish a functional rural sales and service network. The design of the subsidy and the structure for its provision are drawn from successful experience with similar projects elsewhere such as Sri Lanka, Uganda, Bangladesh, etc. In particular, project suppliers will be required to adhere to a code of practice including provision of qualified equipment, warranty support, and local sales-and-service. Subsidies will be provided using an output-based-aid approach in which installation certifications, signed by customer and installer will be required for subsidy release. Field verification will be undertaken to protect against gaming and to ensure that installation quality standards are maintained. Initially, the subsidy will be provided by GEF, however, an important element of GEF support is ensuring sustainability of the program once GEF funds are no longer available. With this in mind, the RATF will take over renewable energy subsidy provision during the course of the project.

The project also will support development of a solar water heating market in Swaziland to improve efficiency in energy use by taking advantage of the plentiful solar resource available in the country. The potential market for solar water heating exists for institutional, commercial, and household applications. For example, there are more than 200 Government facilities such as hospitals, health clinics, and correctional facilities which have significant hot water demand currently served by coal or electric geysers. In addition, Government staff housing, for police, correctional officers, nurses, etc. add another 2000 electric geysers for which Government is currently paying the utility bill. Moreover, the more than 400,000 bed-nights provided annually by Swazi hotels results in substantial baseload of water heating (in-room usage, laundry, etc.) in the tourism sector. Applications, such as restaurants and other commercial/institutional facilities, and some households also contribute to the overall solar water heating market in Swaziland. Despite this potential market, there has been very little activity to date due to an overwhelming lack of knowledge on the part of potential customers, and a corresponding lack of ability of private suppliers to create the needed market demand. To address this issue, the project will support a solar water heating program which provides technical assistance and capacity building, as well as cofinancing support for about 30 demonstration sites. The TA/capacity building will be in the form of assistance to the MNRE for program promotion and management, and support through the ETF for business development services to potential suppliers. The overall program will aim at establishing a market, as well as an efficient Swazi-based supply response. This will include linkages with suppliers in South Africa and elsewhere

Component 3: Expansion of Information and Communications Technology Access

The project will accelerate expansion of telephony coverage to the remaining 10% of the country which is currently unserved and also support implementation of regulatory reform. This support of the telecom sector in the project offers strong synergies with the proposed energy investments both because energy is required for telecom operation, and also because access to both energy and telecom increases the development potential of both.

Access expansion will be facilitated through the support of the Rural Access Trust Fund. In the same way as for electricity, rural telecom providers will be given grant support to buy-down the non-commercial portion of their rural access expansion investment. The balance of project costs would be raised from commercial sources, and the investment would be operated on a commercial basis. Like the PREPs, the Rural Access Trust Fund will package these new telephony license areas for bidding to private sector operators on a minimum subsidy basis. It is expected that renewable energy systems will be used in support of some of the ICT applications, including for remote transmission/repeater stations. Renewable energy systems may also be used to support productive uses of telecommunications systems.

Component 4: Capacity Building and Technical Assistance

Capacity building and technical assistance activities to be supported through the project are aimed at: i) maximizing the project development impact and benefit; and ii) increasing capacity of all stakeholders with a view toward sustainability of the programs and investments supported by the project. These activities are summarized in Table 2 below by implementing agency. Detailed terms of reference for these activities are being developed and will be included in the Project Implementation Plan. Procurement for the near-term, high priority activities will commence early with a view toward immediate start-up upon effectiveness.

4.a Sector Reform and Restructuring

The enactment of the legal framework for restructuring of the energy and ICT sectors, to be completed during the preparation phase, is only the first step in sector reform and restructuring. Operationalization of the new framework will require establishment of new entities, (the sectoral regulators and the Rural Access Trust Fund); changes in ministerial functions, particularly in MNRE and MTC; continued progress toward a more commercial orientation by SEB; restructuring and commercial orientation for SPTC; and support to key private sector actors - in particular financial institutions - to understand the scope of the reform and opportunities for their participation. The project will support technical assistance and capacity building in support of these efforts. In particular, this will emphasize start-up support for the regulators and the RATEF; support to MNRE and MTC for information and outreach programs; and private sector capacity building, including to the financial sector.

4.b SME Development Support

The project will support Enterprise Growth And Development activities that link entrepreneurs in both the direct supply and productive uses segments with existing financial intermediaries, Business Development Service (BDS) providers, and higher value markets. The delivery will be

in a commercially oriented manner and the enterprises to benefit will be private sector based.

On the customer side of the meter, the Enterprise Trust Fund (ETF) will be supported to serve as a BDS facilitator with services delivered by NGOs and private providers in the targeted areas. The aim is to provide time limited, intensive services to assist potential entrepreneurs to take advantage of the new opportunities afforded by the electrification and ICT investments. The program will provide limited support to strengthen ETF capabilities as BDS facilitator and to strengthen selected providers based on an assessment that ETF would conduct of BDS needs and provider capabilities. The program anticipates and will support a close working partnership between SEB and the ETF, with advance teams identifying high response areas for the rural electrification investments and supporting them with necessary SME related interventions.

The BDS services will link SMEs in the target communities with providers of enterprise finance, which in many cases will be the ETF and existing NGO microfinance organizations. For high potential enterprises, coaching and mentoring will be provided to assist them with business-to-business linkages into higher value markets. The project's interventions would include support to strengthen the capabilities of for-profit BDS providers to provide these services on a commercial basis to SMEs.

These are catalytic, bridging interventions to accelerate the response to the project investments. They are not aimed at establishing new, non-sustainable support structures. The project's interventions in this area would build upon the technical assistance activities of the EU. SME development has been a focus of recent EU support in Swaziland, including assistance with the development of the SME unit and the national SME policy and support for a study of business linkages opportunities.

Business development services will assist in linking micro enterprises to existing Micro Finance Institutions (MFIs). These organizations will receive some support under the project to strengthen their capabilities, on a sustainable basis, in recently electrified areas.

On the service provision side of the meter, ETF also will provide support for entrepreneurs, communities or others planning to enter or expand the off-grid service market. In particular, this will include: a Solar PV Development activity, which will focus on provision of business development services to solar PV suppliers, and also support for development by private actors, community groups or other interested parties, of independent mini-grid networks. ETF also will provide similar business development services for solar water heating business development. This assistance will take the form of cost-shared support for consultant assistance in business plan development, access to finance, or other business development support services.

Additional capacity building efforts will be undertaken by SEB in support of: i) capacity building for the newly constituted Rural Electrification Unit, focusing on a commercial orientation for rural electrification, including cost effective technical designs – both in terms of initial and operating costs – a more market based focus, including collaboration with the ETF on load promotion, and closer links with social sector customers; ii) Introduction of best practices for rural electrification operation and maintenance, including design aspects, service efficiency, and

quality monitoring; iii) facilitation for local suppliers to capitalize on rural electrification business opportunities, including training seminars and twinning arrangements and more detailed contractor and electrician training and certification on SEB-approved procedures and techniques.

4.c Cross-Sectoral Energy and Telecom Implementation Support

During project preparation, an assessment of the energy and ICT needs for health and education facilities has been carried out. The focus of this work was to identify interventions for which energy/ICT provision will make a marked, positive impact on meeting that ministry's mandate. For example, solar PV systems at rural health clinics can facilitate improved service not only by providing safe, convenient, and reliable lighting for nighttime medical services, but also to enhance staff retention in rural areas, where lighting and small appliance (radio or television) use greatly improves the quality of life. The next step, to be undertaken through the ERT Project will be the final design, procurement/installation, operation/maintenance, and monitoring/evaluation, of the needed investments. The project will provide capacity building support for these efforts. Cofinancing for these investments will be included in the respective investment component (i.e. Component 1 for grid extension to these rural service providers, Component 2 for mini-grid or solar PV service.)

Assistance also will be provided to the Ministry of Tourism, Environment, and Communications in support of corporatization of the Swazi Post and Telecom Corporation, and in strengthening its newly formed ICT department. In addition, the ERT investments in telephony and ICT will highlight the untapped opportunities for dissemination of high impact information on health (e.g. HIV/AIDS), economic development (e.g. business opportunities including business development programs), and other current issues. Support will be provided through MTEC for development of suitable information content.

4.d Renewable Energy Capacity Building and Technical Assistance

GEF support in the proposed project would be aimed at development of key renewable energy market areas, including grid-connected renewables and off-grid renewables including solar PV and solar water heating. The program is summarized here, with additional details in the incremental cost section (Annex 4):

Renewable Energy Power Development Framework would include creation of an initial framework for development and implementation of renewable energy projects, including both structural requirements and training/capacity building for stakeholders. In particular, this activity will support the preparation by MNRE of a long-term renewable energy development policy building on the 1997 Renewable Energy Action Plan and other relevant efforts. This will clearly define the outlines of an enabling framework for renewable energy development. Amendments to the energy legislation are not expected to be required to implement the policy, but if needed, preparation of such amendments will be supported by the project. Assistance will also be needed for development of a pro-forma power purchase agreement, between the private supplier and SEB. Further

development of the enabling framework will include support to: a) MNRE for information and outreach to both the public and private sector on the policy, its benefits and implications; market promotional efforts, in collaboration with the Renewable Energy Association of Swaziland (REASWA) and/or other relevant partners; as well as for development and implementation of a monitoring and verification system for carbon emission reductions; b) The Energy Sector Regulator, for development of regulations consistent with the renewable energy policy as well as training and capacity building for their implementation; c) Other key actors in both public sector (e.g. Ministry of Finance) and private sector (e.g. local financial institutions) for training and capacity building as needed to facilitate adoption of the framework.

Cross-Sectoral Use of Renewable Energy Cross sectoral ministries (e.g. Ministry of Health, Ministry of Education, Department of Works, etc.) would retain project-supported consultant assistance for appropriate incorporation of renewable energy in their ongoing programs.

Solar PV Market Development - The project will provide a package of assistance to support the expansion of the solar PV market based on service provision by commercial entrepreneurs, modeled on experience in Uganda, Sri Lanka, Bangladesh, etc. This package will include (i) strengthening the local PV capabilities in business, finance and technical areas through direct assistance, supplier support, linkages between the institutional and consumer market segments, and encouraging additional investors and entrepreneurs to enter the sector; (ii) increasing the access of PV businesses to financial institution credits and customer access to end-user microfinance; (iii) increasing consumer awareness and confidence; (iv) increasing access to best price sourcing opportunities, including possibly the local production of some components; (v) establishing a sound market framework in terms of tax and duty treatment and technical standards. These will complement the per Wp subsidy to reduce first costs and enable PV to extend sales and service networks, improve product and service quality, and strengthen their financial and business capabilities.

Technical assistance support will be provided for use of solar PV in off-grid institutional, commercial, and household applications. In particular, coordination with the recently inaugurated HIV/AIDS program, other health sector initiatives, as well as education and water sectors, and productive uses will be emphasized;

Renewable Energy Mini-Grid Market Development - Technical assistance will be provided through the ETF to assist potential mini-grid developers in preparing the necessary feasibility studies, technical designs, business plans, financing packages etc. for project implementation. Given the small-scale and remote nature of these systems, local social issues, including who will contribute to the project, who will benefit, tariff levels, service levels, connection policies, etc. will be very important to address at the initial stages of project development. With this in mind, the provided support will include staff with social science skills along with the technical and business assistance that will be required for adequate development of such projects. Financing for the renewable energy portion of the investment will be supported by the project sponsor, including sweat equity of the project beneficiaries. In addition, GEF resources will be applied on an

incremental cost basis, and additional support will be provided through the RATF. While loan funds will be sought even for the initial projects, financial intermediaries may be unwilling to participate until mini-grid projects are demonstrated in Swaziland.

Solar Water Heating Market Development – Technical assistance support will be provided through the ETF for use of solar water heating, emphasizing institutional applications such as hospitals, other Government facilities with high hot water usage, and commercial/industrial applications. This support will include information, and promotional, activities, supported through the MNRE as well as support for business development services through the ETF for market development activities for both institutional and domestic markets.

4.e. Monitoring and Evaluation

Project M&E will include two separate and parallel paths, both administered by the Rural Access Agency. At the Project level, the Rural Access Agency (RAA) will prepare quarterly Project Reports in the Banks Financial Monitoring Report (FMR) format. In particular, this report is divided into three sections, one each for: i) Implementation Progress (describing investment, TA, Capacity Building, etc. in the context of the agreed project performance indicators); ii) Financial Management Reporting; and iii) Procurement Reporting. The report covers the prior quarter, and provides a projection over the future two quarters. The Project Reports are submitted to the Bank in fulfillment of the periodic reporting requirements, and also as the basis for replenishment of the Special Account(s). These reports, along with periodic project supervision, the Mid-Term Review, and the Implementation Completion Report provide a comprehensive monitoring and evaluation package at the project level. This information, combined with close monitoring of related renewable energy investments also will permit monitoring of global environmental impacts, as well as progress toward elimination of barriers to renewable energy development in Swaziland.

The Project Report will be supplemented by a second M&E activity focusing on project Impacts. In particular, project objectives in areas such as rural employment, and quality of life improvements are not easily tracked through simple implementation progress monitoring. This Impact M&E will take the form of baseline and follow-up surveys, to assess impact in project areas as well as control areas. Results from the Impact M&E will feed directly into the ongoing project supervision, to identify strengths which should be capitalized on as well as weaknesses to be addressed before they become serious impediments to reaching project objectives.

As mentioned above, MEMD monitoring and verification of carbon emission reductions will also be supported.

Credit Support Facility

Financial institutions have indicated a willingness to consider support for the private sector investments included in the project. At the same time, however, they expressed concerns in lending into rural areas. Also, lending terms of local banks, which are typically less than 24

months, do not match the requirements for infrastructure investments, which typically require loan terms of 5-10 years. There may therefore be a need for a Credit Support Facility which help local banks to bridge these gaps. A Credit Support Facility could provide for liquidity extension, partial risk guarantees, or other appropriate provisions. The cost estimate includes provision for a Credit Support Facility, but the need for such a facility, and its detailed design must be developed during project preparation.

Table 2: ERT Capacity Building and Technical Assistance Activities by Implementing Agency

Implementing Agency	Related Project-Financed Capacity Building
Swaziland Electricity Board	<ul style="list-style-type: none"> • RE Unit Capacity Building (including future PREPS) • Introducing Best Practices in RE Operation and Maintenance • Facilitation of local supplier business opportunities in RE • Local RE Contractor & Electrician Training and Capacity Building
Enterprise Trust Fund	<ul style="list-style-type: none"> • Enterprise Growth and Empowerment • Off-grid service supplier business development services, including Solar PV Development support to private sector SMEs • Solar water heating market development support • Energy/ICT-related enterprise growth and empowerment
MNRE	<ul style="list-style-type: none"> • Information and outreach on new energy policy and restructured sector • Renewable energy information and dissemination system and upstream project development • Renewable Energy Policy and Program Development • Institutional solar water heating demonstration program
Energy Regulatory Authority	<ul style="list-style-type: none"> • Startup and initial implementation support to Regulator • Preparation of regulations and operating rules(including for renewable energy)
Telecom Regulatory Authority	<ul style="list-style-type: none"> • Startup and initial implementation support to Regulator • Preparation of regulations and operating rules
MTEC	<ul style="list-style-type: none"> • SPTC Corporatization support • Assessment and development of high impact information content for dissemination through ICT
Rural Access Board and Agency	<ul style="list-style-type: none"> • Startup and initial implementation support to Board, and to newly created Rural Access Agency • Development of operating policies and procedures • Development and implementation of a Monitoring and Evaluation Program
MEPD	<ul style="list-style-type: none"> • Credit Support Facility creation and start-up

Cross-Sectoral Ministries	• Cross-sectoral implementation support
---------------------------	---

- Notes: a) Ministry of Economic Planning and Development (MEPD) will provide overall project coordination, and may require some capacity building, technical assistance support for this.
b) MNRE – Ministry of Natural Resources and Energy
c) MTEC - Ministry of Tourism, Environment, and Communications

Project Cost and Financing Plan

1. A preliminary cost estimate and financing plan is given in Table 3. The plan provides for a total project cost of about \$118 million, including \$18.6 million IBRD loan, \$8 million Prototype Carbon Fund (PCF) “carbon emission reduction” purchase, and \$3.1 million Global Environment Facility (GEF) grant. Rural electrification investments are estimated to cost a total of \$17 million, of which \$10 million would be on-granted by Government to SEB from the IBRD loan – representing the subsidy portion of the investment - and \$7 million would be raised by SEB debt. There may be a need to consider including this additional \$7 million in the IBRD loan should the Government so request. The proposed flow of funds from the Bank (IBRD, PCF, and GEF) is depicted in Figure 1.

Table 3 Project Cost Estimate and Financing Plan

Component/Activity	Private	Govt.	IBRD	PCF	GEF	Donors	Total
1. Grid Based Electricity Access Expansion	7.0 ¹		11.4 ²				18.4
2. Renewable Energy							
a. Main Grid Renewable Energy	70.8			8.0 ³			78.8
b. Off-Grid Renewable Energy	2.3				1.2	1.6	5.1
3. Telecom	0.5		2.0				2.5
4. Capacity Building & TA		2.7	3.6		1.9	2.0	10.2
Credit Support Facility			3.0				3.0
Total	80.6	2.7	20.0	8.0	3.1	3.6	118.0

¹ Commercial debt required for SEB. Should Government decide to borrow this amount from IBRD, it would be on-lent to SEB.

² Borrowed by Government and on-granted to the RATF. RATF will provide as a capital grant to SEB, SPTC, MTN, and other qualified sponsors of priority rural electrification and ICT projects to buy down the non-commercial portion of service extension. Includes connections and/or wiring costs of approximately 420 schools and clinics that have access but no connection and/or wiring.

³ Provided directly by PCF to sponsors of projects that successfully conclude an emissions reduction purchase agreement (ERPA) with the PCF.

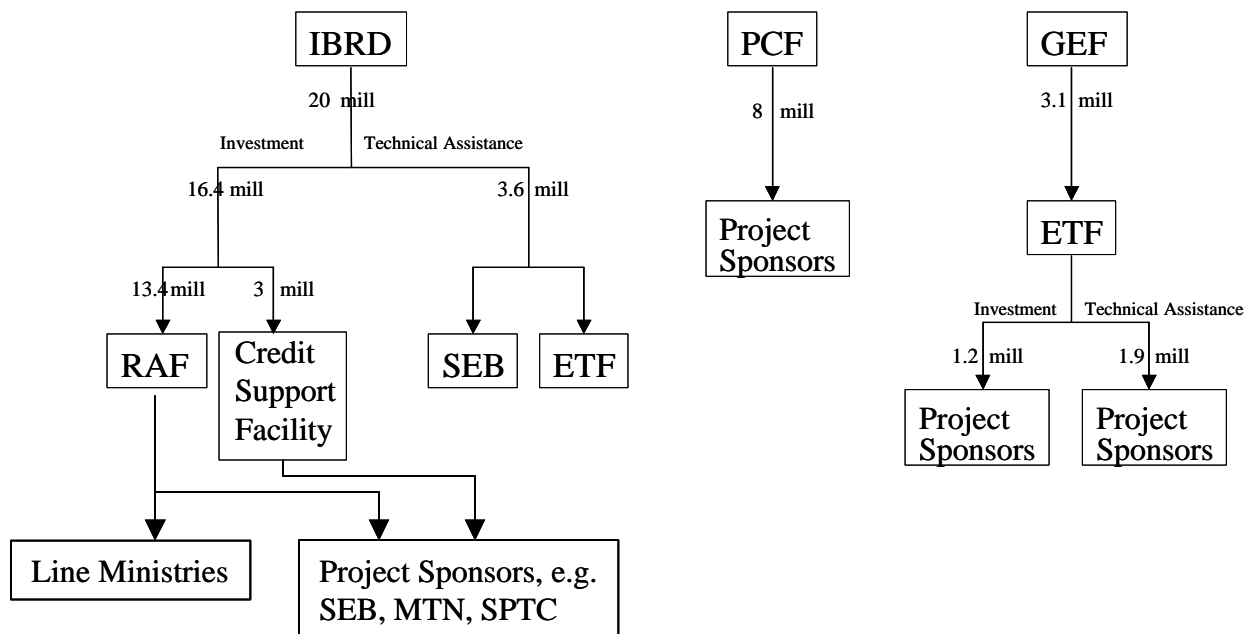


Figure 1: Proposed Flow of World Bank Funds and Estimated Funding Amounts

IBRD – International Bank for Reconstruction and Development (i.e. World Bank)
 PCF – Prototype Carbon Fund/or syndications
 GEF – Global Environment Facility
 RATF – Rural Access Trust Fund
 SEB – Swaziland Electricity Board
 ETF – Enterprise Trust Fund
 MTN – Private Sector Cellular Phone Service Operator

Component	Indicative Costs (US\$M)	% of Total	Bank financing (US\$M)	% of Bank financing	GEF financing (US\$M)	% of GEF financing
Investments		0.0	0.00	0.0	0.00	0.0
Grid-Based Electricity Access Expansion	18.40	15.6	11.40	57.0	0.00	0.0
Main Grid Renewables	78.80	66.8	0.00	0.0	0.00	0.0
Off-Grid Renewables	5.10	4.3	0.00	0.0	1.20	38.7
Telecom	2.50	2.1	2.00	10.0	0.00	0.0
Capacity Building & TA	10.20	8.6	3.60	18.0	1.90	61.3
Credit Support Facility	3.00	2.5	3.00	15.0	0.00	0.0

Total Project Costs	118.00	100.0	20.00	100.0	3.10	100.0
Front-end fee	0.00	0.0	0.00	0.0	0.00	0.0
Total Financing Required	118.00	100.0	20.00	100.0	3.10	100.0

2. Key policy and institutional reforms to be sought:

As described in Section B.2 above, Government is currently preparing legislation for reform of both the power and telecom sectors. The ERT project is predicated on the finalization of the related policy documents (Energy Sector Policy and Telecom Policy - both completed) as well as the enactment of the related legislation. The Government has agreed to enact the enabling legislation by no later than June 2004, and has agreed that establishment of Regulators as well as the Rural Access Fund are necessary conditions of appraisal.

3. Benefits and target population:

The benefits of the project are:

- For *rural households*, there will be direct and indirect benefits of increased access to electricity and ICT services, both of which will improve the quality of lives. Direct benefits will accrue to households which are directly connected in the form of improved quality and convenience of service, enhanced opportunities for cottage industry, increased ability of student's to study, etc. The indirect benefits will arise from the improved service provided by rural public institutions - health, education and water as well as the HIV/AIDs outreach centers - resulting from their increased access to electricity and ICT services.
- For *rural enterprises*, the benefits of increased productivity and income arising from electricity and ICT access -- with technical assistance provided to accelerate switch over to electricity and uptake of ICT service. In particular, the improved access to telephones and Internet is expected to: (i) increase the ability of rural enterprises to select between and coordinate with upstream suppliers thereby reducing the costs of doing business, and (ii) improve the linkages with downstream markets, helping entrepreneurs to identify suitable markets and to obtain the best prices for their produce.
- Reductions in greenhouse gases, which has global environmental benefits.

4. Institutional and implementation arrangements:

As indicated in Figure 1, several actors will be involved in project implementation. A brief description of implementation roles is given below. The project is designed so that stakeholders take on roles which are consistent with their current responsibilities. In this sense, the project seeks to the maximum extent feasible, to embed the implementation arrangements within existing institutions and structures. However, there will be a need for overall project coordination, especially in the early stages. The Rural Access Agency, described below, will fill the role of project coordinator, with sectoral oversight from the relevant line ministries - MNRE and MTEC.

Rural Access Board/Agency/Trust Fund – As described in Section C.1 above, the Rural Access Trust Fund (RATF) will be the primary vehicle for disbursing grant support for rural infrastructure investments. Within the ERT Project, the RATF will provide grant support for both grid electrification and telecom investments. The RATF will be overseen by a Rural Access Board, which will bear fiduciary responsibility for fund usage. The Board will be served by a Rural Access Agency, which will undertake day-to-day operation of the RATF. Disbursements will be made through a Trust Agent, which will most likely be a local bank selected competitively.

Experience in other countries with similar multi-sectoral funding agencies points to the need to ensure that sector-specific funding allocations are provided, and that intermingling of sectoral allocations be avoided. Conflicts in fund management will be largely abated from the clear funding streams of the two initial sectors: power & telecom. The legal agreements for IBRD funds will be clearly define the funding available for each sector, local funding will derive from separate levies on the current sector customers.

Baseline funding for the RATF will be maintained through provision of a levy on the current electricity and telecom customers. These funds will be sufficient to maintain the institution and undertake a limited number of investments annually. However, additional funds, from Government budgetary allocations as well as donors, will be required to maintain the level of investment established through the ERT project. Bilateral and multilateral donors have expressed an interest in participating in the RATF, but seek to assess the initial performance of the fund before making firm commitments. Actively seeking additional funding will be an important function of the Rural Access Agency.

For the most part, the partners and agents in the project will have distinct roles and responsibilities and undertake activities independently. However, many activities are complementary and, in some cases, interdependent. Therefore, cooperation and collaboration among the project partners and agents will be necessary for effective implementation. Ensuring adequate coordination will be the responsibility of the Rural Access Agency. In this regard, the RAA will assume the following roles:

- (i) Manage the consolidated progress monitoring and reporting of ERT activities by the partners and agents. This will include:
 - a. convene progress review meetings of the implementing partners and agents

- b. receive and review quarterly reports from the partners and agents with a view to ensuring completeness and compliance with agreed reporting arrangements;
 - c. prepare consolidated ERT financial quarterly and annual reports;
 - d. prepare consolidated ERT quarterly and annual progress reports as well as other reports for the Government of Swaziland on ERT (for the Minister of Natural Resources and Energy, Parliament and any other organs of Government as shall be required).
- (ii) Develop and pro-actively provide information and support to ERT's implementation partners and agents, as well as other potential collaboration partners to capture specific opportunities for collaboration. This will include entities involved with GEF or other climate change/carbon abatement activities, rural employment and economic development, relevant cross-sectoral initiatives, rural electrification, and rural telecommunications.
- (iii) Generate, compile and feedback to the implementation partners and agents information on ERT progress and achievements. This information will be in a form that will enable all the participants to see the overall implementation of ERT. This would be separate from the consolidated reports that are necessary for more formal reporting.
- (iv) Identify implementation issues and bottlenecks and, in consultation with the partners and agents, develop viable solutions. This will include, when necessary, follow-up discussions with key leaders of the partners and agents to agree measures to improve implementation coordination and performance.
- (v) Provide guidance to the partners and agents on the preparation of work plans, procurement plans and such other planning tools as shall be required in ERT implementation. This includes advice on World Bank guidelines on financial management and procurement and on the reporting requirements as agreed with the World Bank.
- (vi) Coordinate the activities of the partners and agents for the mid-term and full-term reviews of ERT. This includes agreeing schedules and formats for the submission of necessary reports and other inputs by the partners and agents.
- (vii) Liaise with other organizations and projects to ensure adequate information flow between ERT and those entities.
- (viii) Participate in public information activities to assist in communicating ERT approach, objectives and activities.
- (ix) Carry out such other activities as are necessary for the good of the project in consultation with the Ministry of Natural Resources and Energy and Mineral Development, and the World Bank. This will include liaison with the World Bank's operational ERT staff and consultants to facilitate implementation.

Ministry of Natural Resources and Energy (MNRE) - MNRE will continue its monitoring

and oversight role for the power sector, and in this capacity it will continue to be the Government's developer and custodian of sectoral policy. It will be assisted in its monitoring activities through the rural electrification information provided by the Rural Access Agency. MNRE also will take primary responsibility under the project for development and dissemination of the renewable energy information that is a prerequisite for private sector development of these resources. In addition, MNRE will take a lead role in the initial market demonstration activities for solar water heating, as well as the investigation and program development of other promising renewable energy sources such as mini-hydro and biomass. On this latter work, MNRE will closely collaborate with the Renewable Energy Association of Swaziland.

Ministry of Tourism, Environment, and Communications (MTEC) - In the same way as MNRE for the power sector, MTEC will continue its monitoring and oversight and policy development role for the telecommunications sector, with inputs as needed from the Rural Access Agency.

Ministry of Education and Health - The line ministries will be responsible for the implementation of cross-sectoral aspects of the project. This will mean participating in the rural electrification committee and providing information regarding priority areas to be targeted by the PREPS. Additional activities include development of energy and ICT guidelines within their respective ministries as well as ensuring that the appropriate funds are available for the recurrent cost expenses.

Energy & Telecom Regulatory Authorities - These Authorities will execute their duties as envisioned under the relevant enabling legislation. The ERT Project will provide assistance for initial start-up support and capacity building.

Credit Support Facility – The need for a Credit Support Facility appears likely at this point, but must be confirmed during project preparation. This facility would serve to facilitate access by project sponsors to commercial credit through such means as liquidity extension support and possibly a partial risk guarantee. The operator for the facility would most likely be a private entity contracted by the Government and selected competitively.

Swaziland Electricity Board – As the primary electrification agency in Swaziland, SEB will be the implementing agent for most of the Priority Rural Electrification Projects supported under ERT. In addition, SEB will undertake capacity building activities for its staff and suppliers in the areas described in Table 2 above.

Enterprise Trust Fund – The Enterprise Trust Fund (ETF) will focus on the solar PV and SME support aspects of the project, as well as grant disbursement and supervision for off-grid renewable energy investments. Development of the solar photovoltaic market is a separate and distinct activity from development of grid extension. Successful solar PV distribution involves a network of rural sales & service agents, selling to groups and individuals on a commercially oriented basis. This contrasts with the more centrally organized approach to grid-based electrification. Given its current experience in working with local entrepreneurs, the ETF is

viewed as the best entity to implement this component. In this role, it will administer an output-based grant scheme for solar installations as well as the TA associated with this component. ETF also has considerable expertise and track record in SME development, and will be tasked with applying those same development skills to assist businesses on both the equipment and service supply side of the energy business, as well as the demand side, where businesses may need assistance in utilizing the newly available energy to its best advantage. With regard to off-grid investments, ETF also will undertake the disbursement and supervision of the GEF grant in close collaboration with the RAA.

SPTC and MTN - Both of these entities will be involved in implementation of the rural ICT access expansion. They will operate on a commercially-oriented basis, after taking account of the buy-down of the non-commercial portion of the investment from the RATF.

Project Sponsors – Electrification and telecom investments will be undertaken by a variety of entities, who will have the responsibility for investment, construction, operation, and maintenance of the systems under relevant regulatory control. In the area of electrification, these will include SEB (mentioned above) for the bulk of the grid extension and possibly other private entities for selected grid extension or mini-grid investments. For solar PV, existing Swazi businesses will be the primary implementers, with the possibility of additional firms, both local and international (especially South African) entering the business as the program becomes established. Telecom investments are expected to be undertaken by SPTC, MTN, and perhaps other operators.

