TECHNICAL & FINANCIAL FILE

RENEWABLE ENERGY FOR RURAL DEVELOPMENT

MOZAMBIQUE

DGDC CODE: 3008385
BTC NAVISION CODE: MOZ0901811

La coopération belge
au développement
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CONTENTS

ABBREVIATIONS

ADB	African Development Bank
AFD	Agence Française de Développement
BTC	Belgian Technical Cooperation
CDM	Clean Development Mechanism
CEO	Chief Executing Officer
DGDC	Directorate for Development Cooperation
DIPREME	Direcção Provincial de Recurcos Minerais e Energia
EDM	Electricidade de Mozambique
EIA	Environmental Impact Assessment
EU	European Union
FUNAE	National Energy Fund
GIS	Geographical Information System
GTZ	Gesellschaft fur Technische Zusammenarbeit
ICP	Indicative Cooperation Program
kW	kiloWatt
kWh	kiloWatt hour
kWp	kiloWatt peak
MDG	Millennium Development Goals
ME	Ministry of Energy
MZN	Meticais (New Mozambican Metical)
PARPA	Plano de Acção para a Redução da Pobreza Absoluta (=PRSP)
R&D	Research and Development
RR	Resident Representative of BTC
SC	Steering Committee
SME	Small and Medium-sized Enterprises
TA	Technical Assistant
TFF	Technical and Financial File
UGEA	Unidade Gestora Executora des Aquisições
WB	World Bank

EXCUTIVE SUMMARY

Notwithstanding the energy generated by the Cahora Bassa power plant and some other minor hydro power plants, energy consumption in Mozambique relies still heavily on wood and petroleum products.

In rural areas most of the energy is obtained from fuel, wood and charcoal, which are costly, inefficient and environmentally damaging.

By the end of the year 2008, around 615.000 households, mostly in urban areas, had access to the electricity grid, giving an electricity access rate of 12%, significantly below the SADC average of 27%.

The electricity access rate in rural areas, where the population is very scattered, is less than 5%. Grid extensions towards rural areas remain very expensive and are not economically viable.

In order to increase the access to energy in rural areas, this program will focus on off-grid energy systems, based on renewable energy resources (hydraulic, solar and wind), in remote rural areas where no grid connection is foreseen within the next five years.

- ✓ The program will finance, on grant basis, electrification systems for **community infrastructures** such as administrative buildings, schools, health centres, water pumping devices and public lighting.
- ✓ Renewable energy **installations for private use** (household, shops or small enterprises) will be stimulated by subsidies (investment funds) and soft loans through micro-finance systems. This will make the investment more economically feasible for rural people.

In order to increase the sustainability of the renewable energy installations, the program will also provide a computerized asset management system and technical assistance focussed on capacity building through training initiatives, research and development. Two long-term international experts (one with technical and one with a socio-economical profile) will join and cooperate with the FUNAE staff during the implementation of the project.

The total budget of the program has been established at 18.000.000 EUR, composed of a 15.000.000 EUR contribution of the Belgian Government and an additional contribution of the Mozambican Government estimated at 120.000.000 MTN (equivalent to 3.000.000 EUR) for payment of all taxes and duties, personnel, staff and office space provided by FUNAE.

Considering the large area of the country and the dispersed population in the rural areas, a geographical concentration and/or clustering of the activities will be essential for the follow-up and the cost-effectiveness of the activities. As the provinces of Manica, Tete, Zambezia and Nyassa have a high potential for small hydropower, the possibility of concentrating activities in these four provinces will be investigated.

The project will be **co-managed by FUNAE and BTC**. FUNAE or Fundo Nacional de Energia, is the public institution established by the Mozambican Government in 1997 in order to promote rural electrification and rural access to modern energy services.

The project activities will be **implemented in a five-year period** starting after the signing of the Specific Agreement between the Mozambican and Belgian state and the signing of the implementation convention between BTC and the Belgian state. The signing of these documents is foreseen before the end of the year 2009.

The **Specific Agreement** will have a term of operation of five years

ANALYTICAL RECORD OF THE PROGRAM

DGDC intervention number	NN 3008385
Navision code BTC	MOZ0901811
Partner institution	Ministry of Energy - FUNAE
Duration of Specific Agreement	5 years
Duration of the intervention	4 years
Estimated starting date of intervention	March 2010
Partner's contribution	120.000.000 MZN (3.000.000 EUR)
Belgian contribution	15.000.000 EUR
Intervention sectors	23030 - Power generation/renewable sources 23065 – Hydro-electric power plants 23067 – Solar energy 23068 – Wind power
Overall Objective	To promote rural development by providing access to energy
Specific Objective	To increase access to hydraulic, solar and wind energy for use in off-grid installations in rural areas, by investments in renewable energy systems, stimulation of micro-finance initiatives and institutional capacity building
Results	
Result 1	Access to energy is increased by the implementation of solar, wind and hydro projects
Result 2	Financial accessibility to energy is improved
Result 3	Technical and Administrative capacity of FUNAE is increased

1. SITUATION ANALYSIS

1.1 ENERGY SECTOR IN MOZAMBIQUE

Mozambique is endowed with a variety of considerable energy resources. Estimated hydropower potential is about 12.500 MW. Proven recoverable reserves of natural gas (gas field of Pande) are about 127 billion cubic metres, with reserves estimated to be as high as 700 billion cubic metres. Proven reserves of coal are 212 million tonnes of bituminous coal.

Energy consumption relies still heavily on petroleum products, while in rural areas most of the energy is obtained from fuel, wood and charcoal which are costly, inefficient and environmentally damaging.

1.1.1 Electricity Generation

Current national electricity generation is dominated by renewable energy. However, given the large reserves of gas and coal, and higher investor interest in new coal and gas-fired power plants compared to hydroelectric projects, the composition of the national electricity generation mix might change in the coming years.

Mozambique is connected to the Southern African Power Pool (SAPP) via the Republic of South Africa and Zimbabwe as a net seller of electricity. The 12 dams in the country have a total storage capacity of 44.700 million cubic metres, with Cahora Bassa, the second biggest dam in Africa, having installed capacity of 2.075 MW.

1.1.2 Electricity Distribution

However, in spite of this generation capacity, distribution is insufficient and requires investment in transmission lines, particularly in rural areas. All the large generation projects are located far from the major consumers and significant investments in transmission facilities are needed. Estimates suggest that annual Government investment in transmission and distribution will total US$ 55 million over the next 10 years.

The quality and reliability of the electricity supply have improved significantly over the last few years although the improvements have been concentrated in the major cities.

Currently around 650.000 households have access to electricity, giving an electricity access rate of 12%, significantly below the SADC average of 27%, with the number of new households growing faster than the capacity of the State-owned company to add new connections.

Use of electricity in Mozambique by domestic customers is on average 1.590 kWh per year per customer (household). However, the consumption ranges from 640 kWh/year in recently electrified, less developed regions, to more then 2.200 kWh per year in the Maputo metropolitan area. Average use by commercial establishments in 2005 was 4.7 MWh (2.8 - 5.4 MWh/year); and "large consumers of low voltage" used on average 59 MWh (23 - 98 MWh) per year.

Peak electricity demand in the Country was 416 MW in 2008, with an energy consumption of approximately 2,362 GWh. The growth in power consumption has been significant during recent years; the average annual increase over the last 7 years is in the order of 8 %.

1.2 INSTITUTIONAL FRAMEWORK

1.2.1 Ministry of Energy (ME)

The Presidential Decree No. 13/2005 of 04 February 2005 created the Ministry of Energy. The Presidential Decree No. 21/2005 of 31 March 2005 laid down the objectives, tasks and powers of this Ministry.

According to this Decree, the "powers" (or tasks) of the Ministry are as follows:

- ✓ Formulate the energy sector policy and ensure its implementation;
- ✓ Make an inventory of energy resources of the country;
- ✓ Acquire, analyse and disseminate information on national and international prices of oil and its derivatives;
- ✓ Proceed with the long-term planning, development and implementation of sectoral policies;
- ✓ Strengthen the legal framework and the institutional development;
- ✓ Prepare and ensure implementation of the legal framework for the distribution and marketing of natural gas,
- ✓ Conduct promotional activities to promote the potential energy of the country;
- ✓ Approve studies and projects to develop new energy;
- ✓ Establish and maintain the energy balance and statistics of energy consumption;
- ✓ License activities of storage, distribution, supply and marketing of natural gas and petroleum products.

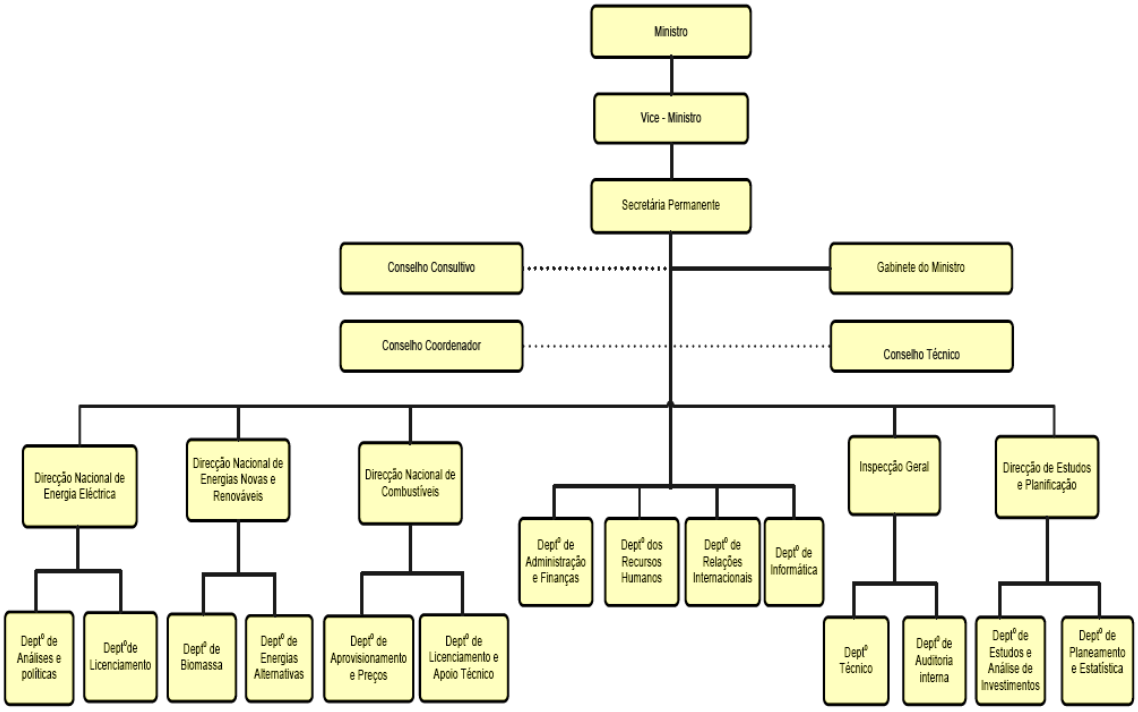
To ensure the internal functioning of the institution and the conduct of the activities in order to achieve the goals set out in the sector, the Ministry of Energy has the following organizational structure:

- ✓ Gabinete do Ministro (Minister's Cabinet)
- ✓ Direcção Nacional de Energia Eléctrica (National Directorate of Electricity)
- ✓ Direcção Nacional de Energias Novas e Renováveis (National Directorate of New and Renewable Energies)
- ✓ Direcção Nacional de Combustíveis (National Directorate of Fuels)
- ✓ Direcção de Estudos e Planificação (Directorate of Studies and Planning)
- ✓ Inspecção Geral (General Inspection)
- ✓ Departamento de Administração e Finanças (Department of Administration and Finance)
- ✓ Departamento de Recursos Humanos (Department of Human Resources)
- ✓ Departamento de Relações Internacionais (Department of International Relations)
- ✓ Departamento de Informática. (Department of Informatics)

The Ministry also disposes of:

- ✓ Coordinating Board: Convened by the Minister of Energy to assure the coordination and assessment of all institutions of the Ministry and subordinated institutions are safeguarded.
- ✓ Advisory Board: Convened and chaired by the Minister of Energy in order to examine and report on key issues related to the activities of the Ministry.
- ✓ Technical Committee: Panel of technical-scientific support and advice to the Minister of Energy.

Organigrama do Ministério da Energia (ME).



At local level the Department of Energy is represented in every province of the country through the Provincial Directorates of Mineral Resources and Energy (DIPREME's) which have a dual subordination to the Ministries of Energy and Mineral Resources and locally, to the Provincial Governor.

These directorates are responsible for the follow-up and the facilitation of the development of the energy sector at the provincial level in accordance with current legislation.

Regulatory Framework

Most important regulatory documents are

- The Electricity Law n° 21/97, which defines the general policy for the organisation of the electrical energy sector and the administration and supply of electrical energy. It also prescribes the general legal framework for electrical energy generation, transmission, distribution and sale within the country, as well as its exportation to and from outside of the national territory, and granting concessions for such activities. It opens the activities of generation, transmission and distribution of electricity also to the private sector. This law is under review and will be completed with a new policy regarding the new and renewable energy sector.
- The Energy Policy (1998) provides a clear statement of the need for providing energy to the household and productive sectors, building capacity and improving management in the sector, increasing exports and efficiency.
- The Energy Sector Strategy (2009 - 2013) focuses on how to implement the Energy Policy and provides concrete guidance for actions to be undertaken during the five years from 2009 to 2013, including the increasing role of the private sector, the development of more competitive markets, and the need for regulation.

In addition, specific plans for electrification have been developed:

- The rural electrification strategic plan, focuses on policy and off-grid electrification.
- The electricity master plans for development of the generation and the national grid, focuses on electricity production and distribution in the short to medium term.

1.2.2 Electricidade de Moçambique, E.P. (EDM)

The national electricity company, Electricidade de Moçambique (EDM), was created in August 1977 by the law n° 38/77. EDM is a legal entity established to generate, transmit and distribute electricity throughout Mozambique.

In pursuing the policy objective of the Mozambican Government for the provision of electricity to all the people and within the context of ongoing reform in the sector, the EDM was transformed into a Public Company, through Decree 28/95 of 17 July 1995.

In 2005, EDM, EP, was appointed by decree of the Council of Ministers to manage the National Grid for Transmission and distribution of Electricity.

EDM has a total installed generation capacity of 233 MW of which 157 MW is currently available. The available capacity comprises 82 MW of hydro power plants and 75 MW of thermal power including diesel and natural gas plants.

EDM currently has the right to purchase most of its electricity (400 MW) from Hidroelectrica de Cahora Bassa (HCB). Part of this power is delivered directly by EDM for consumption in the Northern and Central regions of Mozambique through a 220 kV and 110 kV transmission system. The southern region of Mozambique is connected to the South African grid through a 275 kV transmission line from Komatipoort and a 110 kV from Corumana.

The total number of customers of EDM was about 615.000 in 2008, taking into account the increase of new connections by 105.000 units during that year.

However, since 1997, all three electricity sectors (generation, transmission and distribution) have been opened to private investors.

1.2.3 Conselho National de Electricidade (CNELEC)

The National Electricity Council (CNELEC - Conselho Nacional de Electricidade) was established as an independent regulatory body for the electricity sector.

In a July 2006 a directive issued by the Minister of Energy, instructed CNELEC to give its highest priority to an evaluation of EDM's performance under its Performance Contract with the Government of Mozambique. This Performance Contract covers the years 2007 to 2009 and sets out the goals and indicators to be met annually by EDM.

The 2006 directive also instructed CNELEC to conduct a review of the current methodology used by EDM in setting tariffs.

1.2.4 Fundo Nacional de Energia (FUNAE)

The Fundo Nacional de Energia (FUNAE) was established in 1997 by decret n° 24/97 as a public institution agency under the umbrella of the Ministry of Energy in order to promote rural electrification and rural access to modern energy services, in a sustainable manner, and as a contributor to economic and social development in the country.

Since its establishment FUNAE has been able to implement numerous successful projects using solar, wind and biomass energy resources and technologies to electrify or bring access to modern energy services (water pumping, crop grinding, communications, etc.) to schools, clinics and communities. FUNAE has two decentralized offices in Tete and Nampula.

1.2.4.1 Mission

Promote better access to energy in a sustainable and rational way in order to contribute to the economic and social development of the country

1.2.4.2 Vision

Become a reference institution in the dissemination and promotion of alternative sources of energy for rural electrification

1.2.4.3 Values

- ✓ Focusing on the Customer - Focus on customer needs and ensure that beneficiaries have a comprehensive access to energy.
- ✓ Integrity - Financing and subsidies for projects managed in a transparent way.
- ✓ Efficiency - Maximizing the impact of the resources used.
- ✓ Effectiveness - Oriented to achieve objectives.
- ✓ Teamwork - Working together and commitment to achieve a common goal.
- ✓ Focusing on Change - Accepting and promoting changes and enhance skills.

1.2.4.4 Activities

The activities of FUNAE are aiming to increase access to energy services in order to improve the quality of live through better income generation.

The activities of FUNAE can be classified in nine areas of action, namely:

- ✓ **Electrification of districts, administrative posts, Schools and Health Centres through photovoltaic systems;**

  During the next 5 years FUNAE will implement the electrification of 105 communities using this type of technology.

  The electrification includes the installation of photovoltaic systems for lighting in homes, hospitals and health centres, public buildings and public lighting.

  The estimated cost for the electrification of 105 communities is MZM 328.04 million, and is expected to reach about 126 thousand direct beneficiaries.

- ✓ **Construction of small hydro or micro hydro;**

  During the period 2010-2014 the FUNAE plans to implement 19 projects in the provinces of Tete, Manica, Zambezia and Niassa.

  The implementation costs of the projects are estimated at about 249.32 million MT and are expected to reach about 23 thousand beneficiaries.

- ✓ **Construction of wind pumps for irrigation;**

  The implementation costs of the 50 projects planned is budgeted at about 53.56 million MT and is expected to reach about 60 thousand beneficiaries

- ✓ **Promoting the expansion of the marketing of photovoltaic systems through the private sector;**

  In order to encourage private sector participation, an allowance per Wp system provided will be paid.

  The number of beneficiaries under this pilot project should not be more than 400 customers per supplier in each province and the total Wp provided not more than 40.000 Wp by province.

  The provinces to be covered are: Niassa, Tete, Manica and Sofala.

- ✓ **Institutional Development and Training.**

  The training of staff has been a goal of FUNAE since its creation. With this training the FUNAE seeks to provide its employees knowledge and tools to meet current and future development of the activities.

  This area of institutional development and capacity building includes 3 sub-components, namely: environmental management planning, technical assistance, and training on equipments.

  The Institutional Development and Training component is intended primarily to increase the capacity of the institution in order to improve its performance.

  The financial needs to cover the costs of development and capacity building are of 136.58 million MT during the period 2010-2014.

Other activities of FUNAE, which will not be included in the Belgian cooperation program, are:

- ✓ Electrification of Districts and Administrative Posts through Generators
- ✓ Rehabilitation and extension of the network;
- ✓ Construction of filling stations and fuel stations in the Districts and Administrative Posts;
- ✓ Promoting the use of biomass technologies

1.2.4.5 Finance and budget for the year 2009

The activities undertaken by FUNAE are funded by the following capital resources:

Earmarked Revenues

Is expected for the year 2009 that earmarked revenues will attain the amount of 244.092.000 MZN, considering the geographical bonus and the reliability premium amounting respectively to 179.000.000 MZN and 54.000.000 MZN

Geographical bonus

Article 20, paragraph 2 of the Decree No. 63/2006 of 26 December, established the assignment to FUNAE of 5% on motor fuel tax on petrol and diesel.

This recipe is intended to support the geographic expansion of access to liquid fuels, namely the construction of fuel supply pumps, rehabilitation of infrastructure of fuel pumps and construction of storage facilities of LPG in bulk

Reliability premium

According to the Decree 24/97 on the establishment of FUNAE, a reliability premium coming from the Cahora Bassa receipts, was earmarked to FUNAE.

The estimated value of 54.000.000 MZN was based on the receipt obtained during the year 2008.

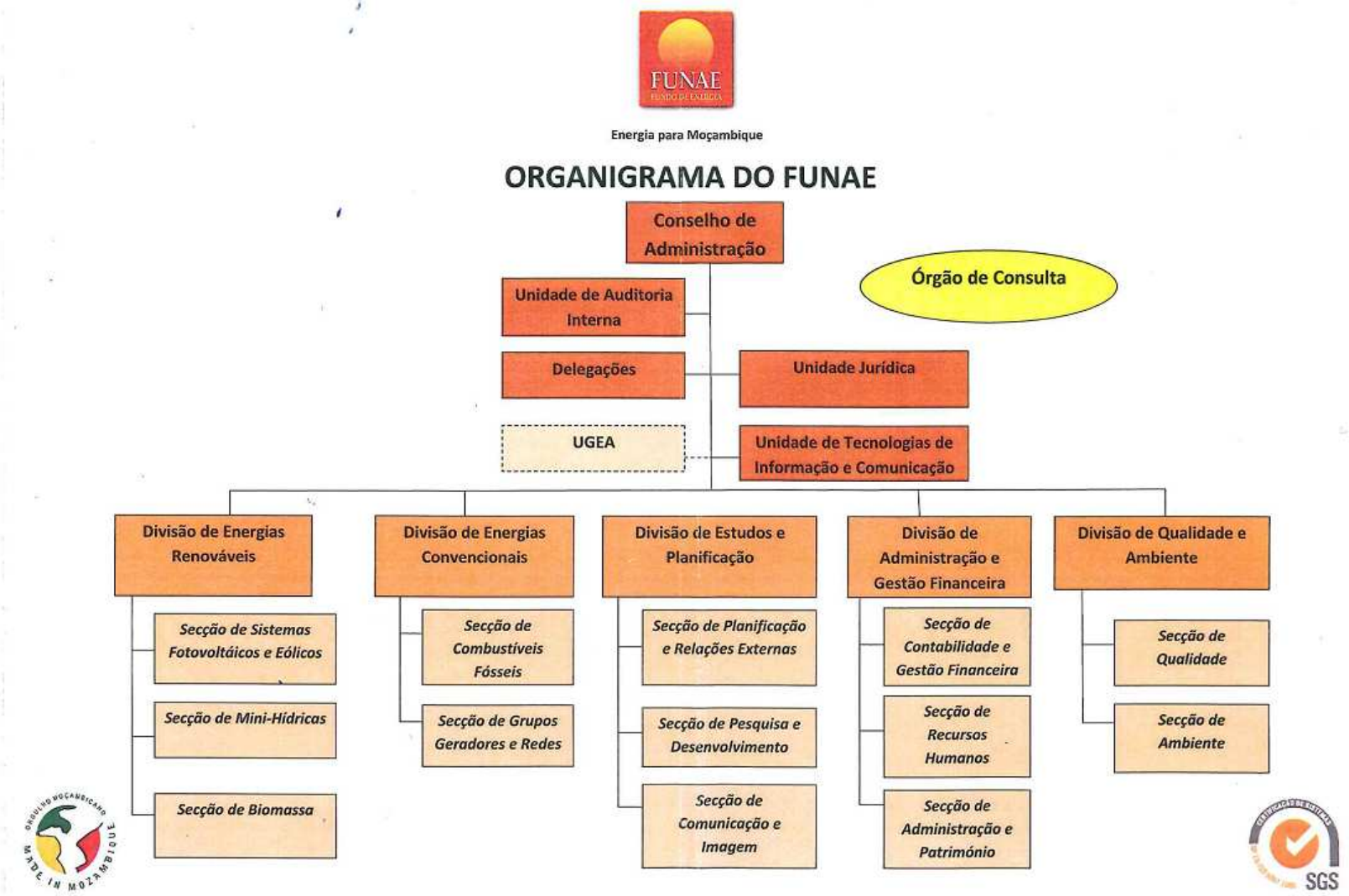
State budget

The Governmental poverty alleviation project provides a budget for rural electrification which was allocated to FUNAE since 2006.

This budget line has been estimated to an amount of 10.000.000 MZN for the year 2009 which corresponds to the limit allowed under the Poverty Alleviation project.

Financial contributions of the Development partners

The disbursements of the EU Energy Funds will add 40.327.000 MZN to the FUNAE budget.


FUNAE
Energia para Moçambique
ORGANIGRAMA DO FUNAE
Conselho de Administração
Órgão de Consulta
Unidade de Auditoria Interna
Delegações
Unidade Jurídica
UGEA
Unidade de Tecnologias de Informação e Comunicação
Divisão de Energias Renováveis
Divisão de Energias Convencionais
Divisão de Estudos e Planificação
Divisão de Administração e Gestão Financeira
Divisão de Qualidade e Ambiente
Secção de Sistemas Fotovoltáicos e Eólicos
Secção de Mini-Hídricas
Secção de Biomassa
Secção de Combustíveis Fósseis
Secção de Grupos Geradores e Redes
Secção de Planificação e Relações Externas
Secção de Pesquisa e Desenvolvimento
Secção de Comunicação e Imagem
Secção de Contabilidade e Gestão Financeira
Secção de Recursos Humanos
Secção de Administração e Património
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2. STRATEGIC ORIENTATIONS

Access to energy is a development catalyst. The main strategy of rural electrification is to contribute to rural development. This strategy is translated into the many global and energy sector strategies available, on which the Belgian cooperation program will be aligned.

2.1 PRSP (PARPA)

The poverty reduction strategy paper (PRSP/PARPA II, 2006-2009) is presented with reference to three pillars: governance, human capital, and economic development. The pillars approach enables to focus attention on the functions of social organization via the State, the development of individual abilities, and the creation of wealth to improve the well-being of the citizens. It also makes it possible to examine the connections among the three functions that are necessary in order to achieve the objectives.

2.1.1 Governance pillar

The governance pillar seeks to make the apparatus of the State a means of sparking the development of human capital and the economy. The government will give special attention to improve the quality of policy analysis and design in order to obtain fully the expected results of their implementation. Officials will be guided by the principles and laws of a government ruled by law, thus ensuring transparency and accountability and combating the diversion and improper use of public funds and resources. Also included is active enforcement of the laws against criminal acts and corruption.

2.1.2 Human Capital

The human capital pillar provides continuity to the plans for developing work-related technical and scientific skills, good health and hygiene, and access to basic resources—especially food and water—and reducing the incidence of diseases that affect the most vulnerable population groups, focusing particularly on the battle against HIV-Aids, malaria, and tuberculosis. A special part of the resources in the state budget will be used to finance classic social services that cover a huge proportion of the population, including the poorest.

2.1.3 Economic Development

The economic development pillar concentrates on basic condition to the pursuit of productive activities, such as improvement in infrastructures that promote the creation of wealth and ensure the availability of natural resources, a reduction in bureaucratic obstacles, and the enactment of legislation that safeguards citizen rights and encourages gains in productivity, and innovation. It will also give priority to intersectoral connections in order to ensure higher productivity in agriculture and related sectors. Additional priorities are the development of the banking and financial systems so that they may fulfil their duties in retention of savings and active financing of production, particularly production by small and medium-sized companies.

Under the Economic Development Pillar, **Energy Infrastructure** is one of the subchapters. The expansion of off-grid energy services for health and education is one of the objectives of the PARPA II, to be executed by FUNAE. Also the expansion of energy services for domestic use and the construction of hydropower projects are objectives under this chapter.

2.2 ENERGY STRATEGY

The Government of Mozambique specifies in its energy strategy a broad sectoral approach to economic and social development, putting rural electrification as a booster for the fight against poverty and for enhancing the socio-economic development. It also stressed that the electrification should not only be made using the National Network of Electric Power, but with the use of other sources of energy, focussing on new and renewable energy.

The strategy for the energy sector, based on the sector policy of the year 1998, outlines guidelines for the development of programs focusing on specific initiatives.

Under this strategy, priority actions in the area of new and renewable energies are:

- ✓ Continue with the rural electrification program, through the use of new and renewable energies;
- ✓ Electrify social infrastructure, including hospitals, clinics and schools based on alternative sources of energy;
- ✓ Intensify efforts to cover small cities with the use of photovoltaic technology, taking into account the recent technological advances and consequent reductions in costs;
- ✓ Pursue electrification programs using low-cost technologies, based on the Low Cost Rural Electrification Plan (LCREP);
- ✓ Enhance the use of electricity in the areas served by the national network and remote areas
- ✓ Promote hybrid approach using sustainable biomass resources (wood and bio-fuel), solar, wind and hydro;
- ✓ Promote more efficient methods of charcoal production through training and dissemination of information on more effective techniques for conversion;
- ✓ Promote and disseminate solar thermal equipments;
- ✓ Promote more efficient methods for use of fuel and wood by disseminating information on new types of improved stoves;
- ✓ Identify opportunities for private sector participation in projects of production and sale of power systems and marketing of improved stoves;
- ✓ Assign high priority to combat vandalism, increasing the legal and punitive measures to acts that destroy the energy infrastructure;
- ✓ Develop actions to implement projects to generate electricity, through the diversification of alternative sources of energy, aiming preservation of biomass resources;
- ✓ Strengthen the operations of the Management Committees and local operators, through technical training in environmental conservation and management.

2.3 STRATEGIC PLAN OF FUNAE

The strategic plan of FUNAE for the years 2010 – 2014 defines realistic and measurable objectives, which are in line with the strategic plan of the Ministry of Energy recently approved.

This strong alignment with government's strategy gives additional value to the FUNAE strategy and points out criteria for setting up priorities in the development and implementation of energy projects by FUNAE.

The strategic plan of FUNAE for the years 2010-2014 has 5 macro-objectives, split over 13 objectives. A schematic version of the plan is given below.

I. Access to Sustainable Energy Services	1. Increase the number of the beneficiaries with access to energy services through the implementation of sustainable projects with strong social, economic and environmental impact 2. Ensure that projects are implemented according to the cost and time frame (on time and within the budget). 3. Provide more training courses on technology, operation and maintenance of equipment already installed or to install
II. Quality and Environment	4. Implement procedures to ensure compliance with quality standards of FUNAE. 5. Ensure the evaluation of environmental and social impact of projects financed by FUNAE
III. Mobilization of Funds	6. Ensure the reimbursement of the loans (credits). 7. Ensure sufficient financial resources for development projects
IV. Partnership Development	8. Increase the involvement of Private Sector as a beneficiary and partner of FUNAE. 9. Increase the participation of Community and Social Organizations (NGOs, local authorities and others) as beneficiaries and partners of FUNAE. 10. Involve institutions of micro-finance as intermediaries in the allocation of funds of FUNAE
V. Capacity Buildin	11. Increase the effectiveness and efficiency in resource allocation. 12. Continue with the policy of training employees to increase the capacity of intervention of the institution. 13. Ensure implementation of internal procedures (using the PHC system, implement the procedures of the Quality Manual, Procedure and Rules of Professional Careers).

2.4 PROGRAM STRATEGY

2.4.1 Components

The activities of the Belgian cooperation program will be aligned with the strategic plan 2010-2014 of FUNAE, and will fit into it.

The global strategy of the program is to reinforce the capacity of FUNAE to be able to implement the rural electrification projects financed by the Belgian and Mozambican government and other development partners.

Development of cooperation programs with micro-finance institutions for household and commercial electrification devices, will allow the program strategy to focus on the electrification of the community infrastructures.

The Belgian cooperation program comprises 3 major components (called results in the logical framework).

2.4.1.1 Access to energy

This component will be aligned with the FUNAE macro-objective I

- ✓ increased access through projects with a high impact on social, economic and environmental conditions (FUNAE objective 1)
- ✓ on time and on budget execution (FUNAE objective 2)
- ✓ more training on operation and maintenance of the installed systems (FUNAE objective 3)

This component (result) will be achieved through 4 activities:

1. Needs assessments and pre-feasibility studies (followed by ranking of the possible projects according to predefined criteria)
2. Implementation of hydropower projects
3. Implementation of solar power projects
4. Implementation of wind water pumping projects

2.4.1.2 Increased financial accessibility to energy

This component will be aligned with FUNAE's macro-objective IV (partnership development)

In accordance with the FUNAE objective 10, this component will analyse the feasibility of micro-finance system for individual households and small businesses in order to have access to renewable energy systems through soft loans.

This relatively small component can have a large impact on individuals. Once the systems are put in place, access to the micro-finance system can substantially increase access to energy in rural areas, with only a supervisory role for FUNAE. This will decrease the workload for FUNAE, and allow it to focus on community infrastructure electrification, on large-scale electrification (mini-grids) and policy development.

The multiplication of small (mainly solar) installations will create a local market for these installations and jobs in selling, installing, repairing, maintaining these systems. Local markets for battery charging systems with renewable energy can also emerge.

A precondition for the system to work is of course that people can afford the loan. At household level, energy consumption is now estimated at 30-120 MZN per month. Subsidies from FUNAE are to be considered. The program foresees investment funds to cover initial subsidies.

2.4.1.3 Technical and Administrative capacity building

This component will be aligned with FUNAE's macro-objective V (Capacity building)

FUNAE is a relatively young organisation, and is still in a growth phase (see situation analysis – point 1.2.4). A substantial amount of expertise in different domains is already available. However, continuous growth of annual turnover means that the organisation will have to grow accordingly.

This component (result) of the project will be achieved through 4 activities:

1. Training (FUNAE Objective V/12) of new and already present staff members in different departments. Staff members of the Ministry of Energy will also benefit some training on lessons learned based renewable energy policy making.
2. Research and Development activities in the renewable energy sector, to optimise the projects that are implemented
3. GIS-based management, an indispensable tool to facilitate planning, follow-up, maintenance and financing of the systems
4. Long term technical assistance, to provide guidance to the program by working close together with the FUNAE staff.

2.4.2 Focus on community infrastructures

2.4.2.1 The program will focus on the community infrastructures.

These include :

- ✓ administrative buildings
- ✓ health centers
- ✓ schools
- ✓ water pumping systems
- ✓ public lighting

Community infrastructures have a high impact on rural development. Administrative entities can increase their performance with electricity (lighting, communication, computers, meetings, consciousness-raising).

Schools can drastically increase their potential by giving nocturnes classes in various disciplines, going from basic alphabetisation to specific evening courses on topics like management, agriculture or consciousness-raising on social issues like HIV/AIDS, hygiene and sanitation, etc. The electrification of schools and the surrounding teachers houses is a big incentive for teachers to go and work in these schools. Quality of teaching will increase.

Health centers can perform emergency operations at night in decent light conditions, and can keep a stock of vaccines in a fridge. Radio communication between the health network also becomes an option. The program will also improve living conditions for staff houses near the health center, which is also an incentive.

All these community infrastructures can become places for social gatherings, where for instance TV-news can be watched.

The electrical water pumping systems can be very much timesaving. Where water is available, the water chores (transport and pumping) still occupy a large portion of the (mainly female) people in charge of water supply. Options are not only to replace the manual pump with an electrical one, but could include pumping over a certain distance to limit walking time. These systems should be equipped with back-up systems, so that in case of electrical failure, the water supply is not hampered and people are not forced to fetch water even further than before.

Close collaboration with other donors or agencies working in the area of rural water supply will need to be sought, as the expertise for water supply is not present in FUNAE and not the role of FUNAE.

Public lighting is known for its high impact on security. It facilitates movements at night, and thus improves social life in the village.

To have more impact (better health services, better schooling, …), the installation of some electrical appliances (fridges, televisions) as a complement to lighting will be analysed, within the framework of the line ministry strategies and action plans, and in synergy with other donors.

2.4.2.2 Households and commercial applications

Household and commercial installations will be stimulated through micro-finance systems, after analysis of the feasibility of these systems.

In the past, FUNAE has directly financed small household and commercial installations. This certainly has a big impact on these households and shops, but is hard to manage. After a long period of time, FUNAE would have to manage thousands of these micro-systems (one solar panel)

The hydropower projects will be able to provide much more power than is needed by a health centres or schools. These projects will include complete village electrification. A tariff study for rural electrification in ongoing and will ensure that funds for maintenance are collected.

2.4.3 Geographical concentration

Considering the large area of the country and the dispersed population in rural areas, a geographical concentration and/or clustering is needed.

As the strategic plan of FUNAE identifies the provinces of Manica, Tete, Zambezia and Nyassa to have a high potential for all kind of renewable energies and more specifically for small hydropower, this program might consider to concentrate its activities mostly in districts with a poor electricity provision in these four provinces.

However, the concentration area can be adjusted by the steering committee after the needs assessments and feasibility studies of the energy projects to be implemented.

2.5 LINK WITH MILLENNIUM DEVELOPMENT GOALS

The program activities are totally aligned with the Millennium Development Goals, more specifically through the implementation of:

- ✓ The electrification of small villages (postos administrativos), health units and rural schools using renewable energy;
- ✓ The electrification and irrigation using the hydraulic energy potential of the country
- ✓ Water pumping using renewable energy

These projects reduces the time and effort collecting water and therefore has a significant impact in the daily activity of women and improves hygiene conditions and health of families. It also creates opportunities for production and income generation

They will improve the quality of life of communities and create job opportunities and sources of income. In particular, those who are using the hydraulic potential can create a flow of economic benefits, using electricity for irrigation, food processing, services, and other activities that boost the rural economy and generate income

They also have an impact in terms of health, education, HIV, the situation of women and also offer opportunities for information and communication, which, regarding women, allows them to rise to their level of knowledge and the quality of care or education of their children

They will enable the development of the health and education sectors so that communities enjoy a better quality of services in these areas.

3. PROGRAM FRAMEWORK

3.1 OVERALL OBJECTIVE

The overall objective of the project is

To promote rural development by providing access to energy.

3.2 SPECIFIC OBJECTIVE

The specific objective of the project is

To increase access to hydraulic, solar and wind energy for use in off-grid applications in rural areas by investments in renewable energy systems, stimulation of micro-finance initiatives and institutional capacity building

3.3 EXPECTED RESULTS AND ACTIVITIES

3.3.1 R1 Access to energy is increased by the implementation of solar, wind and hydro projects.

3.3.1.1 R1.A1 Needs assessment and feasibility studies

The first step in increasing the access to energy is to make a comprehensive needs assessments. These assessments will be done in close cooperation with the ministries of Health and Education, and with local administrations, according to existing needs assessments and specific (sectoral) strategies and action plans.

A database of needs assessments will be kept, to be able to link it to the GIS-system (see further).

The needs assessments will have to take into account following aspects :

- ✓ future growth of communities and needs
- ✓ number of beneficiaries
- ✓ interventions of other donors
- ✓ planning of other ministries
- ✓ local development plans and initiatives

The needs assessments exercise will also be used to gather the base-line indicators, to be able to measure project impact during final evaluation.

For the hydropower systems, a pre-feasibility study of the sites is needed in order to see if hydropower in these sites is feasible from a technical and economical point of view.

Solar systems depend much less on local circumstances like topology and the feasibility of solar systems can be more globally assessed based on experience and taking into account variation in radiation across the country. No extensive feasibility studies are needed; design studies will be done after prioritisation.

Wind pumping systems are already installed in many parts of the country, so an up scaling of the number of wind pumping systems seems straightforward. However, local circumstances as wind speed and direction as well as turbulence can influence, so care should be taken when planning these systems. Moreover, an analysis of the water resource needs to be done to assure an optimal investment.

The pre-feasibility studies will allow to estimate which projects should be included in the priority list.

After the needs assessment and pre-feasibility studies, lists of priorities in water, solar and wind energy can be made, based on the following criteria (list is not exhaustive) :

- ✓ cost effectiveness of the project
- ✓ synergy with other projects (from Belgian development cooperation or other donors)
- ✓ number of beneficiaries
- ✓ impact of the project
- ✓ sustainability aspects (with a strong emphasise on maintenance by local communities)

A revised and updated list of criteria for the selection of projects will be prepared during the baseline study of the project and submit to the SC for approval.

The sites will not be covered by the grid extension plans of EDM within the next 5 years.

Once the ranking of priorities is established, the technical studies for the implementation of the projects can start. These studies and follow-up costs are included in budget for the activities described below.

3.3.1.2 R1.A2 Hydropower project implementation

Hydropower, connected to an isolated mini-grid is an opportunity for rural electrification. Although investment costs are prohibitive for a small community, hydropower is relatively cheap compared to other renewable energy technologies. It also has the advantage of being very reliable (if well planned and executed) and of generating enough power to electrify villages entirely. Hydropower is available day and night, and as such doesn't need batteries to store energy (the energy is stored as water in the basin).

On the disadvantages, hydropower requires maintenance of electric and mechanical components, but also of the civil construction works. If dams are constructed, they alter water and sediment flows, the latter being responsible for a gradual loss of water and thus energy storage.

It is also not always readily available where it's needed. Sometimes transmission lines can bridge the distance between production and consumption sites.

A site list with hydropower potential in the Manica, Tete, Zambezia and Niassa provinces, cross-checked by initial feasibility studies (or pre-feasibility), is already available. The program will implement part of the micro hydropower installations on this list.

The total budget for hydropower is an envelope of 4.000.000 euro, which will be spent as a fund according to priorities and opportunities of the eligible projects. It's not possible to estimate the number of hydropower installations or the total power that will be

installed, as these depend on a large number of factors that feasibility studies will provide (canal length, medium tension line length, local consumption, local topology, …)

The activity covers the full project cycle, from implementation studies (5% of the budget line) to implementation of the civil works and electromechanical installations (85% of the budget line) and the follow-up of these works (10% of the budget line).

A maintenance contract for each installation will be foreseen and financed by FUNAE. Beneficiaries will be trained to operate the system and will receive clear instructions on what to do in case of failure.

3.3.1.3 R1.A3 Solar power project implementation

This activity will implement the priority solar projects for electrification of community infrastructures such as administrative buildings, health centres and schools.

Photovoltaic energy costs have decreased substantially over the last 5 years, and will continue decreasing in the future. Sector developments will make photovoltaic energy so cheap that "grid parity" will be reached soon, meaning that the cost of electricity produced by solar panels is less than the grid electricity cost. Of course, the main disadvantage of solar energy in off-grid contexts is that the energy is not available when it's needed, and electricity storage is required in the form of (expensive) batteries, using charge controllers (and inverters when alternative current is needed).

FUNAE already has experiences with centralised and decentralised systems, as well as with the electrification of community infrastructures. Recent experiences in the ERAP project (World Bank) will also be very useful to optimise solar systems installed in the community infrastructures.

A particular attention will be given to solar water pumping where it's feasible. Where no water is available, people often use too little and too polluted water, with consequences on their health.

Water is a basic utility in health centers and will thus be included in the needs analysis. Providing water in schools is also essential for good sanitary conditions and the health of the children and will be an incentive for children (or people) to go to school.

As for the hydro projects, the envelope for solar projects is to be considered as a fund of 6.500.000 €, to be disbursed according to the criteria based priority list.

The activity covers the full project cycle, from implementation studies (3% of the budget line) to implementation of the civil works and electromechanical installations (90% of the budget line) and the follow-up of these works (5% of the budget line). Training of beneficiaries (health staff, teachers, administrative) will be done for the operation and the minor maintenance of the solar systems.

3.3.1.4 R1.A4 Wind water pumping

Wind can provide mechanical power for water pumping, at a relatively low cost. Where an opportunity is found (according to priority lists), windmill-pumping system will be installed.

A rather small budget of 500.000 EUR will be allocated to these activities.

A maintenance contract for each installation will be foreseen and financed by FUNAE.

3.3.2 R2 Financial accessibility to energy is improved

In addition to the electrification of community infrastructures, it can be very interesting for the population in rural areas to have access to electricity on household (lighting, television) or small commercial level (fridge/freezer, mills, machinery, …). As the priority of the program is to provide access to electricity for administrative buildings, health centres and schools, the program will not directly finance private household or commercial electrification.

As these private systems can have a big impact, but their cost is sometimes prohibitive, the program wants to stimulate micro-financing initiatives to provide a way for the population to be able to pay for these systems on a loan basis.

3.3.2.1 R2.A1 Set-up of micro-finance mechanism

This activity covers the analysis of micro-financing opportunities in the renewable energy domain. These will be mainly solar systems, but very small hydro-systems (pico-hydro) will also be eligible for micro financing.

The mechanism could include a subsidy by FUNAE, to make the investment more attractive/feasible for the rural population.

Consultancy services will be contracted to analyse the following points :

- ✓ technical and economical feasibility of micro-finance in rural areas
- ✓ subsidies aspects
- ✓ potential for micro-finance initiatives, links with other micro-finance activities in the rural development sector
- ✓ overview of micro-finance institutions in Mozambique
- ✓ eligibility criteria for micro-finance credit applications (target group)
- ✓ risk management

The set-up of micro-finance initiatives is not necessarily limited to the geographical areas where the program is implemented. A few pilot projects can be sufficient to launch micro-finance initiatives countrywide and to have a huge impact on the rural development.

A budget of 100.000 euro will be allocated to this activity.

3.3.2.2 R2.A2 Promotion of micro-finance mechanisms

After the set-up and testing of micro-finance initiatives, the system needs to be promoted. The relatively small budget available will allow for a couple of first communications (by local or national media), to create the initial demand and to launch and boost the mechanism.

3.3.2.3 R2.A3 Investment funds

Micro-financing systems for private (household or commercial) applications will not be able to finance the total cost of renewable energy systems. The program proposes to install a system of subsidies or investment funds to make the investment for private people more economically feasible by decreasing the amount of the loan.

The systems to be purchased on micro-finance loans will have to meet a number of eligibility criteria for funding, such as :

- ✓ technical specifications and quality of the installation subsidised (norms)
- ✓ maintenance and warranty periods
- ✓ supplier certification

Funding through micro-finance could have a considerable impact on the access to energy in the private sector in rural areas, as well as on the renewable energy systems import, distributors, vendors, …

The modalities of this funding have to be defined during the program implementation.

A budget of 1.000.000 euro will be allocated to this activity.

3.3.3 R3 The technical and administrative capacity of FUNAE is increased

3.3.3.1 R3.A1 Training

Training is an important aspect of any capacity building exercise, especially in the relatively young and dynamic context of renewable energy systems.

Training can be short term (intensive courses, conferences, seminars) or long term (masters degree etc), and can be done in Mozambique or abroad. FUNAE and the Ministry of Energy (MoE) commits theirselves to replace all staff members that go on a long term training, to avoid the loss of capacity for implementation of the program. To this effect, training initiatives will be closely coordinated with the human resources department of FUNAE and the Ministry of Energy.

The training initiatives can be technical (on renewable energy technologies, GIS) or in other domains that are relevant for the implementation of the FUNAE mission (management, (micro-) finance, sociology, …).

Training needs and relevance on CDM topics will be analysed.

Distance learning will be analysed and if possible implemented.

A link with universities or high schools in Mozambique (teaching by MoE or FUNAE-members, training of MoE or FUNAE members, joint educational site visits, …) can be developed according to opportunities. This aspect will have to be analysed.

A budget of 200.000 euro will be allocated to this activity.

3.3.3.2 R3.A2 Research and Development

The research and development (R&D) component of the program will look for optimisation of existing systems and try out new systems or approaches for Mozambique. As solar energy is more recent and quickly evolving, most research topics will apply to solar energy.

Some aspects for research could be :

- ✓ analyse national weather data to have a reliable database of inputs for the various renewable energy technologies (solar radiation, rainfall, wind speed and directions)

- ✓ remote monitoring of hydro or photovoltaic installations, in order to detect malfunctioning and to capitalise experiences
- ✓ testing different kinds of solar panels (crystalline, thin film, amorphous, …) in order to find out the best price/quality for the local conditions and climate
- ✓ comparing centralised to decentralised solar systems
- ✓ installing pico-hydro turbines for research purposes
- ✓ testing a hybrid system
- ✓ comparing CFL lamps and LED-technology

Reporting and capitalisation of the R&D projects is crucial for the success.

A budget of 200.000 euro will be allocated to this activity.

3.3.3.3 R3.A3 Implement a GIS asset management system

A lot of renewable energy systems are already installed in Mozambique, going from large (grid connected) over small hydropower plants to very small solar systems. Some –but not all- of these systems were installed by FUNAE (except for the large hydro), and more installations will be built in the coming years under this program and World Bank en European Commission programs. Moreover, the ministry of Health implements also a parallel electrification program, other donors already financed school electrification, and so on. It's no wonder that there can sometimes be confusion over what installation belongs to whom, who is in charge of follow-up of the system, who financed the system, …

To keep a clear view over all these systems, the program will implement a GIS-system at FUNAE, as an assets management tool.

Having this tool will allow :

- ✓ for better monitoring/reporting on all systems by all stakeholders, as the tool can easily be shared with other ministries and donors
- ✓ for better planning, as existing installations can be easily eliminated from needs assessment by cross-checking with public infrastructure (schools, hospitals, postos administrativos) lists
- ✓ for a better management of the assets that belong to FUNAE

The GIS-system will be put in place in coordination with the ministries and other donors, in order to make sure the database reflects the wishes for data collection from those stakeholders, which will increase the utility of the tool. GIS-system experiences with mines cleaning operators will be taken into account.

Data to be gathered (preliminary list) are :

- ✓ owner
- ✓ type of system (solar, hydro, wind, hybrid…)
- ✓ type of infrastructure (postos administrativos, health centres, schools, …)
- ✓ power installed
- ✓ contact person
- ✓ status of the system (operating or not)

- ✓ maintenance contract or firm
- ✓ possibly serial numbers of panels, turbines, transformers, batteries, ... for warranty issues and theft protection
- ✓ value of the system
- ✓ number of beneficiaries
- ✓ ……

A budget of 150.000 euro will be allocated to this activity.

3.3.3.4 R3.A4 Technical Assistance

A Project Management Team will provide technical and financial assistance to the program. This team will include a national Project Director, two International Technical Assistants, one Local Accountant and an Administrative Assistant. The recruitment of the TAs will be done by BTC after consultation with FUNAE. The recruitment of the Local Accountant and Administrative Assistant will be carried out jointly by the BTC Representation in Mozambique and FUNAE. Profiles of the TAs are proposed in annex. One TA has a technical profile, the second one a socio-economic and management profile.

The TA-team will assist FUNAE in the following aspects

- ✓ follow up the entire program from a technical point of view
- ✓ advise the BTC resident representative with regard to non-objections on tender launching, awarding and on acceptance
- ✓ capitalize the experiences of previous installations and R&D activities
- ✓ elaborate needs assessments and priority lists within rural development strategies
- ✓ capacity building of FUNAE and Ministry of Energy
- ✓ evaluate training needs and opportunities with the HR department of FUNAE and Ministry of Energy

Key results for the TA-team are listed in the item 7.3 of this technical file.

The activity provides a small additional budget for external consultancy as guidance to the project, as a supplement to the many consultancies available for feasibility studies, detailed project studies, training, and micro-finance.

A budget of €1 .200.000 will be allocated to this activity.

3.4 INDICATORS AND MEANS OF VERIFICATION

The indicators for the global objective are indicators of rural development:

- ✓ alphabetisation degree/number of students in evening classes
- ✓ vaccination ratios and health care
- ✓ water chore time
- ✓ crop yields

The indicators for the global objective are sometimes difficult to measure and additionality is sometimes hard to prove. The project evaluation will refer to the baseline (to be developed in the study phase).

Indicators for the specific objective are :

- ✓ the total number of beneficiaries of the program and their satisfaction with the program
- ✓ total installed power

Indicators for the first result (Access component) are :

- ✓ the list of priorities for hydro, solar and wind power is established
- ✓ number and total power of hydro-electric power plants installed, operational and properly maintained and quantity and quality of electricity provided to the beneficiaries.
- ✓ number and total power of solar systems installed, operational and properly maintained and quantity and quality of electricity provided to the beneficiaries.
- ✓ number of schools, hospitals and postos administrativos electrified, and quantity and quality of electricity provided to the beneficiaries.
- ✓ number of windmills for water pumping for drinking water/irrigation

Indicators for the second result (financial accessibility component) are :

- ✓ the presence of a micro-finance system
- ✓ the number and number of beneficiaries of the micro-finance system involved
- ✓ number and amount of private sector projets financed using investment funds

Indicators for the third result (Capacity Building component) are :

- ✓ number of people trained
- ✓ number of trainings received
- ✓ number of (reports on) R&D projects
- ✓ presence of a GIS-system

The indicators are also mentioned in the logical framework at the appropriate places. As far as possible, the indicators should be quantified before the start of the project in order to allow adequate monitoring and evaluation. The SC will approve the updated quantified indicators proposed by the baseline study.

3.5 DESCRIPTION OF BENEFICIARIES

3.5.1 Direct beneficiaries

The direct beneficiaries of the project will be the population in areas where electrification projects will be implemented. They will benefit from better community infrastructures.

In general the rural population will benefit from better water supply (reduced pumping time and effort) and improved health care (vaccination, radio communication etc). Children will benefit from better lighting in schools and from access to media, as will all adults following evening classes.

Personnel in those infrastructures (postos administrativos, health centres, schools) will benefit from electrification by having substantially better working and living conditions. This will be an incentive for these people to perform their job.

People having access to energy through micro-finance systems will be beneficiaries as well. They will be able to make an investment in energy that can be paid back over a longer period of time.

3.5.2 Indirect beneficiaries

Indirect beneficiaries are the private companies that will install, maintain and repair the different installations, either community infrastructures or household/business systems. The renewable energy sector has the potential to create a large number of long-term jobs.

4. RESSOURCES

4.1 HUMAN RESOURCES

A project management Team (PMI) will be appointed and will carry out the technical and financial follow-up of the project activities. The responsibilities of the PMT are listed in item 5.3.2 of this file.

The Project Team Leader (project director) will be a member of the FUNAE staff and will be appointed by the CEO of FUNAE.

FUNAE commits itself to put any extra human resources needed for the smooth execution of the program at the disposal of the PMT, and if necessary recruit new human resources for the program at their own expense. This commitment goes for as well the central level of FUNAE as the delegations in the regions where the program will be implemented.

These human resources affected to the program will be financed on the Mozambican contribution to the project.

The Belgian contribution will finance two international Technical Assistants (TAs) and a program Accountant and Administrative assistant.

The recruitment of the international TAs will be done by BTC, with the approval of FUNAE.

One TA will have a technical profile, the second one a socio-economic and management profile. Profiles and key results for the TAs are listed in item 7.3.

The recruitment of the Local Accountant and Administrative Assistant will be carried out by the Project Management Team.

Human resources from the BTC representation office in Mozambique and from the BTC headquarters in Brussels will also be available to follow-up the program implementation. Their salaries will be budgeted for on other funds.

4.2 MATERIAL RESOURCES

A limited number of material resources will be put at the TA's disposal in direct management by BTC. This includes vehicles and its running costs, as well as some IT-equipment.

These material resources will be imported or locally bought free of duties and other charges in compliance with the article 8 - Privileges and Immunities of the General Convention of Cooperation signed between Belgium and Mozambique

This will allow the TA's to have their own logistics to fulfill their tasks

Missions of the TA to the interior of the country (flights, hotel and per diem) are also taken in charge on direct management.

FUNAE will put the following resources at disposal (at their expense)

- ✓ (furnished) office space for the PMT
- ✓ transportation within the provinces (equipment, fuel, maintenance, insurance, ...)

- ✓ IT, communication, furniture, offices for the new staff engaged for the implementation of the program
- ✓ If relevant and needed, the equipment of a new delegation in the zones of the program
- ✓ Organisation of workshops and seminars
- ✓ All Taxes and duties levied on any purchase by the project of goods and services

The human and material resources put at disposal by FUNAE represents a considerable amount of money, to be considered as the Mozambican contribution to the project.

4.3 FINANCIAL RESOURCES

The **Belgian contribution** is detailed in this document. It amounts to 15.000.000 euro.

Around 12% of this amount will be managed under direct BTC management. This includes some material resources (logistics) invested for the TAs (see further), as well as the project audits, follow-up and backstopping, mid-term and final review (evaluation).

The detailed budget, including the expenses chronogram, is given in the table on next page.

The **Mozambican contribution** to the project will be in Human Resources, material resources and the all taxes and duties levied on goods and serviced purchased by the project.

This additional budget has been estimated at 20% of the Belgian contribution amounting 120.000.000 MTN (3.000.000 EUR)

The program could also trigger extra funding by FUNAE and its development partners, for instance on micro-finance aspects and on maintenance contracts.

MOZ0901811 - Renewable Energy for Rural Development				N°	Unit price	Budget (€)	%	Mode	Y1	Y2	Y3	Y4
A			**Increase access to energy**			**14.200.000 €**	**94,7%**		**850.000 €**	**2.425.000 €**	**5.750.000 €**	**5.175.000 €**
A	*01*		*Access to energy is increased by implementation*			*11.300.000 €*	*75%*		*400.000 €*	*1.750.000 €*	*4.750.000 €*	*4.400.000 €*
A	01	01	Needs assessments, feasibility studies			300.000 €		co-management	100.000 €	150.000 €	50.000 €	0 €
A	01	02	Hydroprojects			4.000.000 €		co-management	150.000 €	500.000 €	1.500.000 €	1.850.000 €
A	01	03	Solar electrification			6.500.000 €		co-management	100.000 €	1.000.000 €	3.000.000 €	2.400.000 €
A	01	04	Wind water pumping			500.000 €		co-management	50.000 €	100.000 €	200.000 €	150.000 €
A	*02*		*Micro financing mecanisms are developed and subsidised*			*1.150.000 €*	*8%*		*50.000 €*	*175.000 €*	*525.000 €*	*400.000 €*
A	02	01	Set-up of MF mechanism			100.000 €		co-management	50.000 €	50.000 €	0 €	0 €
A	02	02	Communication			50.000 €		co-management	0 €	25.000 €	25.000 €	0 €
A	02	03	Investment funds			1.000.000 €		co-management	0 €	100.000 €	500.000 €	400.000 €
A	*03*		*Capacity of co-management is increased*			*1.750.000 €*	*12%*		*400.000 €*	*500.000 €*	*475.000 €*	*375.000 €*
A	03	01	Training			200.000 €		co-management	25.000 €	75.000 €	75.000 €	25.000 €
A	03	02	Research and Development			200.000 €		co-management	25.000 €	75.000 €	75.000 €	25.000 €
A	03	03	Implement GIS asset management system			150.000 €		co-management	50.000 €	50.000 €	25.000 €	25.000 €
A	03	04	Technical Assistance	2	12.500	1.200.000 €		direct-management	300.000 €	300.000 €	300.000 €	300.000 €
X			**Reserve**			**79.000 €**	**0,5%**	**co-management**	**0 €**	**0 €**	**0 €**	**79.000 €**
X	*01*		*Reserve*			*79.000 €*			*0 €*	*0 €*	*0 €*	*79.000 €*
X	01	01	co-managed Reserve			79.000 €		co-management	0 €	0 €	0 €	79.000 €
Z			**General Means**			**721.000 €**	**4,8%**	**own-management**	**299.000 €**	**142.000 €**	**142.000 €**	**138.000 €**
Z	*01*		*Personnel Costs*			*48.000 €*			*12.000 €*	*12.000 €*	*12.000 €*	*12.000 €*
Z	01	01	Accoutnant and Administrative officer	1	1.000	48.000 €		direct-management	12.000 €	12.000 €	12.000 €	12.000 €
Z	*02*		*Investments*			*95.000 €*			*90.000 €*	*0 €*	*5.000 €*	*0 €*
Z	02	01	Vehicles	2	40.000	80.000 €		direct-management	80.000 €	0 €	0 €	0 €
Z	02	02	ICT	1	15.000	15.000 €		direct-management	10.000 €	0 €	5.000 €	0 €
Z	*03*		*Operating costs*			*388.000 €*			*97.000 €*	*97.000 €*	*97.000 €*	*97.000 €*
Z	03	01	Vehicles operation and maintenance	96	750	72.000 €		direct-management	18.000 €	18.000 €	18.000 €	18.000 €
Z	03	02	Communication costs	48	500	24.000 €		direct-management	6.000 €	6.000 €	6.000 €	6.000 €
Z	03	03	Mission costs	100	2.500	250.000 €		direct-management	62.500 €	62.500 €	62.500 €	62.500 €
Z	03	04	Other operating costs			42.000 €		direct-management	10.500 €	10.500 €	10.500 €	10.500 €
Z	*04*		*Audits, Follow-up and Evaluations*			*190.000 €*			*100.000 €*	*33.000 €*	*28.000 €*	*29.000 €*
Z	04	01	Audit	2	20.000	40.000 €		direct-management	20.000 €	0 €	20.000 €	0 €
Z	04	02	Internal control and risks asssessment	1	50.000	50.000 €		direct-management	50.000 €	0 €	0 €	0 €
Z	04	03	Mid term and Final evaluation			50.000 €		direct-management	0 €	25.000 €	0 €	25.000 €
Z	04	04	Baseline study	1	20.000	20.000 €		direct-management	20.000 €	0 €	0 €	0 €
Z	04	05	Follow-up and backstopping			30.000 €		direct-management	10.000 €	8.000 €	8.000 €	4.000 €
			Total			**15.000.000 €**	**100,0%**		**1.149.000 €**	**2.567.000 €**	**5.892.000 €**	**5.392.000 €**

co-management	**13.079.000**
direct-management	**1.921.000**

5. IMPLEMENTATION MODALITIES

5.1 LEGAL FRAMEWORK AND ADMINISTRATIVE RESPONSIBILITIES

The legal framework for the project is given by the Specific Agreement, to be signed between the Belgian Minister for Development Cooperation and the Mozambican Ministry of Energy at the end of the formulation process. This Technical and Financial File will be attached to this Specific Agreement.

5.2 MANAGEMENT MODALITIES

The Specific Agreement specifies that the Mozambican party designates :

- ✓ FUNAE as the agency responsible for the Mozambican contribution to the project and implementation of project activities. The Authorising Officer is responsible for authorising expenditures on the Belgian Contribution.
- ✓ The Chief Executive Officer (CEO) of FUNAE, as the Authorising Officer responsible for approving expenditure chargable to the budget of the project

The Specific Agreement specifies that the Belgian party designates :

- ✓ The Directorate-General for Development Cooperation (DGDC), represented by the attaché for International Cooperation in Maputo as the Belgian entity responsible for the Belgian contribution.
- ✓ The Belgian Technical Cooperation, represented by the BTC representative in Maputo, as the Belgian entity responsible for the co-management of the project.
- ✓ The BTC Resident Representative in Mozambique is responsible, as co-authorizing Officer, for providing a no-objection for the expenditures chargeable to the Belgian contribution of the budget of the Project.

Most activities of the project will be co-managed.

The DGDC will take all institutional, administrative and budgeting measures towards BTC, permitting the latter to implement the project.

The modalities can possibly be modified if an international independent auditing firm carries out an assessment on the level of maturity of the internal controls of FUNAE, including a risk assessment. The conclusions of the assessment must be positive and the proposed recommendations must be implemented for the identified weaknesses.

This assessment is financed in direct-management, with the participation of the other donors if interested.

5.3 IMPLEMENTATION AND FOLLOW-UP STRUCTURES

5.3.1 Steering Committee

A joint local consultative body (JLCB), also called steering committee (SC), will be created for the implementation of the project, on the approval of this document.

The Steering Committee (SC) represents the highest management level of the project. It is responsible to provide the necessary strategic guidance to all project implementers and stakeholders. It supports the project management in view of reaching the program inputs and objectives. The SC is the organizational, technical and financial auditor of the project.

The Steering Committee will consist of the following members:

- ✓ The Permanent Secretary of the Ministry of Energy, chairman of the Steering Committee
- ✓ A representative of the Ministry of Foreign Affaires and Cooperation of Mozambique
- ✓ A representative of the Ministry of Health
- ✓ A representative of the Ministry of Education
- ✓ The CEO of FUNAE
- ✓ The BTC representative for Mozambique

All members can designate a delegate for the steering committee in case they are not able to attend the meeting. Representatives the Ministry of Energy and FUNAE (other than the Steering Committee members) can attend the meeting as observers. The project Direction will attend the Steering Committee meetings as reporters.

The steering committee can invite any relevant person involved in the project to attend the meeting as an informer or an observer.

The SC will assume the following responsibilities and is mandated to:

- ✓ Provide general guidance to the program implementation;
- ✓ Resolve policy and coordination issues
- ✓ Appraise the state of progress of the program and the achievement of its specific objectives;
- ✓ Approve the six-monthly progress reports
- ✓ Approve the six-monthly financial reports (budget monitoring report) and cash flow reports (bank account statements) based on exhaustive and correct accounting data's and progress reports prepared by the program management;
- ✓ Approve the disbursement and utilisation of program funds based on the six-monthly budgeted Action Plans and list of the main commitments submitted by the program management;
- ✓ Approve the six-monthly financial planning
- ✓ If necessary, approve modifications of Program Results, Activities and budget realignments provided that such modifications do not alter the program's overall and specific objectives nor its overall budget;

- ✓ Approve the Terms of Reference of evaluation missions, as well as appraise their recommendations;
- ✓ Approve the criteria for the selection of priority projects proposed by the baseline study and pre-feasibility studies;
- ✓ Approve the final report and the final closure of the program
- ✓ Approve the changes in the implementation modalities.

Within the limitations imposed by the Specific Agreement of the program, the Steering Committee shall lay down its own internal rules and take its decisions by consensus of the members.

The steering committee meets at the onset of the project to approve the indicative action plan and on at least a six-monthly basis until the closure of the project. The steering committee can meet at the initiative of any member, after approval of the chairman, who will organise the meeting.

The secretariat of the steering committee will be assured by the Project Direction. Meeting minutes of the Steering Committee shall be taken and sent to all members at the latest one week after the meeting.

5.3.2 The project management team

The project management Team (PMT) will assume the technical and financial follow-up of the project activities.

The human resources to be provided from Mozambican and Belgian side to this Project Management Team are listed in item 4.1 of this file.

The responsibilities of the PMT are as follows:

- ✓ To organize, coordinate and supervise the execution of the project activities in the geographical areas in accordance with the approved project work plans;
- ✓ To assure good management of the project resources (material, financial and human);
- ✓ To deal with any problem of interpretation of the TFF;
- ✓ To write the Bi-annual progress reports, annual reports and the final report;
- ✓ Submit monthly accounting reports according to a BTC format;
- ✓ To provide financial management, accounting and timely compilation of progress reports and budgeted work plans for the following period for consideration by the Steering Committee;
- ✓ To propose adjustments or modifications of the activities and results;
- ✓ To supervise the preparation and tendering of contracts for procurement of works, goods and services;
- ✓ To coordinate the tendering processes and to ensure they are executed according to the appropriate procedures;
- ✓ To be a member of the Tendering Committee where appropriate;
- ✓ To submit the project progress reports and the achievement of results to the Steering Committee;

- ✓ To coordinate the tendering processes and to ensure they are executed according to the appropriate procedures;
- ✓ To be a member of the Tendering Appraisal Committee;
- ✓ To submit the project progress reports and the achievement of results to the Steering Committee;
- ✓ To ensure synergy with other donors' projects, including synergy with other BTC projects;
- ✓ To assure the administrative support of the Steering Committee (secretariat, agenda, documents, minutes; dissemination of minutes);
- ✓ To assure the administrative and financial management of the project according to the applicable procedures;
- ✓ To propose recruitment of personnel necessary to execute the project.

5.4 FINANCIAL MANAGEMENT

As stated in the Specific Agreement, the project will be implemented in co-management i.e. the CEO of FUNAE will be the authorising officer while the BTC Resident Representative will be the co-authorising officer through a mechanism of no-objection of the programme, together they will be responsible for the management of the EURO account.

The Director of "Divisão de Estudis e Planifição" of FUNAE will be the project director and the technical assistant appointed by BTC will be project co-director. Together they will form the project management and they will be jointly responsible for technical, administrative, budgetary and accounting management of the programme.

Part of the budget (the budget lines detailed in the general budget on page 32 earmarked to BTC) will be managed directly by BTC as mentioned in the previous chapter. This budget will be used for the technical assistance salaries and their logistics costs and running costs, follow-up and backstopping, evaluations and the final audit of the project.

5.4.1 Bank accounts and signing authorities

From the moment an implementation agreement is signed between the Belgian State and BTC a EUR account (main account) will be opened at a commercial bank in accordance to the following modalities:

The main project account will be opened for the Belgian contribution under FUNAE management. This account will be replenished by BTC Brussels in quarterly installments based on the provisions made in the TFF and approved work-plans. The account shall operate by dual signature of both the Project Authorizing Officer (CEO of FUNAE) and the head of the Division of Administrative and Financial Management.

A second account in Meticais operating on dual signature of the Project Authorizing Officer (CEO of FUNAE) and the head of the Division of Administrative and Financial Management will be replenished by transfers from the main Project account.

For payments from the above accounts BTC will have to give a no-objection.

For a limited number of budget lines, allocated as BTC in the detailed budget, funds will be managed directly by BTC through BTC accounts (in Euro and/or MZN) of which the BTC Representative is the only authorising officer.

5.4.2 Funds transfer

5.4.2.1 First transfer

After signing of the implementation convention between the Belgian State and BTC, a first request for funds can be done and introduced to the BTC Resident Representative based on the action plans and the financial needs (financial planning). The requested amount should correspond to the financial needs of the first Quarter.

5.4.2.2 Subsequent transfers:

The subsequent transfer of the funds is done only if:

- ✓ The accounting for the previous period has been closed and has been transmitted to BTC Representative.
- ✓ An updated financial planning of the current quarter has been transmitted to BTC Representative.
- ✓ The amount of the request do not exceed the budget balance

It is also possible to submit an intermediate urgent cash call provided a written explanation is given explaining the unforeseen circumstances.
The amount of the transfer equals the estimated needs of funds for the following 3 months with a reserve. The amount of the cash-call cannot exceed the budget balance.

5.4.3 Financial reporting

5.4.3.1 Accounting

The accounting of the project must be elaborated and approved following the FUNAE accounting system. The accounting must be signed by the Authorising Officers and the head of the Division of Administrative and Financial Management of FUNAE and sent to the Co-authorising Officers (BTC representative).

The following must be forwarded by the project to the BTC Resident Representative:

- ✓ Electronic account files.
- ✓ Certified copies of Bank statements and signed cash statements.
- ✓ Certified copies of all supporting documents.
- ✓ Motivated request for replenishment of the bank accounts

The format of the quarterly accounting return should enable BTC to monitor output performance related to project's specific objective and expected results. Expenditures in the report must be grouped in accordance with the budget lines of the original detailed budget (See page 34)

5.4.3.2 Financial Planning

Every quarter, the project Management will prepare a financial planning for the current quarter and upcoming quarters of the current year and the future years.
The financial planning must be done in the BTC format and must be sent to the BTC Representation.

5.4.3.3 Reporting to the Steering Committee

At the Project Steering Committee meetings, the Project Management will present the following financial information:

- ✓ Budget monitoring reports
- ✓ Updated financial planning
- ✓ List of the outstanding but unpaid commitments
- ✓ Bank accounts statements
- ✓ List of received funds
- ✓ Budget change proposal if needed
- ✓ Action plan related to audit requirements

5.4.4 Taxes and Duties

FUNAE will pay all taxes and duties levied on the purchase of goods and services as foreseen by Mozambican legislation where necessary. This is considered as part of the Mozambican contribution to the program.

5.4.5 Budget constraint

The Belgian grant is a fixed amount of €15.000.000.

The total budget amount cannot be exceeded. If a budgetary increase is necessary, a motivated request for increase must be introduced by the Ministry of Foreign Affairs and Cooperation of the Republic of Mozambique to the Belgian State after having received the request by FUNAE through the Ministry of Energy. If Belgium accepts the request, the two parties must sign an exchange of letters.

The budget of the project gives the budgetary constraints in which the project must be carried out. The Steering Committee, on the basis of proposals motivated by the project management must approve each change of budget. The possible budgetary changes are:

- ✓ Change of the budget structure
- ✓ Transfer of resources between existing budget lines
- ✓ Use of the reserve allocation. The budgetary reserve can only be used for project activities and after approval of the SC. Its use must always be accompanied by a change of the budget.

The management of a budget change must be made according to BTC procedures.

5.5 PROCUREMENT MANAGEMENT

All disbursement will be linked to tender procedures. The BTC Resident Representative will give his/her no-objection during each phase of each procurement, and at disbursement phase.

5.5.1 Procurement unit

The project will use FUNAE's dedicated procurement unit UGEA (Unidade Gestora Executora des Aquisicões) under the authority of the head of the Legal Department. This procurement unit will be reinforced if necessary.

The procurement cell, counting 5 members, has extensive experience in working with as well World Bank procurement regulations as with Mozambican procurement legislation.

5.5.2 Procurement legislation

For this project, the Mozambican procurement legislation (Decree no 54/2005 of 13 December 2005) will be used, as is the case for a government-funded project. This legislation has been validated by OECD-DAC and is very similar to World Bank procedures.

BTC will follow the Belgian legislation for all the expenses in direct management.

5.5.3 Transparency of procurement

The members of the Steering Committee shall have access to all administrative, financial or technical documents regarding the procurement for the project. All tender documents will be duly archived at FUNAE and made available to audits.

5.5.4 BTC involvement in procurement

FUNAE will ask the BTC Resident Representative for a no-objection on the following procurement steps:

- ✓ Before publication of tenders (technical specifications/ terms of reference)
- ✓ At tender awarding
- ✓ At the provisional and final appraisal/ acceptance of the works, services or deliveries.

The Resident Representatives' (RR) will provide his agreement in compliance with the BTC's internal regulations on delegation of financial authority.

5.6 MODIFICATION OF THE TFF

The present TFF may be amended by mutual consent of the parties. Careful consideration must be given not to change the present TFF in a way that would unnecessarily change the outcome of the intervention as originally agreed between the parties.

A formal agreement by the Belgian government is needed for the following:

- ✓ modification of the duration of the Specific Agreement;
- ✓ modification of the total Belgian financial contribution;
- ✓ modification of the Specific Objective of the intervention.

The request of the above modifications has to be approved and motivated by the Steering Committee. The exchange of letters requesting these modifications shall be initiated by the Mozambican party and shall be addressed to the Belgian Embassy.

The following changes to the TFF will have to be approved by the Steering Committee:

- ✓ the financial modalities;
- ✓ the program results and activities and their respective budgets;
- ✓ the respective budgets for central and provincial levels;
- ✓ the specific objective indicators and result indicators;
- ✓ the composition and responsibilities of the Steering Committee;
- ✓ the mechanism to change the TFF.

All other changes to the TFF should be approved by the chairman of the SC or his mandated responsible and the BTC resident representative.

The adapted version of the TFF shall be communicated to the BTC headquarters and to the Attaché for International Cooperation (DGDC).

5.7 MONITORING AND EVALUATION

Several follow-up missions from BTC (internal or external personnel) will be performed during the course of the project. These missions can coincide with and may contribute to the Steering Committee.

A base line study will also take place and should provide amongst other base line data and fine-tune the indicators in order to enable adequate project monitoring.

An external mid-term review (MTR) will be performed after 24 months of project implementation. This mid-review will verify the project progress, and may adapt the project results if necessary, as well as change implementation modalities. The MTR final report will be submitted to the SC that will take timely and appropriate decisions on the proposed recommendations.

At the end of the project, an external final evaluation of the project will take place. This evaluation mission will perform a check of compliance with results listed in the TFF and will capitalise the project's lessons learned. The final evaluation will compare the indicators to the baseline indicators as gathered during the needs assessments.

The Project Management Team will facilitate and support the missions needed to perform the above-mentioned exercises.

5.8 AUDIT

An external audit of the program will be performed the first and third year of the project. These audits will include a "value for money" analysis of the project.

A qualified financial expert who will be selected jointly by both parties will execute the external auditing. The SC asks the BTC Representative for Mozambique to define the terms of reference. Terms of reference will include among others:

- ✓ The evaluation of the respect of procedures and procurement regulations (compliance audit)
- ✓ The completeness, reliability, timeliness of the financial information
- ✓ A "value for money" component (efficiency and effectiveness)
- ✓ The assessment of the internal controls level of maturity as well as a risk assessment

All the audit reports will include recommendations and proposal of corrective actions.

All audit reports will be forwarded to the Steering Committee.

The Steering Committee can require additional audits if necessary.

The FUNAE will also monitor and evaluate the project using its own procedures. These also include annual audits of the treasury accounts. The audit of the program will be fit into the annual general FUNAE audit (with specific attention for this program, as described in the terms of reference), and the program can co-finance this audit.

BTC will be authorized to perform ex-post audits to confirm the management of funds. In case of negative outcome of these audits, BTC reserves the right to take over financial management of the whole Belgian contribution.

5.9 CLOSURE OF THE PROJECT

The project will be closed at the latest five years after the signature of the specific convention.

Amounts managed in BTC direct management and not used at the end of the project, as well as the balance of the financial contribution not sent on project bank accounts will fall in cancellation at the end of the project.

The balance of the co-management bank accounts will be allocated by mutual agreement.

Six months before the end of the project, a financial report will be elaborated by the project direction and presented to the SC. BTC will launch the external final evaluation of the project at that time.

After the end of the Specific Agreement, no expenditure will be authorized except if related to commitments entered into force before the end of Specific Agreement and which are endorsed in the Steering Committee's minutes before expiry of the Specific Agreement.

6. CROSS CUTTING ISSUES

The PRSP (PARPA) explicitly mentions that all poverty reduction activities mentioned in the strategy should take into account the cross cutting issues to be sustainable. The PRSP mentions HIV/AIDS, gender, environment and food security as cross cutting issues. These correspond quite well to the cross cutting issues as defined by the Belgian development cooperation.

6.1 ENVIRONMENT

Where renewable electricity replaces the use of kerosene lamps, the impact on the environment is clearly a positive one when it comes to carbon dioxide emissions. Moreover, the kerosene lamps can have a very negative influence on living conditions in the dwellings, due to fumes and toxic gases.

The common practice in many regions is to buy single use batteries for radio and other small electrical appliances. After use, these batteries are thrown away. Recycling these small batteries is very difficult from a logistical point of view, and is not economically feasible. Where renewable electricity (even with rechargeable batteries – small or larger types-) replaces the use of single use batteries, the impact on the environment is positive as well.

The impact of a small hydropower plant can be (but not necessarily) negative. The project will therefore analyse environmental impact before hydropower implementation. If the impact is too important (flooding of large areas for instance), alternative solutions will have to be found. Generally, the impact of hydropower plants is however largely compensated for by the clean energy supply, compared to diesel generators or kerosene lamps.

Solar systems are often considered pollution-free. This is true during the operational period of the system. However, at the end of the lifetime of a solar system or its components, the components have to be disposed of somehow. Solar panels can be recycled into new panels, at lower energy costs and at a financial cost comparable to new panel production. As solar panels have a lifetime of several decades, solving this issue is not extremely urgent, but will need attention in the long-term future.

Batteries on the other hand are much more harmful to the environment when improperly disposed of. Recycling of batteries is possible, and initiatives at FUNAE are underway. As battery lifetimes are much shorter than solar panel lifetimes, this issue has to be addressed on the short term.

A recycling/disposal system for solar panels, invertors and batteries will be analysed by the program (for instance by installing recycling fees, paid to the system owner, or by replacement).

A good management of the renewable energy systems will limit the negative impacts on the environment. The implementation of the GIS-based asset management tool will contribute to this.

6.2 GENDER

Most program activities and impacts are not specifically targeting women or men or the gender theme, but some have a considerable impact by improving more specifically women's environment and opportunities. Indeed:

- ✓ Water chores remains mainly in women and even children's hands. Solar water pumping to replace manual pumping and/or to decrease walking distance can have a considerable impact on the time management of women.
- ✓ Also productive activities like milling are often manually done by women. Electrification can increase productivity and/or decrease the labour-intensive work.

Access to better health care by electrifying the health centres will improve the health conditions of the rural population and more specifically the reproductive health, even at night. Awareness rising on health issues can also be done much easier in electrified health centres.

Women, like men, will also have access to evening classes on various topics from alphabetisation to commercial skills.

Street lighting increases the overall security in rural town's and more specifically decreases women's risks when they're on the street at night.

House lighting by electricity instead of kerosene drastically improves air quality for all the people inside the small houses.

6.3 SOCIAL ECONOMY

Bringing electricity to the villages will stimulate existing economies by increasing productivity (maize mills, refrigeration, television). The micro-finance initiatives will allow people (or often a group of people) to invest in energy systems for increasing productivity or comfort. Groups of people will get organized to pay back the micro-credit.

A new energy economy can emerge in the private sector, by producing and selling energy under the form of battery charging for instance. With this energy economy, new local markets will emerge for distribution, installation and maintenance of these energy systems (batteries, lights, telecom, radio and TV, wiring, …).

6.4 CHILDREN'S RIGHTS

Improved schools and motivated teachers will improve the quality of education of the children. Access to (inter)national media will increase awareness on global issues. Electrification of schools allows for basic informatics training and a better preparation for adult life. Domestic but also street lighting will improve studying conditions.

Improved health services will also benefit to children, often the first victims of epidemics and disease.

Children are often in charge of water chores. Decreasing the chores will allow children to focus on other aspects, like education or playing. Improving quality and quantity of the water available will decrease water-borne diseases.

6.5 HIV / AIDS

HIV/AIDS prevalence in Mozambique is among the highest in the world.

Through radio and television awareness campaigns and in health centres, awareness can be increased and behaviour can be changed.

Electricity will enable the rural people to have access to this media campaigns and to benefit of the better health care that will be provided by the electrified health centres.

The Ministry of Health, being an essential stakeholder of this renewable electrification program, will guide the project initiatives in this matter.

The PMT will actively look for synergies with other stakeholders and actors, like other donors, NGO's and of course national governmental agencies.

7. ANNEXES

1. Logical framework
2. Implementation calendar
3. Technical Assistant Profile

7.1 LOGICAL FRAMEWORK

Global Objective	Indicators	Means of Verification	Risks and assumptions
To promote rural development by providing access to energy.	- alphabetisation degree/number of students (in evening classes) - vaccination ratios and health care quality - water chore time - crop yields	- surveys from line ministries - site visits - vaccine quantities - agriculture statistics	o energy systems are properly designed, installed and maintained o population is motivated to profit from the energy systems provided
Specific Objective	Indicators	Means of Verification	Risks and assumptions
To increase access to hydraulic, solar and wind energy for use in off-grid applications in rural areas, by investments in renewable energy systems, stimulation of micro-finance initiatives and institutional capacity building	- Number of beneficiaries - Beneficiary satisfaction - Total power installed	- Surveys/impact evaluations - project reports - audits	o Systems are well designed, installed and maintained o Projects are implemented on time and on budget

Intermediate Result 1		Indicators	Means of Verification	Risks and assumptions
Access to energy is increased by the implementation of solar, wind and hydro projects.		- the list of priorities is established - number and total power of hydro-electric power plants and solar systems installed, operational and properly maintained and quantity and quality of electricity provided to the beneficiaries - number of schools, hospitals and postos administrativos electrified and quantity and quality of electricity provided to the beneficiaries - number of windmills for water pumping for drinking water/irrigation	- project reports - surveys - GIS-system	
	Activities for R1	Actors involved	Estimated Budget	Risks and assumptions
	R1.A1 Needs assessment and feasibility studies	Consultancy, Min Education, Min Health, Min Energy	300.000 €	Quality consultants are found Geographical dispersion
	R1.A2 Hydropower project implementation	Consultancy (supervision), Companies	4.000.000 €	Maintenance issue Sufficient opportunities are found
	R1.A3 Solar power project implementation	Consultancy (supervision), Companies	6.500.000 €	Maintenance issue
	R1.A4 Wind water pumping	Consultancy (supervision), Companies	500.000 €	Maintenance issue

Intermediate Result 2	Indicators	Means of Verification	Risks and assumptions
Financial accessibility to energy is improved	- Presence of MFI's - Number of beneficiaries - Amount of private sector projects financed	- progress reports - reports from Micro-Finance institutions	Affordability, willingness to pay, cooperation of Micro-finance institutions

Activities for R2	Actors involved	Estimated Budget	Risks and assumptions
R2.A1. Set-up of micro-finance system	Consultancy, Micro-finance institutions	100.000 €	
R2.A2 Promotion of MF system	Media	50.000 €	Beneficiaries have access to media
R2.A3 Investment funds	Micro-finance institutions	1.000.000 €	Demand exceeds subsidies

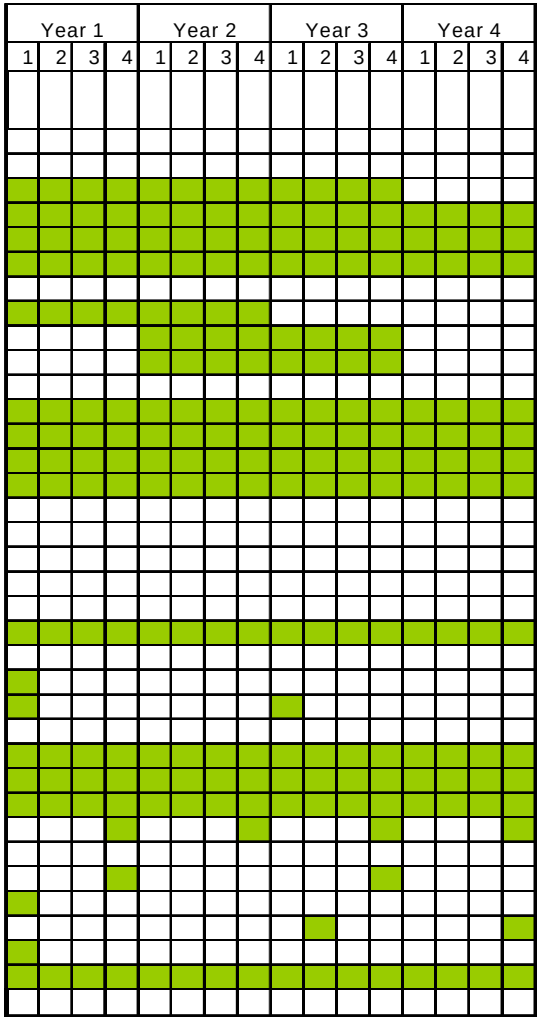
Intermediate Result 3	Indicators	Means of Verification	Risks and assumptions
Technical and administrative capacity of FUNAE is increased	- number of trained people - number of trainings given - number of document research projects - presence of a GIS-system	- reports, audits	- trained people stay at FUNAE (no brain-drain) - GIS-system is kept up to date - Staffing is kept sufficient for implementation and research

Activities for R3	Actors involved	Estimated Budget	Risks and assumptions
R3.A1. Training	FUNAE staff	200.000 €	
R3.A2. R&D		200.000 €	
R3.A3. GIS-system	Consultancy, software provider, GPS suppliers	150.000 €	
R3.A4. Technical assistance	BTC	1.200.000 €	

7.2 IMPLEMENTATION CALENDAR

MOZ0901811 - Renewable Energy for Rural Development				N°	Unit price	Budget (€)	%
A			**Increase access to energy**			**14.200.000 €**	**94,7%**
A	*01*		*Access to energy is increased by implementation*			*11.300.000 €*	*75%*
A	01	01	Needs assessments, feasibility studies			300.000 €	
A	01	02	Hydroprojects			4.000.000 €	
A	01	03	Solar electrification			6.500.000 €	
A	01	04	Wind water pumping			500.000 €	
A	*02*		*Micro financing mecanisms are developed and subsidised*			*1.150.000 €*	*8%*
A	02	01	Set-up of MF mechanism			100.000 €	
A	02	02	Communication			50.000 €	
A	02	03	Investment funds			1.000.000 €	
A	*03*		*Capacity of co-management is increased*			*1.750.000 €*	*12%*
A	03	01	Training			200.000 €	
A	03	02	Research and Development			200.000 €	
A	03	03	Implement GIS asset management system			150.000 €	
A	03	04	Technical Assistance	2	12.500	1.200.000 €	
X			**Reserve**			**79.000 €**	**0,5%**
X	*01*		*Reserve*			*79.000 €*	
X	01	01	co-managed Reserve			79.000 €	
Z			**General Means**			**721.000 €**	**4,8%**
Z	*01*		*Personnel Costs*			*48.000 €*	
Z	01	01	Accoutnant and Administrative officer	1	1.000	48.000 €	
Z	*02*		*Investments*			*95.000 €*	
Z	02	01	Vehicles	2	40.000	80.000 €	
Z	02	02	ICT	1	15.000	15.000 €	
Z	*03*		*Operating costs*			*388.000 €*	
Z	03	01	Vehicles operation and maintenance	96	750	72.000 €	
Z	03	02	Communication costs	48	500	24.000 €	
Z	03	03	Mission costs	100	2.500	250.000 €	
Z	03	04	Other operating costs			42.000 €	
Z	*04*		*Audits, Follow-up and Evaluations*			*190.000 €*	
Z	04	01	Audit	2	20.000	40.000 €	
Z	04	02	Internal control and risks asssessment	1	50.000	50.000 €	
Z	04	03	Mid term and Final evaluation			50.000 €	
Z	04	04	Baseline study	1	20.000	20.000 €	
Z	04	05	Follow-up and backstopping			30.000 €	
			Total			**15.000.000 €**	**100,0%**

co-management	**13.079.000**
direct-management	**1.921.000**



7.3 INTERNATIONAL TECHNICAL ASSISTANTS

The International Technical Assistants (TA) will have the following qualifications, tasks and key results:

7.3.1 Senior Renewable Energy Engineer

7.3.1.1 Qualifications :

- ✓ A masters degree in engineering in the(renewable) energy sector or an equivalent experience
- ✓ A thorough experience in the renewable energy sector engineering
- ✓ At least ten years of experience in the planning, designing and supervising the construction of energy systems
- ✓ At least 5 years of overseas experience, of which part in sub Sahara Africa. Knowledge of the country of Mozambique is an advantage
- ✓ A proven capacity for project management;
- ✓ A proven capacity for training and sensitisation of adults;
- ✓ Team spirit and communication skills with colleagues and project partners of different social levels.
- ✓ An analytical mind and a good technical writing and reporting capacity
- ✓ Knowledge of common IT-applications, GIS-software and modelling software
- ✓ Good knowledge of Portuguese will constitute a competitive advantages
- ✓ Good knowledge of English.
- ✓ He will be in good health, and accept frequent field visits to remote areas;
- ✓ He is sensitive to the cross cutting issues of the Belgian cooperation (environment, gender, HIV/AIDS, children's rights and social economy)

7.3.1.2 Tasks

The TA will act as a team member of FUNAE and so participates in all relevant meetings. More specifically he will:

- ✓ analyse capacity building needs (training, IT, R&D) with the Mozambican partner and helps to strengthen the institutional capacity
- ✓ provide links with other partners and projects in the energy and rural development sector ;
- ✓ assure the quality of the planning and reporting documents for the Steering Committee;

7.3.1.3 Key Results

The activities of the TA will have the following key results

- ✓ The technical issues of the project activities will be monitored, and more specifically:
  - o the installations and equipments, which will be provided in conformity with the needs assessments;

- the technical issues of the tender documents and the quality standards of the equipments to be provided;
- the proper maintenance of the equipments provided.

✓ the overall quality control of the program activities will be assured.

✓ the timely publication of quarterly progress reports and annual reports, as well as the final reports will be guaranteed.

✓ the implementation and vulgarization of the lessons learned (technical part of the program activities) during the implementation of the program will be assured

7.3.2 Senior manager, socio-economical expert

7.3.2.1 Qualifications :

✓ A masters degree in socio-economics or an equivalent experience

✓ At least ten years of experience in project management

✓ A thorough experience in development contexts

✓ Large experience in development project prioritisation based on socio-economic criteria

✓ Large experience in capacity building in development contexts

✓ At least 5 years of overseas experience, of which part in sub Sahara Africa. Knowledge of the country of Mozambique is an advantage ;

✓ A proven capacity for training and sensitisation of adults;

✓ Team spirit and communication skills with colleagues and project partners of different social levels.

✓ Knowledge of common IT-applications

✓ Good knowledge of Portuguese will constitute a competitive advantages

✓ Good knowledge of English

✓ He will be in good health, and accept frequent field visits to remote areas;

✓ He is sensitive to the cross cutting issues of the Belgian cooperation (environment, gender, HIV/AIDS, children's rights and social economy)

7.3.2.2 Tasks :

The TA will have the following tasks in the program:

✓ analyses capacity building needs (training, IT, R&D) with the Mozambican partner and helps to build the institutional capacity

✓ analyses and defines HR needs

✓ socio-economic links with other projects in the energy and rural development sector ;

✓ helps to prepare planning and reporting documents for the Steering Committee;

✓ helps to write quarterly progress reports and annual reports, as well as the final reports

7.3.2.3 Key Results

The activities of the TA will have the following key results

- ✓ the socio-economic criteria to be used for prioritisation of investments will be defined and applied.
- ✓ the set-up of micro-finance and funding-systems will be assured.
- ✓ the administrative and financial management of the direct and co-managed part of the funds will be assured.
- ✓ the implementation and vulgarization of the lessons learned (socio-economic part of the program activities) during the implementation of the program will be assured.