FINAL REPORT
OF THE END-TERM REVIEW OF THE INTERVENTION
RENEWABLE ENERGY FOR RURAL DEVELOPMENT (PART 1 AND PART 2)

COUNTRY	**MOZAMBIQUE**
NAVISION CODE	**MOZ 0901811 & MOZ 1002211**

December 2015

This review has been realised in the framework of the cooperation between Mozambique and Belgium.

The report has been drawn up by independent external experts.
The opinions expressed in this document are those of the authors and do not necessarily reflect the views of BTC, the Belgian Development Cooperation, the Ministry of Foreign Affairs of the Netherlands or the Authorities of the country concerned.

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Intervention form

DGCD intervention number:	3008385
Navision code BTC:	MOZ0901811 & MOZ 1002211
Partner institution:	Fundo de Energia (FUNAE)
Duration of intervention:	originally 5 years, extended to 6 years (Closure of intervention starts 6 months before the end of Specific Agreement)
Duration of Specific Agreement:	originally from 20/07/2010 to 20/07/2015, extended to 28/12/2016
Starting date of intervention:	20 11 2009

Contributions	Mozambique (FUNAE)	Belgium	The Netherlands
Total million EUR			
26,34	3,00	15,00	8,34

Intervention sectors: Rural Development, Renewable Energy

Intervention summary

The objective of the intervention is to increase access to energy in the rural areas of Mozambique. The intervention focuses on development of off-grid energy systems, based on renewable energy resources (hydraulic, solar and wind), in remote rural areas where no national grid connection is foreseen within the next five years. The project finances, on a grant basis, electrification systems for community infrastructures such as administrative buildings, schools, health centres, water pumping devices and public lighting. The aim is also to promote a viable market for renewable energy installations for private use. Finally, the project provides funds for capacity building of the partner institution.

Evaluation team

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Preamble

Although the report is referring to the fact that there are two sources of funding (see page before), neither the implementation methodology nor the end-term review of the intervention Renewable Energy for Rural development (Part 1 and Part 2) were oriented to refer to the different sources of funding.

It is treated as one project with one budget.

Executive Summary

The intervention “Renewable Energy for Rural Development” (RERD) is part of the Indicative Cooperation Program (ICP) between Belgium and Mozambique. The project was formulated in 2009 and started implementation in 2011. Its planned completion date is December 2016. The project is aligned with the strategic plan (2010-2014) of the partner institution, FUNAE (Energy Fund).

The overall objective of the RERD project is to “*Promote the rural development*”. This is done “through increasing access to energy” in recognition of the fact that access to energy is a development catalyst and thus, by supporting the rural electrification, the project contributes to rural development.

The project formulation document (original TFF of 2009 and the amended TFF of 2011 following inclusion of Dutch contribution) comprised three major components, which following a Mid-term review (made in 2013) were reformulated in the RERD Action Plan 2013-2015.

The reformulation was done by the Project Management Team composed by members of both partner institution (FUNAE) and TA’s assigned to the project, under the strategic directions given by the Project Steering Committee. Since 2013, the project has been operating based on the following three (reformulated) components:

- *Implementation of solar, wind and hydro projects*
- *Support for promotion of small solar products*
- *Capacity Building Support for increasing the technical and administrative capacity of FUNAE*

The development partners (Belgium and the Netherlands) contribution to the RERD project is 23,340,000 Euros.

The purpose of the present End-Term Review is to provide an in-depth analysis of the intervention’s performance, including implementation process, efficacy of the monitoring system as well as the achievement rate of the intended results. To this end, a well-integrated Evaluation Framework has been prepared based on a set of structured Generic Evaluation Questions (EQ) that addresses the main evaluation criteria (as defined by the OECD DAC). For each generic EQ, a number of assessment criteria has been defined and/or selected based on the specific evaluation questions and other evaluation issues as presented or highlighted in the ToR of the assignment.

The evaluation findings show that the project is well aligned with the known Government of Mozambique policies and strategic objectives for off-grid energy provision, notably through renewable energies, in rural areas. However the overall energy policies for provision of electricity (national grid and off-grid) require further clarity regarding the renewable energies.

RERD project provides a valid response to the beneficiary needs for access to energy. However, it is not evident that access to energy could be to be ranked as priority need for some of the institutional beneficiaries, notably administrative buildings.

The project has been operating in four provinces. Given the available resources by the development partner, further geographic concentration is needed in order to increase effectiveness of the actions and eventually the likelihood of making an impact on the socio-economic development of the selected areas.

The legal and administrative framework defined in the TFF (as amended in 2011) provides for co-management as the main execution modality but a detailed analysis of the provisions of amended document shows that the so-amended modality can no longer be qualified as “co-management”. The project is in fact being executed through two modalities: an ad-hoc modality that is very close to the national execution for the majority of project activities; and regie modality for a limited number of project activities.

Given the way the main project execution modality was applied until 2013, the representative of one partner, FUNAE CEO, was found to be the central point for all project decisions (including on operational matters) for quite a significant time during the project life. Consequently, the project was overburden by the “no objection” procedure, which has inevitably resulted into inefficient project management.

Further to the MTR, it was realized that the project could no longer be operated at the level of the partners’ representatives, which was not however meant to be so. The formal appointment of a FUNAE staff member as PM in 2013 has enabled the creation of a joint core team with the TA’s, one member acting as co-PM. The creation of a harmonious team (both FUNAE PM and TA’s) dedicated to daily management of the project has finally allowed the project to make efficiency gains compared with the previous period.

RERD project is being managed according the partner institution’s systems and standards, as it is actually foreseen in the amended TFF 2011, therefore closer to the national execution modality. It doesn’t appear there is a properly defined PM model in FUNAE, where the typical role and responsibilities of the PM are well defined in addition to the delivery method in terms of planning and assigning the required human resources for implementation of project activities.

RERD project with support of the TA has however been maintaining a number of project management tools in accordance with BTC guidelines and standards, as well as developing state-of-the-art tools for planning and controlling specific project activities. These tools are properly maintained, which significantly contribute to increasing project efficiency. The issue remains though the level of appropriation by the partner institution of the PM tools designed and used by RERD project.

As to the technical aspects of the project design, the most appropriate technological option for increasing access to energy in remote rural areas, where there is no plan for main grid extension in the foreseeable future, is through off-grid renewable energy technologies. Among these, the most effective is mini hydropower plants or solar power plants accompanied with mini-grids for electricity distribution. Individual PV solar installations can be considered on case-by-case basis. Additionally solar water pumps are a very appropriate solution for the isolated communities. Regarding the wind energy, wind resource measurements and studies are still ongoing and until results are known, it is early to say if investments in this RE option would be efficient and/or effective in comparison with the other options available. However from preliminary results, it can be anticipated that in certain locations, wind energy investments could be a feasible option in combination with other energy sources like solar under hybrid systems.

Implementation of the first project component (RE investment projects) has been strongly challenged in a number of occasions. Firstly, the assumptions made on robustness and accuracy of needs assessment and priority investments list to be provided by FUNAE had to be revised. This caused significant time slips. Secondly, procurement challenges with implementation of hydropower investments have slowed down not only the process but also the expected outputs rate. Lastly, re-planning of the activities as a result of the MTR (e.g. changes required to wind power activity, addition of maintenance activity, etc.) have

necessitated further time for decision making, adaptation of resources and launching implementation.

Both time and output quantity wise, the efficiency ratio of this Component is low if the assessment was to be based on the face value of the indicators only. There are a number of activities that for one reason or another, have not resulted into a concrete investment as it was wished but however the outputs produced by such activities need to be taken into account in the present evaluation. These include baseline studies, a projects preparation pipeline for hydro power investments developed, studies on wind resources potential under way, etc., which if properly and in timely fashion re-used, these would offer significant efficiency gains to any future investment project made by FUNAE or another development partner. The outputs produced by these horizontal preparatory activities can balance out to some extent the lower level of outputs achieved in some areas of the project.

In the light of this and whilst considering the pilot nature of RERD project, the implementation efficiency of this component should be considered as acceptable although it remains lower than average, especially if considered the risk of non-utilization of the said project outputs in the near future.

Concerning the second project component (*Promotion of small solar products),* the current output ratio is almost nil. Activities have been halted and reshuffled as to carry out a last market study with a reduced scope. Even if the lastly planned study is completed, it is questionable as to the extent to which it will be useful to support planning and launching of concrete intervention activities by FUNAE in the future. As the level of interest is low, the risk is a high for the output not to be utilised and therefore the resources used ineffectively. For the time being, the whole intervention concept for this component has remained in study phase that is well behind the expected result.

Concerning the third component (Capacity Building), the efficiency ratio of this component in terms outputs produced against input resources used is considered good. The same cannot be said for the efficiency ratio of outputs against time planned for production, where one sub-activity in particular is lagging behind. This is the Preparation of FUNAE's Institutional and Organizational Capacity Building Plan, which is so crucial that its delay or non-completion would fade the effectiveness of other actions being carried out under this component and consequently negatively affect the efficiency of the resources used so far.

Given the low cost-efficiency ratio of the current investments under the project, a number of alternative approaches has been explored with a view of finding options requiring fewer resources to achieve the same level of outputs.

The length of procurement procedures required for implementation of certain project activities are another aspect that affects the efficiency and eventually effectiveness of the project. Changes agreed on the project after the MTR regarding the procurement modalities to apply for different categories of expenditure, particularly increased utilisation of Belgian procurement procedures for a number of budget items, have improved the implementation time for the concerned activities. On a number of occasions where the Mozambican procurement procedures were applied, no sufficient value for money was achieved, sometimes leading to the cancellation of the procurement procedure, thus negatively impacting on the outcomes expected by the concerned activities. It must however be noted that in addition to the procurement procedure, a number of other factors might have influenced the value for money.

As to the Capacity Building, there is an apparent difficulty to measure the effectiveness of

any CB action in FUNAE as long as it is impossible to establish a meaningful capacity baseline. This reinforces the need to prepare as a priority an Organisational and Institutional Development CB Plan for FUNAE. This is an activity planned under RERD project but not yet initiated. Only if the competencies required for each function are well defined, an effective CB action plan can be drawn up and consequently meaningful capacity indicators be established for the monitoring system to be able to measure individual capacity improvements.

Some improvements have however been observed in the quality of planning documents prepared by FUNAE thanks to GIS software. However GIS system is still in development phase and as long as it is not integrated with planning and management in one single integrated system, no significant contribution can GIS system bring into improving the planning and management capacity.

Looking at the improvements for planning within FUNAE, there is a need to further consolidate and streamline all existing databases that can turn into a comprehensive GIS Asset Management, Planning and Monitoring System for renewable energy. A integrated GIS management tool can be used to its full potential in terms of achieving better monitoring/reporting on all systems, sharing information within departments and other institutions (ministries and donors), and improved planning.

Regarding the effectiveness of the energy investments made by the project, from information collected during site visits and observations, the findings can be summarized as below.

- Healthcare centers are properly and fully using the electricity capacity installed by the project as well as the energy-based products they were provided with.
- For the time being, schools are making only limited use of the electricity capacity installed by the project, although there are indications that the number of schools that are making extensive use of the supplied electricity, i.e. through introduction of evening courses is progressively increasing.
- Healthcare or school staff using the residence buildings are also benefitting from the provided access to electricity.
- Local administrations using the administrative buildings electrified by the project seem to be making only limited use of the supplied electricity because of their timetable of work normally during the daylight.
- Local communities are making full use of solar pumping systems installed by the project. The water supply reliability has improved without any further effort for water pumping as well as chore time has reduced
- Households, are more and more eager to be connected to the electrical mini-grids built by the project. A good number of connections has been made and other households have applied for being connected and/or have plans for relocation closer to areas covered by the mini-grids. Furthermore, households have started to purchase electricity-powered appliances that improve their living conditions
- Commercial activities (shops) are fully benefiting from the mini-grid connected electricity that helps the business to further prosper. Lastly, on some occasions, there is interest to start-up businesses that would make productive use of electricity

Regarding the sustainability of the investments, the FUNAE maintenance capacity assumes a crucial role. Given the current level of financial resources available, FUNAE maintenance resources (staff and material) are overstretched with the current workload of maintaining the backlog of only solar systems installed in the past and currently under its entire responsibility. Once the contractors' responsibility for maintenance has ended for solar systems and mini hydropower plants and grids built by RERD project as well as

solar power plants built with support of other projects, FUNAE capacity for ensuring proper maintenance will be overwhelmed.

Given the prospected growing number of RE systems, the maintenance unit of FUNAE must be transformed in an O&M Division and organized as a utility operator with a sufficient autonomy from the other divisions of FUNAE, with a view to perhaps split it out and create a proper public electricity utility operating in the rural areas.

Financing of O&M activities should be secured ideally through tariffs collected by the users. In order to avoid the phenomena of free ridership, pre-paid metering system must be installed wherever possible and practical. Additionally, if needs be, the O&M must be further subsidized by the government under the same mechanism that main national grid O&M is currently being financed.

Main Conclusions

- The most appropriate technological option for increasing access to energy in remote rural areas is the development of mini hydropower plants or solar power plants accompanied with mini-grids for electricity distribution. Individual PV solar installations can be considered on case-by-case basis.
- Further geographic concentration is needed in order to increase effectiveness of the actions and eventually the likelihood of making an impact on the socio-economic development of the selected areas.
- The increased efficiency pace of RERD implementation in the last two years shows that regardless the execution modality chosen between partners, project operational efficiency is dependent on whether there is in place dedicated PMT, empowered with an adequate level of authority, decisional powers and autonomy to act on the project.
- Outputs delivery status against planned is lower than expected. This is mainly due to Component 2 failing to produce any useful output and numerous planning and re-planning exercises and procurement challenges that Component 1 underwent.
- The requirements for O&M of the systems developed by the project seem to have initially been underestimated and/or FUNAE's actual organisational and financial capacity to carry out such activities might have been overestimated. The assumption which an adequate funding level for O&M could be secured by the government seems compromised, so is the expectation that it could be covered by the users' tariffs.
- As foreseen, the maintenance responsibility needs to be allocated at a level as close as possible to the users, which involves, whenever possible (and feasible), transfer of maintenance responsibility of individual systems onto the beneficiary institutions or user communities.

Main recommendations

- MIREME to issue clear instructions to FUNAE concerning the tariff setting mechanism for users of off-grid electricity, possibly in line with those applicable to national grid users. Additionally, include FUNAE in the same subsidy mechanism as it is currently done for the main national grid in order to obtain funding for good operation and maintenance of off-grid energy systems.
- Facilitate the decision for transferring to the Ministry of Health and Ministry of Education the facilities (individual solar systems) installed by RERD on benefit of their users in full respect of the agreements taken in the beginning of the project. Also discuss possible transfer of systems or maintenance funding with the Ministry of Public Administration.

- Prepare a rolling long-term O&M Plan, properly costed and ideally stretching over a 5-year period and presented to the Ministry for facilitating funding allocations on yearly basis.
- Ensure instalation of prepaid meters, specifically for mini-grids users, where costs can easily be absorbed, as to ensure a fair and reliable tariff collection system.
- Ensure better financial planning of the agreed contributions to the projects financed by the development partners. Particularly ensure to plan and obtain on time funding required for VAT and other tax duties payable to third parties related to investments made by the development partners' projects.
- Give more consideration to the appropriateness of technology to be implemented in a specific project. This should be strongly supported by a thorough needs assessment and feedback from future users with regards to their energy demands and financial capabilities. Project investments must be supported by comprehensive feasibility studies, not only techncial but also financial/economic feasibility, in addition to social and environmental impact assessments.

Acronyms

AMES-M	Access to Modern Energy Services - Mozambique
BTC	Belgian Technical Cooperation
CEO	Chief Executive Officer
DGD	Directorate for Development Cooperation, Belgium
DGIS	Directorate-General for International Cooperation, the Netherlands
EdM	Electricidade de Moçambique
EPC	Engineering, Procurement, Construction
ETR	End-Term Review
EUR	European Common Currency
FUNAE	Fundo de Energia
GIS	Geographical Information System
GIZ	Deutsche Gesellschaft fur Internationale Zusammenarbeit
ICP	Indicative Cooperation Programme
kW	kiloWatt
kWh	kiloWatt hour
kWp	kiloWatt peak
MIREME	Ministry of Energy and Mineral Resources
MINED	Ministério da Educação (Ministry of Education)
MISAU	Ministério da Saúde (Ministry of Health)
MoU	Memorandum of Understanding
MTR	Mid-Term Review
MZN	New Mozambican Metical
O&M	Operation and Maintenance
PMT	Project Management Team
PM	Project Manager
PV	Photovoltaic
R&D	Research and Development
RR	Resident Representative of BTC
SC	Steering Committee
TA	Technical Assistance
TFF	Technical and Financial File
ToR	Terms of Reference
UGEA	Unidade Gestora Executora das Aquisições (Procurement Unit)

1 Background and Context

1.1 Development Intervention Context

Mozambique is endowed with a variety of considerable energy resources. Estimated hydropower potential is about 12.500 MW. 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. 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.

There was therefore an absolute need to intensify the actions at both policy level and investments in the Renewable Energies. In this regard, the Indicative Cooperation Program (ICP 2009-2012) between Belgium and Mozambique included an intervention for fostering the use of renewable energy in the rural areas. It is known that access to energy is a development catalyst and therefore the intervention strategy was based on rural electrification as a determinant to rural development. The later also being one of the focal sectors of Belgian development cooperation.

1.2 Project Background and Intervention Strategy

The project "Renewable Energy for Rural Development" (RERD) is part of the Indicative Cooperation Program (ICP) between Belgium and Mozambique. The project represents over 30% of the ICP budget. The project was formulated in 2009 and started implementation in 2011. Its planned completion date is December 2016.

The project is aligned with the strategic plan (2010-2014) of the partner institution, FUNAE (Energy Fund), which defines a set of objectives in line with the strategic plan of the Ministry of Energy. 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, focusing on new and renewable energy.

The activities of the RERD project thus feed into the strategic plan of FUNAE aiming at strengthening the capacity of FUNAE to be able to implement the rural electrification projects financed by the Belgian and Mozambican governments and other development partners.

The overall objective of the RERD project is to "***Promote the rural development***". This is done "through increasing access to energy" in recognition of the fact that access to energy is a development catalyst and thus, by supporting the rural electrification, the project contributes to rural development.

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".***

The project intervention strategy was anchored on three main axes that can be summarized as follows:

- Investments on Renewable Energy (RE)

- Market development for RE products / individual systems, notably through micro-financing mechanisms
- Institutional Capacity Building

The project formulation document (original TFF of 2009 and the amended TFF of 2011 following inclusion of Dutch contribution) comprised three major components, which following a Mid-term review (made in 2013) were reformulated in the RERD Action Plan 2013-2015.

The reformulation was done by the Project Management Team composed by members of both partner institution (FUNAE) and TA's assigned to the project, under the strategic directions given by the Project Steering Committee. The reformulated project activities and planning were duly endorsed by the Steering Committee.

Since 2013, the project has been operating based on the following three (reformulated) components:

- ***Implementation of solar, wind and hydro projects***
- ***Support for promotion of small solar products***
- ***Capacity Building Support for increasing the technical and administrative capacity of FUNAE***

The tables below summarize the activities and expected outputs as per the latest project planning made after the reformulation in 2013.

Table 1: RERD Project Activity Plan

Component 1: Investments in solar, wind and hydro projects

Activities	Scope	Expected Outputs/Deliverables
Activity 1.1 Needs assessment and feasibility studies	• Comprehensive needs assessment • Project Baseline Studies • Pre-feasibility studies for hydropower systems • Preliminary Monitoring Survey and Impact Assessment Studies for selected sites • Assessment of type and feasibility of solar systems for installation	➔ Solar Energy Baseline Study Report ➔ Hydropower Baseline Study Report ➔ Priority Projects List of solar systems ➔ Pipeline for hydro power projects ➔ Impact Assessment Reports for selected sites
Activity 1.2 Hydropower project implementation	Hydropower plants for village electrification: • Manage full project cycle, from implementation studies to implementation of the civil works and electromechanical installations and the follow-up of works • Extend power lines of existing private micro hydro installations to neighbouring villages so as to	➔ Total installed capacity: 1200 KW ➔ 2 hydropower plants and minigrids (MHP Muoha and Sembezeia) ➔ MHP Majaua grid extension

	increase access to already available hydro power. • Purchase equipment for pico and mini hydro power and leases it for utilisation by community operators/entrepreneurs in rural areas by entrepreneurs (in collaboration with GIZ – AMES-M projects) Engagement with the private sector (for power generation or distribution): • PPP Workshop for FUNAE upper management • Pre-feasibility Studies to attract third private sector parties for hydropower development projects	➔ Progress Status Briefs (to be included in RERD Activity / Results Reports) ➔ PPP Workshop Report ➔ Pre-feasibility Studies Reports on hydropower projects with PPP potential
Activity 1.3 Solar power projects implementation	Solar power electrification for public infrastructure: • Implement the priority solar projects for electrification of community infrastructures such as administrative buildings, health centers, schools and staff residence buildings • Training of beneficiaries (healthcare, teachers and administrative staff) for the operation and minor maintenance of the solar systems • Provision of energy service equipment • Develop and install solar water pumping systems • Within FUNAE programme of conversion of existing 35 diesel generators to hybrid (solar/biofuel), develop and invest in a pilot hybrid system with cost recovering tariff	➔ 704 Solar systems in 625 buildings (total capacity 300 KWp) ➔ Contractors' Training Reports (to be included in Works Completion Reports) ➔ Progress Status Briefs on provision of equipment (to be included in RERD Activity / Results Reports) ➔ 45 solar water pumps ➔ 1 hybrid system
Activity 1.4 Wind power resources assessment	Establishment of wind resource for rural energy: • Collect wind potential data to determine the feasibility of wind/solar or wind/diesel hybrid systems to power village minigrids (5 sites identified)	➔ Wind power resource assessment Report ➔ Feasibility Study on hybrid systems (wind/solar or wind/diesel)
Activity 1.5 Set up Maintenance Structure	• Maintenance of solar/hydro infrastructures (existing and installed by RERD) • Installation of monitoring devices for solar systems (on 600 sites)	➔ FUNAE Maintenance Database ➔ Maintenance Reports (included in FUNAE Activity Report) ➔ Progress Status Brief (included in RERD Activity / Results Reports)

Component 2: Support (marketing, financial and institutional) for promotion of small solar products

Activities	Scope	Expected Outputs/Deliverables
Activity 2.1. Marketing Study	• Needs assessment, market analysis (supply/demand sides and distribution chains) and development potential for solar products in rural areas	➔ Market Development Study
Activity 2.2 Promotion of small solar products	• Promotion activities (awareness campaign, support 'the last mile" supply chain, temporary product subsidies, if necessary) • Defining quality standards • Provision of finance to help the market gain a critical mass (depending on the recommendations of the Market Development Study)	➔ Promotion activities (Progress status included in RERD Activity / Results Reports)
Activity 2.3 Institutional support to FUNAE	• Define the role and levels of involvement of FUNAE to improve access of rural households to small solar products (depending on the outcome of the of the Market Development Study) • Explore potential partnership with existing initiatives and distributing companies with a rural network	➔ FUNAE position paper on its role for promotion of small solar products ➔ FUNAE Partnership activities briefs (to be included in FUNAE Activity Reports)
Activity 2.4 Financial Support	• Project Development Studies on pico-hydro plants and larger solar systems for productive uses for attracting private sector investors. • Investment (e.g. in the form of equity) in the identified projects to bring the FIRR to a level commensurate with the private investment risk	➔ Project Development Study Reports with potential for private financing ➔ Provision of project finance

Component 3: Capacity Building Support for increasing the technical and administrative capacity of FUNAE

Activities	Scope	Expected Outputs/Deliverables
Activity 3.1 Training and Institutional Development	• Provision of specialised trainings and seminars according to the yearly training plans elaborated on the basis of needs assessment for each department • Financing post-graduate courses and master studies according to the criteria of FUNAE. • Organization of a Team Building Exercise for FUNAE, overall and in relation to RERD,	➔ Report on the overall training activities financed by the project* (to be included in the Final Project Report ➔ Team Building Report

	on roles/responsibilities and project coordination mechanism • Develop an Institutional and Organisational Capacity Building Plan for FUNAE	➔ FUNAE Institutional and Organisational Capacity Building Plan
Activity 3.2 Research and Development	• Optimisation of existing systems and trying out new systems or approaches, particularly in solar energy (8 R&D project ideas identified) • Review and capitalisation of results**	➔ R&D Projects Report ➔ R&D Workshop Report
Activity 3.3 Implementation of a GIS asset management system	• Provide support for the development of GIS Database • Improvement of Database for asset management and planning	➔ GIS Progress Status Briefs (included in RERD Activity / Results Reports) ➔ Report on GIS Database performance (to be included in FUNAE Activity Reports)
Activity 3.4 Technical Assistance	Provision of a TA Team to 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	➔ Activity Progress Reports (included in RERD Activity / Results Reports) and Final Project Report
Activity 3.5 Setting up new delegations	• Finance capital investments for the new FUNAE delegations or representations: building rehabilitation, vehicles, ICT-equipment, furniture	➔ Activity Progress Reports (included in RERD Activity / Results Reports)

* *ETR Note*: This is expected to include information such as: training needs assessment, participants selection process and criteria, training objective and modules/content, training activities performed, number and details of trainees and trainee performance assessment results, etc.
** *ETR Note: This can be done for example through a R&D workshop or symposium with partner research institutes, universities, etc.*

Source: TTF – Project formulation document (as amended in 2011 following Dutch contribution and Project Action Plan 2013-2015 (project reformulation document) and discussions with TA Team

Few comments concerning allocation of specific sub-activities against main activities:

- The Action Plan 2013-2015 has allocated the sub-activity “PPP Workshop for FUNAE upper management” under Activity 1.2 Hydropower. This sub-activity would be more appropriate under Activity 3.1 Training and Institutional Development. It relates to knowledge building applicable throughout all FUNAE activities
- Likewise the sub-activity “Pre-feasibility Studies to attract third private sector parties for hydropower development projects” planned under Activity 1.2 should be reallocated to Activity 1.1 Needs assessment and feasibility studies, since this sub-activity does not aim to result into an investment under the current project. The expected output is a pre-feasibility study.
- Activity 1.5 Set up Maintenance Structure is not properly allocated within Component 1 Investments. This allocation may be due to source of financing of this activity, which comes from budget lines originally foreseen for Investments Component. However it is believed that allocation under Component 3 is more appropriate for this activity, since its scope is similar to Activity 3.5 Setting up new delegations. Activity “Set up Maintenance Structure” can become Activity 3.6. In fact, the scope of the activity is to build further capacity in FUNAE

The project budget breakdown per main components is given below.

Table 2. RERD Project Budget

Component	**Budget** (thousands Euros)	
1. Investments	22,375	*80%*
2. Promotion of RE products market	900	*3%*
3. Capacity Building	3,875	*14%*
Other (Contingencies, general means, audit and evaluation etc.)	965	*3%*
Total	**28,115**	*100%*

Source: RERD Updated Overall Budget as scheduled in the Action Plan 2013-2015

The development partners (Belgium and the Netherlands) contribution to the RERD project is 23,340,000 Euros.

The expected project results and their links with the planned activities under each component are succinctly given in the diagram below.

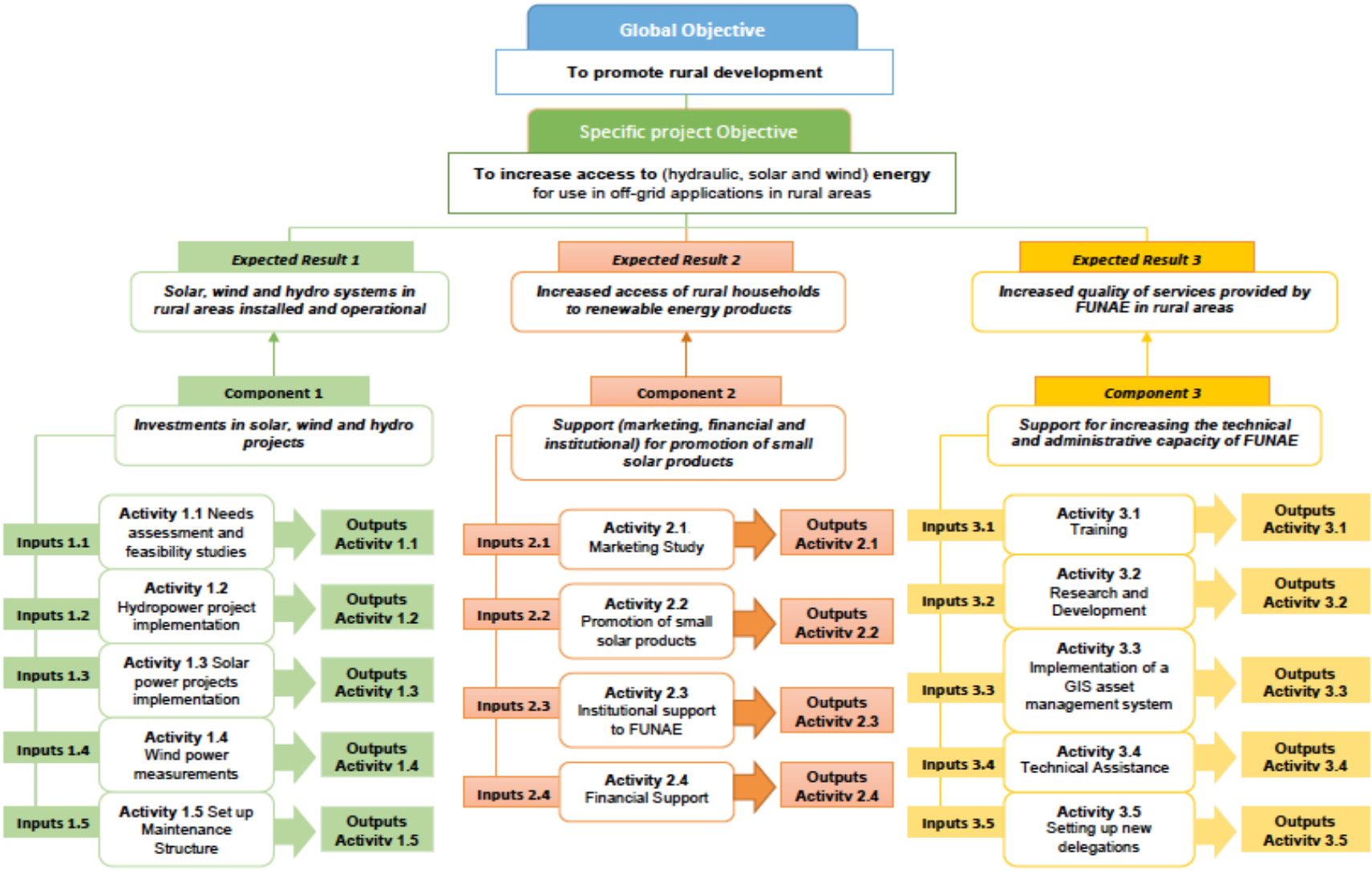

Figure 1. RERD Project Structure Diagram

1.3 Project Governance

Institutional anchorage

The project is anchored on the local partner intuition that is the only institution in Mozambique mandated by the government with responsibility for developing off-grid renewable energy solutions the rural areas.

Execution modalities

The formulation documents state that the main execution modality is co-management. However the legal and administrative framework defined in the amended TFF of 2011 provides for an execution modality that cannot be qualified as “co-management”. The project is in fact being executed through two modalities: an ad-hoc modality that is very close to the national execution for the majority of project activities; and regie modality for a limited number of project activities.

Steering Committee

A joint local consultative body (JLCB), also called steering committee (SC), created for overseeing the implementation of the project. 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 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.

Project management Team (PMT)

The amended TFF of 2011 is not clear on the composition of the PMT. However this is currently composed of a member appointed by FUNAE as PM and a TA member acting as co-PM.

Additionally, the two other TA members have been financed by the project. Other support resources have also been financed by the project. A number of resources at both head office and delegations have also been made available for implementation of project activities by the local partner, FUNAE.

2 Evaluation Purpose and Methodology

2.1 Purpose

The purpose of this End-Term Review is to provide an in-depth analysis of the intervention's performance, including implementation process, efficacy of the monitoring system as well as the achievement rate of the intended results. Its aim is three-fold:

i) Supporting **steering**. On the basis of in-depth analyses, the Review offers evidence-based recommendations that will be essential for the planning and formulation process of the next project. That way, the Review will support the strategic decision making for interventions to come.

ii) Contributing to **learning**. By analysing the development process, the Review will explain what worked, what did not work and why, and will thus enable to draw lessons for new interventions and for the elaboration of new policies, strategies and programmes.

iii) Demonstrating **accountability** to the donor, partner and other internal actors by supplying an external assessment of the progress made and the results achieved.

The learning aspect of the Review requires a specific focus in order to draw useful lessons for the upcoming formulation process of RERD II and partly for the foreseen capacity building interventions for MIREME and FUNAE.

2.2 Evaluation Process

The evaluation process adopted for this End-Term Review consists of three phases:

- Inception and Desk Review Phase (structuring and analysis phase)
- Field Phase (interviews and field visits)
- Synthesis Phase (final assessment and reporting)

The figure below gives a succinct overview of specific tasks to be undertaken within each phase.

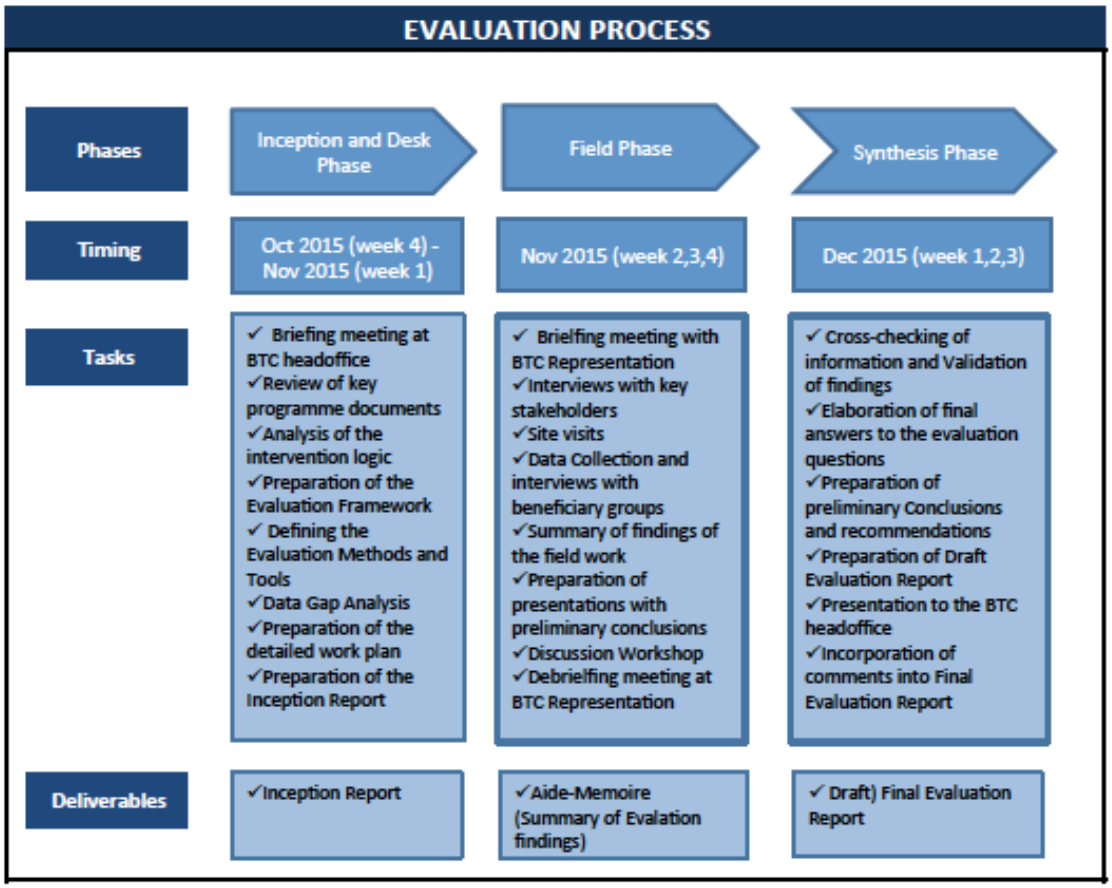

Figure 2. Evaluation Process

2.3 Tools and Methods

In order to adequately apply the evaluation framework built for the purpose of this End-Term Review (presented in the next section), several methodological tools for data collection and analysis are planned in order to gather valid information to substantiate answers to the evaluation questions. Each tool has been considered from the viewpoint of its capacity to help answering the evaluation questions. Below are the main tools planned for each stage of the evaluation.

Inception and Desk Phase

- Briefing with BTC Head office
- Desk study review of project background documentation:
  - Indicative Cooperation Programme (PIC) between Belgium and Mozambique;
  - Poverty Reduction Strategy Paper (PRSP) of Mozambique
  - Strategy for the development of New and Renewable Energies of Government of Mozambique/Ministry of Energy
  - Strategic Pan of FUNAE (Energy Fund)
  - RERD Project Formulation Document (Technical and Financial File – original and amended following Dutch contribution), Action Plan 2013-1015 (project reformulation)
  - RERD Project Annual Reports

  - Steering Committee Meetings minutes (PV)
  - Baseline Report, MTR Report, Backstopping Report and Value-for-Money Audit Report
- Screening of other (publically available) relevant information in energy sector in Mozambique
- Construction of Intervention Logic in the form of effects diagram
- Construction of the Evaluation Framework including (re-) formulation of the Evaluation Questions, defining or selecting relevant assessment criteria and information sources
- Creation of Inventory tools in the form of summary fiches for key evaluation issues
- Data ordering and analysis
- Data gap analysis consisting of assessment of existing data, identifying missing information or information that required cross verification and validation, filling of information gaps and/or identifying complementary data to be collected, whenever feasible, through interviews
- Identification of key informants in each stakeholder organisation (BTC Representation, Ministry of Energy, FUNAE, Project Implementation Team, other donors, local communities, and possibly NSAs and private sector representatives;
- Development of tools for field visits: structuring and organizing of information, preparation of specific questionnaires to support interviews; preparation of meetings agenda and aids for focus group discussions, etc.
- Preparation and coordination of the field phase work in Mozambique with BTC Resident Representative, RERD TA Team and formulation mission of RERD 2, such as: site visits, meetings schedules with stakeholders and donors, etc.

Field Phase

- Briefing meeting with BTC Representation
- Semi-structured Interviews with BTC Programme officer, FUNAE, Project Implementation Team (TA Team and FUNAE staff involved; Ministry of Energy and other relevant ministries, and possibly other organizations (e.g. NSAs)
- Elaboration of preliminary findings on the Evaluation Questions
- Site visits
- Data Collection in the field
- Interviews with FUNAE Delegations
- Interviews with beneficiary groups representatives (schools, healthcare centers, local communities, etc.)
- Test the preliminary findings against situation on the ground;
- (if possible) Focus group discussions with key informants who are personally involved or have observed the project formulation and implementation process and can testify the most significant changes and events over time;
- Meetings and Interview Notes to support further analysis and validation of findings;
- Checking of the reliability and coverage of data.
- Summary of findings of the field work (Aide-Memoire)
- Discussion Workshop with key stakeholders to present the main evaluation findings and collect feedback
- Debriefing meeting at BTC Representation

Synthesis Phase

- Detailed review of the findings from the desk phase and the field visits;
- Triangulation and cross checking of data and evidence;

- Validation or revision of hypothesis drawn at the inception phase;
- Elaboration of conclusions and recommendations based on evidence gathered
- Internal Evaluation Team meeting to discuss/challenge findings and conclusions;
- Preparation of the draft Evaluation Report
- Presentation meeting at the BTC Head office to discuss conclusions and recommendations and collect comments
- Finalization of the Evaluation Report

2.4 Evaluation Framework

Based on a thorough review of the sector strategy, programming and project formulation documents the Evaluation Team prepared a well-integrated Evaluation Framework, which is presented below. This is based on a set of structured Generic Evaluation Questions (EQ) that addresses the main evaluation criteria (as defined by the OECD DAC) at a high level and comprehensively capture the most significant aspects of the project from formulation through to implementation (to date). For each generic EQ, a number of assessment criteria[1] has been defined and/or selected based on the specific evaluation questions and other evaluation issues presented or highlighted in the ToR of the assignment, which provides a robust framework for assessing the performance of the project. The questions are structured in a way to address the following aspects of the evaluation:

Table 3. Overview of the Generic Evaluation Questions

EQ #	Title	Evaluation Criteria
EQ 1	**To what extent the project intervention strategy is in line with the Mozambican government policies in the energy sector and takes into account the priority needs for rural development?**	Relevance
EQ 2	**Is the project (currently and in the view of possible future phases) structured in a way that can adequately address the energy needs of the target beneficiaries?**	Relevance / Efficiency
EQ 3	**Does the project have an adequate delivery capacity as to ensure delivery as planned?**	Efficiency
EQ 4	**Has the project intervention been conducive to improving access to energy in rural areas**	Effectiveness
EQ 5	**To what extent the renewable energy services developed with support of the project can durably contribute to provision of energy in the rural areas**	Effectiveness / Sustainability
EQ 6	**To what extent has the development intervention contributed to rural development in selected areas of Mozambique**	Impact

The detailed Evaluation Framework including the generic EQ, related assessment criteria and the methodological approach for assessment of each generic EQ is presented in Annex 2.

[1] Also known as «Judgement Criteria»

3 Evaluation Findings and Analysis

3.1 Overall Assessment of the Intervention

Relevance *(Problems and Needs)*

RERD project is well aligned with the known Government of Mozambique policies and strategic objectives. It provides a valid response to the beneficiary needs for access to energy. Regarding design of the project, the ruling management modality has not been clear.

Overall assessment	**A**	**B**	**C**	**D**

Efficiency *(Sound management and value for money)*

Outputs delivery status against planned is lower than expected. This is mainly due to Component 2 failing to produce any useful output and numerous planning and re-planning exercises and procurement challenges that Component 1 underwent. Additionally, use of project funds to advance VAT payments that is clearly the partner institution's obligation has created cash flow strains leading to rescheduling or suspension of some planned project activities.

Overall assessment	**A**	**B**	**C**	**D**

Effectiveness *(Achievement of purpose)*

The project will be able to achieve an acceptable level of outcome on result area 1, none on the result area 2 and to some extent on the result area 3 by the end of the intervention. Given the weight of component 1 and the pilot nature of the current project, the overall effectiveness has been assessed as acceptable.

Overall assessment	**A**	**B**	**C**	**D**

Sustainability *(Likely continuation of achieved results)*

Sustainability of results is currently heavily dependent on external financing (by the development partners). The current organizational structures, HR and technical and financial capacity of the partner institution is limited to afford the increased level of operations resulting from the current and prospected investments. However, there are a number of actions undertaken by the project that has set the foundations for sustainability of the current investments[2].

A peculiarity of the current ETR is that it has taken place one year before the end of the project, where it is still early to make a definitive assessment on sustainability of results since a number of actions to be completed in the pending period could change the

[2] These include awareness raising for maintenance, creation of maintenance unit and training of staff in FUNAE HQ and delegations, buiding knowledge on the functioning of systems, provision of material and equipment for carrying out maintenance ativities that have an effect lasting for some time after the project life, testing of monitoring devices which if rolled out would eventually reduce maintenance costs, etc.

prospective of sustainability. The grading below is made on current status of the assessment, as of end of 2015.

Overall assessment	**A**	**B**		**C**	**D**	

It is necessary to reconsider the assessment of the sustainability criterion through a time-phased approach. A rapid review can be made by the end of 2016, perhaps on the occasion of the final project completion / results report on the basis of the following criteria:

- Transfer of the individual solar systems to the Minisitry of Education and Ministry of Health is completed
- FUNAE has translated its maintenance objectives laid down in the new strategic plan into a rolling long term (5-year) O&M Plan, this is assessed as adequate by the TA, and the Ministry's approval has been obtained.
- The (yearly) Maintenance Plan 2016 prepared by the FUNAE maintenance unit is assessed as adequate by the TA, the proposed plan is duly approved by FUNAE Board (in January 2016) and periodic verifications are made on whether or not the quarterly funding required to implement the plan has been fully and in timely fashion provided to the maintenance unit by the finance dept. Additionally the Maintenance Plan 2017 is prepared, assessed as adequte and FUNAE Board approval is granted by the end of 2016
- Pre-payment metering for all mini-grids connections is installed and funds projected for collection in 2017 (based on collections of last quarter 2016) would suffice to cover a reasonable portion (e.g. 60%) of O&M costs.

If the above listed actions are completed by the end of the project, the current RERD project sustainability can be assessed as fully satisfactory (i.e. grade C). If/when the other reccomendations for the Ministry and FUNAE concerning policy actions, traiff setting, subsisdy scheme, etc are completed and implemented, the sutainability of both current RERD investments and any future investments could well be rated as good and very good.

Impact *(Achievement of wider effects)*

RERD intervention is expected to make a contribution, though modest given its current size, to the ambitious overall development objectives

Overall assessment	**A**	**B**	**C**	**D**

3.2 Relevance

EQ 1	To what extent the project intervention strategy is in line with the Mozambican government policies in the energy sector and takes into account the priority needs for rural development?
EQ Label:	*Strategic Alignment*

Assessment Criteria 1.1: Response to the beneficiaries' problems, needs and priorities[3]

Access to electricity is need that all beneficiaries, institutional, communities or individual households, have in rural areas of Mozambique and lack of it is often implied as being one of the factors hindering rural development. It is also well known in the development theory that access to public utilities, such as water and electricity, roads as well as education, health, etc. are the main barriers hindering development.

What the development intervention has tried to establish since the outset is whether access to electricity was a priority and as to which beneficiary group, this was to be regarded as a priority need. In discussion with the partner institution, it was decided to cover by project interventions the following beneficiary groups: Institutional beneficiaries such as schools, healthcare centers and related staff residence houses and administrative buildings in addition to private beneficiaries such as local communities and households.

Definition of the project activities, particularly investment component, were then made based on priorities presented by the partner institution and in line with the government policies. If existing needs assessment studies could have been presented by the partner institution at that time, the "priority" aspects would have been clearer, especially in supporting prioritization of investments and/or type of investment / technology to apply to best address the assessed needs.

Since some inconsistencies about the selected sites were encountered in the beginning of the project, a verification mission was organized in order to feed into the overall needs assessment that had to be carried out. Some adjustments were brought into the investment plan of the project on the basis of making the most appropriate choice of type of technological solution to apply as to achieve the highest level of outputs (and quality) with available resources by however adhering to the overall design of the project in terms of various technological options to adopt.

It is known that local beneficiaries are challenged with many needs on daily basis and consequently, it is reasonable to think whether access to energy solutions brought into by the intervention adequately responds to the local realities and living conditions.

Answer to this question could be found if a closer look is given at the current situation regarding actual use of energy provided by the project. The situation appears to be as follows:

- Healthcare centers are properly using the electricity provided by the project.
- Schools are currently making only limited use of the supplied electricity though the situation is progressively changing

[3] Is the intervention in tune with the problems, needs and priorities of beneficiaries? Is the intervention strategy an adequate answer to the needs and to the reality/living conditions of the beneficiaries?

- Healthcare and school staff using the residences are making use of supplied electricity to various degrees.
- Local administrations using the administrative buildings electrified by the project seem to be making only limited use of the supplied electricity because of the timetable of work normally during the daylight.
- Local communities are making full use of solar pumping systems installed by the project
- Households, are more and more eager to be connected to the electrical mini-grids built by the project. A good number of connections has been made and other households have applied for being connected and/or have plans for relocation closer to areas covered by the mini-grids.

Another indication as to whether the need was demand or supply driven is the willingness to pay for it. There is sufficient evidence that the local beneficiary communities and households are in principle prepared to pay for electricity (tariff setting is another matter that requires separate treatment) whereas there is no clarity as to the willingness to pay by the institutional beneficiaries.

The above findings give an overview on current use of energy provided by the project as response to the declared needs of the beneficiaries. This does not attempt to assess as to the whether the access to energy has enacted the desired chain of effects that could eventually make a change in the socio-economic conditions of population living in the rural areas. This issue is considered within the Impact evaluation criteria further down in this report.

Assessment Criteria 1.2: Consistency with partner country priorities and policies[4]

Mozambique's hydropower potential is about 12.500 MW. There are 12 dams in the country with 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.

Hydropower generated electricity is and should be considered as a renewable energy source. Most of it is transmitted and distributed through a main grid, owned and operated by the national electricity company, Electricidade de Moçambique (EDM). EDM currently has the right to purchase 400 MW of electricity from Hidroelectrica de Cahora Bassa (HCB). Part of this power is delivered directly by EDM for consumption in the Northern and Central regions. Additionally, 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. On the face of it, it can be concluded that the current national electricity generation is dominated by renewable energy.

However, in spite of this generation capacity, distribution is insufficient and requires investment in transmission lines, particularly in rural areas. All the large generation hydropower sources are located far from the major consumers and significant investments in transmission facilities are needed, including main grid extensions to expand the distribution network in order to reach out the highest number of end users possible.

[4] Is the development project for rural renewable energy relevant if considered that the traditional energy sector (high voltage) is highly subsidized by the State and is largely used for export? Can the national priorities and policies in the energy sector be adjusted to give better consideration to Renewable energies?

Faced with this situation, the government has developed electricity master plans for development of the generation capacity and the national grid. However given the significant investment requirements and the speed of development of the national grid, the government has additionally developed a policy for off-grid electrification of rural areas where the national grid is unlikely to reach in the foreseeable future.

In this regard, the Fundo Nacional de Energia (FUNAE) was established in 1997 as a public institution 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. FUNAE operates exclusively in areas not covered and served by EDM, that is off-grid. As a consequence, FUNAE can be considered as the public institution mandated with the responsibility to develop, finance, build or install energy and electrification systems and solutions in the off-grid areas of the country.

In the light of the above analysis that clearly puts FUNAE as a central institution covering rural areas through off-grid systems, almost exclusively based on renewable energy solutions, it can be concluded that RERD Project intervention in support of FUNAE is entirely consistent with partner country priorities and policies. RERD Project includes two elements essential to ensuring Relevance: It aims at promoting rural development through increased access to energy that is in line with partner country's strategy; and in doing so, it works with partner country's mandated institutions in a way that the project activities are aligned with strategic / action programmes of the partner institution as well as the project is fully embedded into partner institution's structures and delivery is assured with the partner institution staff members, which is not always the case with other development partners projects.

Regarding exportation of energy produced through traditional sources which applies to the large HPP of Cahora Bassa, it must be noted that both volume and selling price are not the result of a government's policy choice but rather to the need to respect a long term contractual agreement, involving Mozambique and South Africa, made long time ago which the present and any foreseeable future governments are unfortunately locked in. Renegotiation of that agreement is a very sensitive matter involving Mozambique's foreign relations with neighbouring countries and previous attempts to bring up the matter to the negotiation table have failed. There is not much information available regarding the cost structure of Cahora Bassa electricity production as the HPP is operated by a commercial company owned by a consortium, which the Government of Mozambique has only recently taken over the majority share. However the contractually set price for exportation to South Africa (that is a contractual obligation) is apparently covering the production costs. There is therefore no subsidy provided by the government to HPP Cahora Bassa company. The issue however is that the price that the company can recover for electricity sold abroad is lower that the electricity price that the government pays for import of electricity, notably to service the Maputo province. This partly explains a "perceived" subsidy for export electricity price.

Further to the above considerations, the question to be raised is whether the national priorities and policies in the energy sector can be adjusted to give better consideration to off-grid electrification solutions compared with main grid policies and plans and as to what technologies to be given preference.

It goes without saying that there is room for improvement and streamlining at both policy and planning level. To mention, but few:

At policy level:

- Further integration of sector wise energy policies, both grid and off-grid, aiming at renewable energies and ensuring consistency of plans[5] with the stated policies.
- Increase clarity in all policy documents that any future off-grid electrification has to be made through renewable energy solutions and other non-renewable sources are used only as an exception (e.g. when there are technical limitations) and always in combination with renewable energy systems (i.e. hybrid systems)[6].
- Emphasis put on the need to provide access to electricity, through off-grid solutions, on a continuous basis, which necessitates development of combined systems that, whenever possible, can be fed from a variety of sources (e.g. hydro/solar/wind and eventually biofuel)
- Establishment by FUNAE of a clear policy (to be consistently adhered to) regarding technological solutions to be adopted for off-grid energy provision. This may encompass preference to development of mini-grids over individual systems, mini over pico HPP's, large solar power plants, hybrid systems, etc.
- Clear policy statements recognising that provision of off-grid energy is a public utility service and as such, all beneficiaries (communities/households and public institutions) have not only a right to connect, wherever the service is available, but also a set of obligations towards the service provider.
- Establishment of a clear tariff setting mechanism for users of off-grid electricity, to be regulated and monitored possibly by an independent Energy Regulatory Body.
- Recognition that, besides investment cost, the off-grid energy systems have a cost for operation and maintenance, which may be even higher than for on-grid systems. Nevertheless, harmonisation of tariffs with those for on-grid connected users shall be ensured for the sake of social equity, especially given the least favourable population groups leaving in the rural areas.
- Consequently, establishment of clear government policies that guarantee funding for good operation and maintenance of off-grid energy systems through the same mechanism[7] as it is currently done for the main national grid in the light of tariff ceilings. This includes extension of the government backed subsidy scheme for the off-grid operators.
- Establishment of a clear regulation on the feed-in tariff from off-grid generation points to the main national grid (when the main grid reaches the off-grid areas). Same applies to IPP's for electricity supplied to both off-grid areas (e.g. mini-grids or a possible future network of mini-grids developed by FUNAE) and main grid. Harmonisation of feed-in tariffs and purchase agreements / obligations should be sought.
- Review of regulatory framework in the energy sector in order to create an enabling environment for Private Sector Participation in both generation and distribution, particularly in off-grid areas.

At planning level:

- Priority planning by the government of financing of FUNAE in order to provide it with the required financial resources to implement the ambitious strategic plans for development of new systems for off-grid rural electrification and/or provision of energy services in rural areas.

[5] There are indications that the EDM plans for future investments include a mix of hydro/coal/gas power plants development. It is difficult to assess and make substantiated reasoning on unavailable documented information but it remains the fact though that the written policies require further clarity, and consequently ensuring that planning is made consistently.

[6] It is observed that FUNAE operations are almost exclusively based on renewable energy solutions and there is also in place a program for conversion of any older non-renewable energy system into hybrid.

[7] This does not necessary imply the same level of funding. A careful calculation must be done in the light of likely higher costs for operation and maintenance of off-grid energy systems.

- Smooth coordination between EDM and FUNAE with respect to current and future investment plans and exchange of data and information to be ensured at the ministerial level.
- Preparation of a long term Investment Plan for FUNAE where the strategic objectives are translated into concrete and costed projects and measurable outputs.
- Establishment of clear projects prioritisation criteria, which are technically sound and socially conscious.
- Mandatory cost-effectiveness analysis to be carried out as to support decision on the chosen technological solution for each project
- Separate planning for projects with a PPP potential. Early involvement and engagement of the private sector in project development, through a transparent process, in full respect of the applicable public procurement and/or PPP/concession legislation.
- Preparation of a rolling long term O&M Plan for FUNAE systems. This should ideally stretch over a 5-year period and be properly costed and presented to the Ministry on yearly basis.

Assessment Criteria 1.3: Complementarity with other interventions[8]

- Thanks to the TA support provided by the project, the overall coordination of the development partners operating in the renewable energy sector in Mozambique has been facilitated by the TA Team, whilst orienting and making efforts to converge all development partners initiatives in (off-grid) renewable energies towards FUNAE as a central institution.
- The proceedings of the Energy Sector Working Group composed of both Mozambican institutions and development partners has been facilitated by the RERD project. This is the right forum to ensure complementarity of interventions and division of labour
- In the view of a possible second phase of RERD, the project is sensibilising the other development partners on the need for concentration in order to increase effectiveness of the interventions
- At project level, RERD project has ensured achievement of complementarities and synergies with projects funded by other development partners. Example of this is alignment of project activities on solar power with the WB project implemented by FUNAE or complementary actions panned and financed by RERD project on a hydropower project being developed by FUNE with EU funding.
- Additionally, efforts to complement the investments made by GIZ project in hydro power were made by RERD project to the degree of planning the purchase and installation of equipment and machinery to upgrade the systems but due to impediments posed by the legal agreements framework, implementation of the activity has not been possible. However a good basis of collaboration has been established.
- Challenges remain though with other donor initiatives, including GIZ, having started before RERD project was fully operational. This remains a particularly acute issue with donors and/or any other agencies, financing institutions, NGO's, etc. (public and private initiatives) which have opted to carry out projects in the off-grid renewable energy sector without institutional involvement of FUNAE (i.e. without FUNAE being an implementing partner of the project).

[8] Is the project consistent with an approach that promotes complementarity to relevant other actors working on the same subject?

- The legal compliance of such operations need to be assessed with regards to the property status, licensing, right to operate in a regulated market, compliance with the minimum technical standards of safety, quality, reliability and compliance (e.g. with main grid extension requirements), public service obligation to render a public service (traditionally a government prerogative and obligation, which transfer of both rights and obligations to a private sector operator need to be regulated), registration of private sector operators which are de facto exercising an commercial activity insofar sale of electricity is concerned, etc[9]. It is understood the Mozambican legal and regulatory framework in the energy market and particularly in the off-grid systems is in an evolving stage and many grey areas exist.

EQ 2	**Is the project (currently and in the view of possible future phases) structured in a way that can adequately address the energy needs of the target beneficiaries?**
EQ Label:	*Project Design and Structuring*

Assessment Criteria 2.1: Appropriateness of the chosen technologies for provision of access to energy[10]

The specific project objective: *"to increase access to photovoltaic, wind and hydropower energy*" clearly states the chosen technologies for the RERD project. However the appropriateness of these chosen technologies seems to have been originally assessed only with regards to photovoltaic and hydropower, taking into account that a decision to suspend investments in wind power, due to the financial and technical difficulties it presented, was made half way through the project.

Concerning investments in hydropower, the constructed mini-grids in locations with significant hydropower potential, which at times was indicated by the local population such as is the case for Sembeseia mini HPP, can be regarded as an appropriate choice for the following reasons. Mini grids based on hydro power allow for the distribution of high quality energy to beneficiary institutions and surrounding communities and have been constructed adhering to technical specifications and standards that will allow the connection to the national grid (operated by EDM) once this has reached the site locations, e.g. Majua Hydro Power Plant.

Regarding the appropriateness of (mini-) grids to specific locations, there are apparent challenges when planning the size, number of connections, etc. given the usual wide spreading of households in the project area. Very small sites with widely spread households' locations would not lend themselves well for mini-grid solutions.

RERD project has been considering this issue especially in the light of cost-efficiency of the investment with an eye also on the sustainability of the entire operation, including operation and maintenance period. The mini-grids have been planned in a way these

[9] The **Electricity Law** n° 21/97 defines the general policy for the organization 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 is expected be completed with a new policy regarding the new and renewable energy sector.

[10] To what degree would there have been more appropriate technologies for improving the energy services of the rural Mozambican population (i.e. grid extension, individual solar systems for households; diesel generators; others)?

remain centered on public buildings and main community household agglomerations. There is also evidence that the project has stimulated households relocations from farther areas close to the mini-grids with connection potential. The capacity of the mini-grids has been planned to capture future potential connections, whist however remaining cognizant of apparent challenges regarding assessment of the demand growth and technical limitations of the developed systems.

Though mini-grids planning is still in a learning curve, the current project and certainly future ones has and would further benefit from experience gained which indicates that the focus should be on large sites development in order to achieve a critical mass where there are economies of scale, existing or prospective production activities, metering installation is feasible, and include combined systems, because hydro alone cannot guarantee continuity of services.

Concerning investments in photovoltaic installations, individual solar system have been provided by the project mainly to institutional/public buildings for which solar technology provides the required energy needs and, on a limited number of cases, to the least favorable households which because of very low income cannot afford other means of electrification. The same applies to water pumps, where the structures created, which include the water storage tank, solar panels and water pump, are well designed and function soundly thus appropriately responding to user needs.

Regarding the wind energy, wind resource measurements and studies are still ongoing and until results are known, it is early to say if investments in this RE option would be efficient and/or effective in comparison with the other options available. However from preliminary results, it can be anticipated that in certain locations, wind energy investments could be a feasible option in combination with other energy sources like solar under hybrid systems.

An argument can be made for institutional buildings such as administrative posts, health centres and schools, which as the population grows, their energy needs are also projected to grow, and should it be case, the use of PV technology would prove once again appropriate choice if there is an ease to increase the installed capacity of the current systems.

The significant limitation identified with the choice of technologies is related to the limited capacity, both technical and financial, for operation and maintenance of the system.

A further argument that can also be raised regarding the appropriateness of technologies to provide access to energy is whether endeavors have been taken by the RERD project, as well as other FUNAE initiatives to capitalize on the possible advantages of close collaboration with the public utility, EDM.

This collaboration can be seen both from a perspective of connecting renewable energy generation projects to the main grid, thus strengthening the capacity of the national grid and saving EDM investment costs, as well as connecting renewable energy mini-grids in areas where the EDM grid has reached and such facilities can be used to feed in the national grid or for back-up power.

Both the above scenarios can significantly benefit rural communities, as well as peri-urban areas where there is a concentration of low-income households. Another initiative to support access to energy by low-income households that cannot afford EDM connection fees is to cover such fees by project funds. The experience of GIZ EnDev project shows that this is an action that produces quick outcomes with regards to increase access to energy. However this won't necessary be in the most remote rural

areas where the project wishes to focus its interventions, i.e. areas where the EDM grid is inexistent.

Assessment Criteria 2.2: Project geographic boundaries[11]

The project has been operating in four provinces, Manica, Cabo Delgado, Nampula and Zambezia, where a variety of renewable energy resources are widely available. Operating in these four provinces has meant a wide spread presence across the country and the fact that these provinces are not adjacent to one another has also meant a need to widely spread resources across great distances which may have limited the project capacity to generate visible impact.

An evaluation finding points towards a possible option of RERD project to concentrate its efforts and activities into a smaller number of provinces and restrict its geographic boundaries so as to increase the likelihood of the project impact.

A number of two provinces would be considered as adequate for the type and means of the current (or similar) intervention. Stretching the project operation across two provinces instead of one, also allows for mitigation of the risk of the project having to temporary suspend its activities due to unforeseen circumstances (adverse climate change conditions, political instability, etc.), and thus permitting the project to have an alternative in which to operate. Should the recommendation of selecting only two provinces be further considered, these should be selected taking into consideration that they should not be adjacent to each other in order to possibly mitigate or limit the risks already described.

Assessment Criteria 2.3: Adequacy of the choice of the implementing partner institution[12]

The implementing partner institution of the project is FUNAE. Beyond its denomination, Energy Fund, FUNAE has been conceived, established and operating for nearly 20 years as, what is widely known in the infrastructure development industry, a "project developer". FUNAE is therefore a project development agency that besides financing renewable energy projects, it covers a vast number of activities falling within the infrastructure project lifecycle from project conception, development (feasibility study and design), financing and procurement through to construction and commissioning. It does this with a combination of both own resources and involvement of contractors and consultants / engineering firms. The financing comes from public sector sources that are normally either government or donor agencies. Given that financing of FUNAE projects is usually arranged prior to launching a project, what FUNAE has been doing the least is actually the finance structuring step in the project cycle, that is pooling up resources from different sources to finance a project. This is a speciality in itself, which FUNAE has not been able to develop over years. This, partly because of secured government or donor financing that has pre-empted any incentive to invest and develop the project financing[13] capacity but also because this speciality requires niche expertise, rarely available in the country.

[11] To what degree, a more geographically 'centralised' approach (less provinces, less districts) would have been beneficial/more effective?

[12] Can the choice of an investment fund (as FUNAE) offer the required framework for full cycle delivery of a project (like RERD) that, besides investments, requires maintenance, network management and ensuring accessibility to households?

[13] **Project finance** is the long-term financing of infrastructure and industrial projects and public services where project debt and equity used to finance the project are paid back from the cashflow generated by the project. Project financing decision is based upon a non-recourse or limited recourse financial structure linked with the projected cash flows of the project rather than the

Once the infrastructure is completed and delivered, the next step, and the longest one, of the project lifecycle is the operation and maintenance (O&M). Given the type of RE infrastructure developed and owned by FUNAE prior to 2010 were mainly individual systems and installations requiring sporadic maintenance, the issue of operation has never been raised, nor was the long-term maintenance planning. RERD project, as well as some other institutional donors or lenders (such as World Bank or Korean funds) have been recently developing with FUNAE a number of RE collective systems, encompassing both power plants and minigrids, which require a well structured O&M capacity in order to effectively operate the systems.

At the current state, FUNAE does not possess sufficient maintenance capacity although a maintenance division has been recently set up, which is actually coping with urgent interventions for repair and extraordinary maintenance, as a sort of on-call service. The maintenance interventions are currently mostly for individual solar systems and with the current level of resources and funding available for maintenance, the organisation is experiencing serious bottlenecks.

It goes without saying that when the RE collective systems (hydro or solar energy powered mini-grids), current or others to be built, will come entirely under FUNAE's operation responsibility, the FUNAE organisation, if kept in status quo, will be unmanageable and totally unsustainable. This is perfectly understandable insofar FUNAE has never meant to be a Systems Operator but rather a project development agency. As a side matter, the Contractors that are building the RE collective systems have also been assigned with the responsibility to operate these for two years. This gives a bit of leeway for making decisions on how to cope with these systems once the contractors have fulfilled their contracts.

Insofar the appropriateness of the choice of a project partner as FUNAE relates to the assessment of RERD project design, it must be recognised that this was not only the sole available choice at the time of formulation but this was the right one in order to work within the legitimate institutional framework of the partner country. The issue being faced today regarding FUNAE's strains for ensuring O&M of the new facilities developed by the project, this stems from the assumption made during the formulation which FUNAE would have secured funding from the government for proper maintenance of the new facilities that did not hold true. Nor did the organisational change that FUNAE should have undergone throughout the past 4-5 years in order to be prepared for taking over and O&M of the newly developed systems. The only change occurring was the creation of a small maintenance division, this also being prompted and partly funded by RERD project, which again raises the issue of its sustainability.

Since FUNAE is currently in a crossroad, which decisions taken today will affect its institutional future for decades to come, the time has also come to question whether developing the O&M capacity within the current FUNAE organisation is the right thing to do. This will be a radical change from the original conception of FUNAE as a project development agency.

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balance sheets of its sponsors. Usually, a project financing structure involves a number of equity investors, known as 'sponsors', as well as a 'syndicate' of banks or other lending institutions that provide loans to the operation. They are most commonly non-recourse loans, which are secured by the project assets and paid entirely from project cash flow, rather than from the general assets or creditworthiness of the project sponsors, a decision in part supported by financial modeling of project costs over the lifecycle of the facility and projected revenue flows. The financing is typically secured by all of the project assets, including the revenue streams that the proejct is expected to generate over its lifespan.

As a conclusion, currently FUNAE does not offer the required framework for life cycle infrastructure project development, operation and service delivery that, besides investments, require maintenance, network management, systems operation and ensuring accessibility to households along with tariff billing and collection[14]. Such a capacity can obviously be built but due consideration should be given to time, costs and political commitment needed alongside the sustainability challenges that must be factored into the decision, especially in terms of financing, right since the outset.

Assessment Criteria 2.4: Appropriateness of the current management and Implementation modalities[15]

This question requires assessing if the chosen management modality is appropriate for achieving the expected outcomes of the intervention in an efficient and effective way. It does therefore fall in the Relevance evaluation criteria insofar it relates to the design of the intervention.

The partners involved in the RERD project are: FUNAE as designated partner country institution and BTC as development partner. The chosen execution modality is co-management. This assumes that both partners put together under a common umbrella the required resources (human, financial and material) to manage and implement the project, as in any real partnership endeavour. This does not exclude that part of the resources can be part time or on-call basis.

The original project formulation document (TFF of 2009) appears to adequately respond to the above-described partnership intent and the co-management modality as designed and described in the said document is found to be appropriate and in line with the good management practices and common international standards for both public and private joint project ventures. However the amended project formulation document (TFF of 2011) appears to have radically altered the original intents ruling the formulation. The result of it is an execution modality that can no longer be qualified as "co-management".

The project is in fact being executed through two modalities:

- the majority of project activities corresponding to a large budget amount is executed through an ad-hoc modality that is very close to the national execution by the partner country institution, albeit "no-objection" mechanism provided for the development partner.[16]
- a limited number of project activities corresponding to a minor budget amount is executed through own-management (regie) modality by the development partner

A comparative analysis between the original TFF of 2009 and the complement to the TFF made in 2011 (presented in Annex No.4) suggests that the project legal and administrative framework (as amended in 2011) provides little room for co-management.

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[14] Pre-paid metering systems can alleviate the burden of a commercial department dealing with billing and collection, but still there is a number of activities, like customers management, contract management, marketing, communication, etc. to be covered.

[15] To what degree are the management and implementing modalities of the RERD appropriate for achieving efficient and effective outcomes in the area of rural development through electrification?

[16] This modality is very similar to the project implementation modality commonly used by the World Bank with recipient countries. Note that most of the funding providing by the WB is based on loan agreements and hence, the rationale for limited involvement of the WB in management of funds and/or projects. Rightfully, management is to be done by the recipient governments as a matter of principle on full ownership of funds they have contracted a loan for and will presumably refund one day. Nevertheless, the loan agreements often provide for use of WB procurment procedures for all major project expenditures.

This finding is important from a perspective of identifying the partner that is (actually) vested with management authority on the project (i.e. major project activities) and consequently delivery responsibility and accountability on achievement (or non) of the intended project results.

The diagrams below simplistically depicts the project authority gravity line and subsequent management responsibility for the major project activities falling under the main project execution modality, which was designed as co-management in 2009 but amended in 2011 to an ad-hoc modality closer to national execution.

Figure No.3 Project Management Authority (TFF 2009)

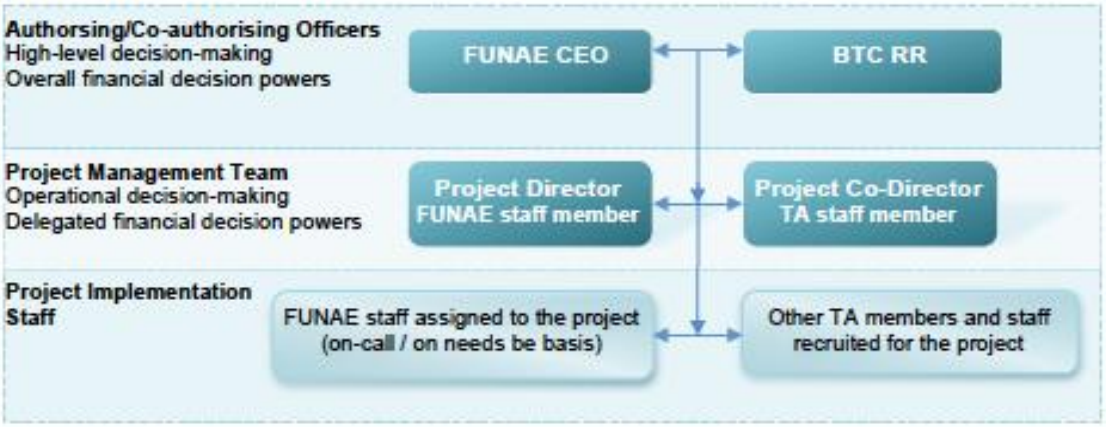
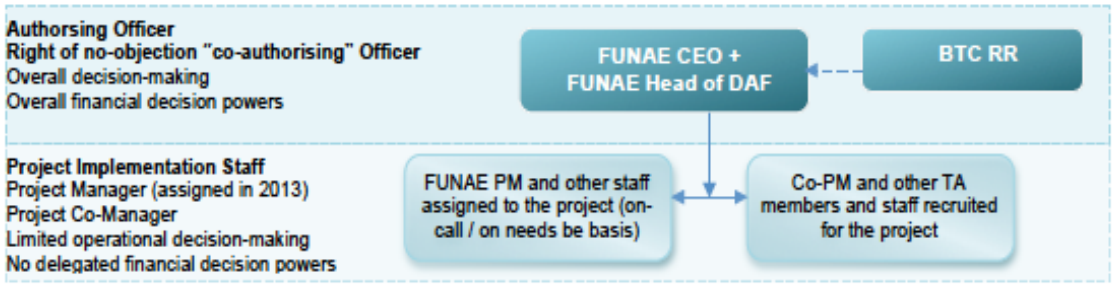


Figure No.4 Project Management Authority (TFF 2011)



Given that the management modality for most of project activities is a kind of ad hoc (i.e. not one of the three well known institutionalised modalities), it is difficult to draw a clear line on the level of authority on decision-making assigned to different actors from 2011 onwards. Few elements are clear though:

- BTC cannot formally be a party in the decision formation process and/or making the decision. Its authority is limited to no-objection. In case of objection, FUNAE would eventually reformulate the decision or make another decision that requires another no-objection review by BTC.
- There was no clarity on the composition of the PMT that seemed to be melded with overall project implementation resources until 2013.
- Assignment of a PM by FUNAE in 2013 is the first concrete effort for creation of PMT structure, expected to drive the project ahead. Consequently the co-PM also starts appearing to have a recognised role.

The agreed-on execution modality has put one partner in a position to hold all decision-making powers on the project until 2013. As a consequence, almost all project decisions (high-level and operational) were to be run past the “no objection” procedure for the sake

of respecting the balance of powers between Authorising and Co-authorising officers. This does inevitably result into inefficient management of the project that affects the effectiveness of actions.

The execution modality of a specific agreement does not preclude delegation of a number of powers, notably those relating to operational project management to members of the implementing organisations, preferably to a specific team set up for the purpose of managing the project. In fact, a properly empowered PMT is the basic requirement to set the basis for achieving project efficiency and effectiveness, which the agreed-on execution modality (as amended in 2011) has been blurry.

In fact, the proper appointment of a FUNAE staff member as PM in 2013 has enabled the creation of a PMT, which has significantly improved the management of the project at an operational level and allowed it refocus its efforts on outcomes.

This been said, it must be noted the PM[17] assignment was to a large extent a formality insofar the person is not in the possession of a clear description of his decisional authority level, responsibilities, time allocation for the project, financial decision powers, etc.

Regarding the other project execution modality, the regie, which a minor number of project activities have been operating with, it has been observed that this is working quite well. A key factor contributing to the efficiency and effectiveness of this modality is the appropriate level of powers delegated to the people assigned to manage the concerned project activities (i.e. co-PM and other TA members) as well as the diligence and flexibility the assigned staff has shown during the operation. Lastly, the growing number of project activities operated through regie modality has helped to increase the overall efficiency of project activities and contribute to achieving the set of outcomes (realised so far) more effectively.

Concerning Relevance criterion in terms of the appropriateness of the Project Design (therein including the choice of the execution modality), it must be noted that given the number of persons involved in the decision making process, the co-management modality is by definition less efficient than the other two modalities: national execution or regie. However co-management is far more efficient than any other ad-hoc modality resulting from an alteration of the formally institutionalized execution modalities. These are the result of studies and experience acquired from many projects in the past, which are carefully designed to enable a project to operate within a legal and administrative framework that fosters efficiency. Ad hoc changes to the formal modalities may expose the projects at risks that the partners may be unable to foresee at the time of formulation. It is evident that the management modality applied on the RERD does not create the premises for an efficient and effective achievement the expected results of the intervention.

[17] The TFF, as amended in 2011, does not foresee the figure of PM. It does though mention the PD but, as earlier analysed, this figure is (practically) divested from a real decision making authority. Furthermore, it remains unclear if the assigned individual is supposed to be PD in accordance with the TFF or PM according to FUNAE procedures. Lastly, there has been little clarity throughout the project as to denomination of the PM structures, i.e. “Project Direction, is often referred to as “Project Coordination”, initially, the FUNAE member was appointed as Project Coordinator rather than PM or PD. All these elements bring evidence that there has been a continuous struggle regarding the authority and powers to be allocated to the PMT, especially the PM, which to some extent explain the restrictions posed to the proper functioning of the PMT.

Furthermore as a generic remark, the co-management execution modality, itself, is not an impediment to efficient and effective implementation on an intervention but it may seriously become so if not appropriately applied.

Assessment Criteria 2.5: Suitable Implementation arrangements between FUNAE and BTC for possible future activities[18]

The project has suffered, especially in the first half of its life, from the insufficient clarity on the applicable execution modalities. In the first year, the modality should have been clear, i.e. co-management, despite the local partner seems to have been uneasy in implementing it according to the agreement. However the amendments brought into the TFF in 2011 have complicated the matter because these have substantially changed the execution modality to something closer to 'national execution" without consistently changing the denomination, which may have led people to believe that the project was still being operated under co-management.

As a generic remark, it must be said that the partner institution had no prior experience with implementation of projects through a co-management modality or similar. Organisations require time to adapt themselves to new execution modalities, especially if such modalities are not well known and thoroughly understood since the beginning. Consequently, established work practices, deeply rooted in the organisation's modus operandis and mindset, have to some extent taken over the genuine principles that the co-management modality is based on to the degree of changing it to an ad-hoc modality closer to national execution, which the partner institution was used to.

With due respect to considerations that might have brought to actual alteration of the execution modality foreseen in the original TFF (2009), it would have been far better if clarity was made on the amended TFF (2011) regarding the real execution modalities that the project was intended to be executed. Keeping its denomination as 'co-management" was detriment to the requirement for clarity on project authority and responsibility lines that is critical for achieving efficiency.

The implementation arrangements between BTC and FUNAE can be improved in the future operations if the partners fully express their intents, clearly state the project execution modalities and implementation arrangements, help each other to fully understand and appreciate the workings and effects of each chosen modality and ensure there is a common understanding before signing an agreement and starting the implementation of a project. Any divergent opinion or interest must be cleared in advance otherwise it risks that people assigned to project management be adversely affected by the insufficient clarity and project efficiency unavoidably suffer.

It is equally of key importance that partners ensure that the project focal point is a PMT, headed by a PM, which is fully empowered with the required level of authority and enjoys sufficient autonomy to make all necessary operational decisions to effectively implement the project. Likewise, both the responsibility line and accountability for achievement of project results have to be made clear. A good brief about the function to be assigned to the PMT, delegated powers, and role and responsibility can be found in the original TFF 2009. For a project to succeed, it is crucial that the agreed implementation arrangements provide for the project operational decision-making be centered on a strong PMT, irrespectively of the execution modality that partners may opt to.

[18] Why and how could the implementation arrangements between BTC and FUNAE be improved for future activities?

Assessment Criteria 2.6: Appropriateness of the selected Capacity Building tools[19]

The capacity building activities planned and/or undertaken under RERD project are focused on two levels:

- ***Organizational/structural level*****,** such as:
  - Setting up new delegations
  - Setting up a maintenance unit
  - Strengthen the Research and Development capacity
  - Strengthen the GIS implementation unit
  - Define the role (and eventually strengthen the capacity) of FUNAE for promotion of solar energy products in rural areas
  - Build knowledge and understanding on how PPP schemes function
  - Organization of a Team Building Exercise on project management and coordination mechanism
  - Develop an Institutional and Organisational Capacity Building Plan for FUNAE (with an aim to have the plan eventually implemented)
- ***Individual level,*** such as:
  - Short-term specialised training courses
  - Long-term academic degrees

The aim of all CB actions is to eventually build institutional capacity in a sustainable manner. Whereas the potential of the first type of CB actions to contribute to building institutional capacity is more evident, the same cannot be said for the second type of CB actions, namely those falling under the individual level.

The present question assesses the CB actions undertaken by the project at the individual level.

The project has sponsored a number of FUNAE staff members to attend specialized training courses in a number of disciplines, both technical such as: solar, wind and hydro technology, environmental management; and managerial such as: contract management, HR management, program management, funds management, etc. It is undoubtedly expected that the specialized trainings would contribute to enhance the competencies and skills of the beneficiary staff since it is supposed that the knowledge acquired would find a direct application in their daily job. This is less evident for long-term postgraduate academic degrees, which an organization would normally make the financial effort to finance only if the competence is not available in the market. This could be the case for very rare disciplines falling in new sectors of activity that can be considered as experimental in a country. However given the time required for the academic education of the staff and the risk for personnel retention in a long term, it is not effective to finance long term academic degrees compared with the option of recruiting new staff already possessing the required academic background, especially in a situation which FUNAE is expected to significantly grow its staff numbers in the coming years in order to be able to deliver the strategic plans of the organization.

This been said, the question to be raised on individual capacity building is not only on effectiveness of short term versus long term training provided but rather as to whether

[19] Are the type of trainings and tools provided efficient and effective to enhance the competencies and skills of the staff? Do post-graduate courses of staff contribute to a higher extent to better/ more sustainable performance of services (e.g. less qualified staff turnover) than short term courses? Would have there been more efficient means/tools?

any type of training that FUNAE would possibly provide to its staff under the current stage of organizational development would be effective at all.

The expected end result of all capacity building actions, including training of individuals, is to strengthen the institutional capacity of FUNAE to deliver better and more sustainable services to its users/beneficiaries, namely rural population.

With this in mind, there were two "theory of change" assumptions made: (i) trainings would contribute to enhance the competencies and skills of the staff, and (ii) the knowledge acquired would find a direct application in their daily job and eventually translate into better services delivered. There are apparent difficulties to assess the above-mentioned changes. With respect to the first, there is insufficient information on the baseline scenario, which can however be addressed in the future through a careful training needs assessment based on robust methodologies and properly documented assessments. Indicators can be set for each relevant area and training performance assessment results can be a first source of information to assess changes in the established indicators. With respect to the second expected change effect, the difficulty to capture capacity changes in the current stage of FUNAE organization is enormous.

Unlike the generalised tendency to view the capacity building in a narrow sense of individual human resources development, the need is to fully integrate the CB actions into an institutional capacity building process that involves more than simply enhancing specific or generic technical and management knowledge of present staff. The human resource development reinforces but it is not synonymous with institutional capacity building and does not of itself guarantee better performance achieved and/or services delivered by an organization.

In this context, the other question to be raised is whether there are other tools/means more effective to achieve institutional capacity development of FUNAE at this point in time.

Indeed, the answer can be found in an activity planned but not yet implemented by RERD project that is "Develop an Institutional and Organisational Capacity Building Plan for FUNAE (with an aim to have the plan eventually implemented)".

This is the first and best capacity building action a project like RERD could finance, rather than disentangled training courses. This obviously assumes that the local partner is willing and prepared to make the needed organizational change.

In order to prepare a meaningful Institutional and Organisational Capacity Building Plan, a technical and organizational audit[20] of the organization is required, which the capacity building plan would be its output. Preparation of the capacity building plan in essence will have to adopt a strategic management perspective through a systematic and needs-based capacity planning process leading from the analysis of actual capacities ("Where we are now") to the determination of capacity building objectives ("Where we want to be"), the identification of suitable capacity building actions and measures ("How to get there") and to the consideration of sustainability issues to ensure the quality of achievements ("How to stay there").

[20] Not to be confused with the mix (financial and organizational) audit currently being carried out on RERD project activities and resources. Moreover, it is generally referred to as an audit but it is not an audit of the likes of financial audit, it is more an assessment of technical and financial functions of an organization compared with its strategic plans and ambitions in order to define the most suitable structure, key functions and competencies needed in order to achieve the goals set out by the organization itself.

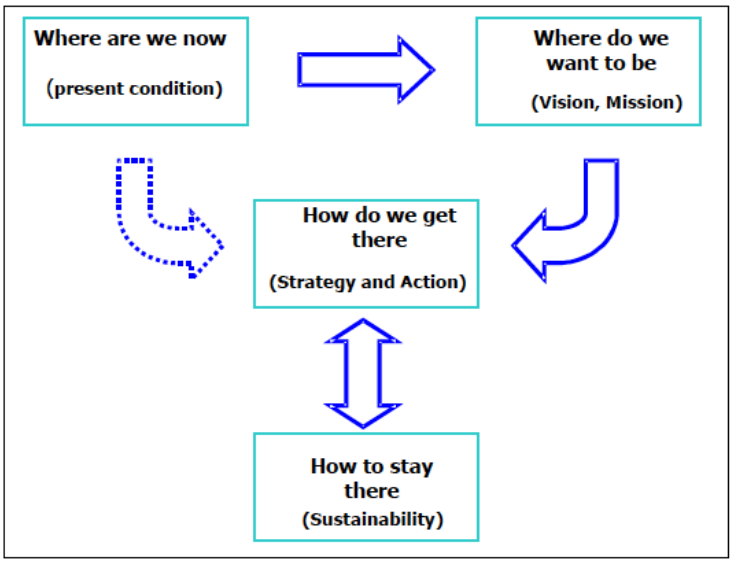


Figure 5 Capacity Building Strategic Framework

The capacity building will go through a process of defining the key functions in each division, competencies needed, job descriptions and capacity gaps identification and assessment, followed with the design and development of a CB Action Plan, including on-the-job or formal training and other formative activities.

As to the efficiency of training or other CB activities, in terms of use of resources compared with the expected capacity outputs, besides formal training, due consideration could be given to such CB actions as:

- technical seminars delivered in-house by external experts or lecturers, accompanied by practical exercises
- management workshops facilitated by external experts
- on-the-job training for newly installed systems, databases, etc.
- couching and mentoring by TA experts (i.e. the experts do not act as doers but rather facilitators that provide options and/or assist the staff to assess and select the optimal solutions)
- establishment of knowledge practice groups and knowledge leaders to facilitate the spread of technical knowledge and best practices throughout the organisations
- peer review mechanisms for junior staff
- study visits to learn from experience of similar organisations
- establishment of working groups for specific themes, which proceedings would lead to a bespoken solution coming in from inside the organisation (possibly facilitated by a TA expert)
- team building exercises
- focus group discussions to allow staff to freely express views, which can possibly lead to innovative solutions
- etc.

As in any other development project, RERD project has also carried out some CB actions through the above-mentioned tools but these have been fragmentary. There is a need to

properly include selected CB tools into project planning and subsequent monitoring. For instance couching and mentoring activities could be planned on quarterly basis depending on the activities at hand and subsequently properly documented in the CB progress reports.

Until/unless a thorough institutional and organisational assessment of FUNAE has not been completed resulting in a comprehensive Capacity Building Plan that clearly links the training and other CB activities to the required functions and job descriptions, any possible training that a project can finance risks not to prove its effectiveness in practice. The institutional and organizational development would have to be complemented with an organizational and individual performance assessment framework, where individual capacity changes can be measured on the basis of suitable performance indicators assigned to each function.

The CB Action Plan should not be a stand-alone facility but should be aligned with planning and management processes of the partner institution in order to be responsive to the actual needs.

3.3 Efficiency

EQ 3	Does the project have an adequate capacity as to ensure delivery as planned?
EQ Label:	*Project Implementation*

Assessment Criteria 3.1: Quantity, Quality and Timeliness of delivered outputs[21]

For the purpose of this assessment, each project component will be examined separately. The tables below succinctly give a comparative overview of outputs planned against current delivery status.

Component 1: Investments in solar, wind and hydro projects
(overall budget weight 80%)

Activities	Planned Outputs/Deliverables	Outputs/Deliverables production status
Activity 1.1 Needs assessment and feasibility studies	➔ Solar Energy Baseline Study Report	➔ Completed
	➔ Hydropower Baseline Study Report	➔ Completed
	➔ Priority Projects List of solar systems	➔ Completed
	➔ Pipeline for hydro power projects	➔ Completed
	➔ Impact Assessment Reports for selected sites	➔ Completed
Activity 1.2 Hydropower project implementation	➔ 6 hydropower plants and minigrids	➔ 2 completed (MHP Muoha and Sembezeia), one in operation and the other expected by end of 2015 ➔ 4 advanced up to design/tender dossier stage
	➔ MHP Majaua grid extension	➔ Expected completion before end of 2015
	➔ PPP Workshop	➔ Not initiated
	➔ Pre-feasibility Studies Reports on hydropower projects with PPP potential	
Activity 1.3 Solar power projects implementation	➔ 704 Solar systems in 625 buildings	➔ Over 90% completed
	➔ Contractors' Training Reports on Users training (to be included in Works Completion Reports)	➔ Ongoing
	➔ Progress Status Briefs on provision of energy service equipment (to be included in RERD Activity / Results Reports)	➔ Ongoing
	➔ 45 solar water pumps	➔ 28 completed,

[21] Are all outputs delivered or likely to be delivered as scheduled and of required quality? In case of delays or substandard quality, have corrective measures been taken in timely fashion?

	➔ 1 hybrid system (solar/biofuel) for electricity generation	remainder (up to 42) on-going ➔ Completed up to feasibility study and tender documents. Installation expected in 2016
Activity 1.4 Wind power resources assessment	➔ Wind power resource assessment Report ➔ Feasibility Study on hybrid systems (wind/solar or wind/diesel)	➔ expected in 2016 ➔ expected in 2016
Activity 1.5 Set up Maintenance Structure	➔ FUNAE Maintenance Database ➔ Report on overall Maintenance Activity (included in FUNAE Activity Report) ➔ 600 Installation of monitoring devices for solar system	➔ Ongoing ➔ Expected in Activity Report 2015 and 2016 ➔ 10 currently installed (pilot), up to 100 in process.

Activity 1.1 Needs assessment and feasibility studies

Initially, RERD based the individual projects development and planning on the overall FUNAE planning documents and other information provided by FUNAE, such as the priority list of buildings for solar installation or sites with hydro potential development potential. Once implementation of certain activities started, notably procurement and commencement of works contracts, it was soon realized that situation on the ground on a number of sites had changed since FUNAE overall planning was made. A lot of efforts were required to adjust activity definition and planning while implementation was ongoing, with known consequences on rescheduling and at time delays.

In order to make a comprehensive assessment, RERD project (TA Team together with FUNAE specialists) undertook a Verification Mission in 2012 in order to adjust/update/validate the initial needs assessments. Example of this verification includes a conditions survey and checking of security measures in the residence buildings selected for solar systems installation. A list of improvements was compiled. Given the time pressure (since some works contracts were awarded), it was impossible (time-wise) to make a detailed appraisal of the socio-economic aspects or the financing aspects of maintenance.

Finally, within this specific activity two baseline study reports both for solar energy and hydropower were planned. These were both completed and resulted in baseline reports. Also within this activity a list of priority projects of solar systems was developed and a pipeline for hydro power projects (from site identification, pre-feasibility to feasibility studies) and impact assessment reports for selected sites.

Activity 1.2 Hydropower project implementation

Within this activity the project planned the construction of 6 hydropower plants and minigrids. MHP of Sembezeia has been completed, and Muoha is expected to be completed before end of the present year (2015). The tender for construction of the other four MHP's resulted in low value for money and was subsequently cancelled. However, these projects are advanced at a design and tender dossier stage which can still be

improved if more favorable market conditions are presented in the future which would allow a smooth procurement.

The project has also funded the grid extension of MHP Majaua, which similarly to Muhoa is expected to be completed before the end of 2015.

Two other activities were also planned under this activity, namely a workshop focusing on private public partnerships (PPP) for top management of FUNAE, and subsequently launching a number of pre-feasibility studies that would identify hydropower project with PPP potential. Due to changing priorities and timing required to properly plan these activities, these have not so far executed.

As a side note, the PPP Workshop activity is better suited to be planned under Component 3 Capacity Building whereas the prefeasibility studies to be reallocated under Activity 1.1.

Activity 1.3 Solar power projects implementation

Despite the procurement challenges and difficulties encountered at the start of implementation requiring some revision of selected sites, this activity has succeeded to make significant efficiency gains during implementation, currently resulting in completion of over 90% of the planned installation of 704 Solar systems in 625 buildings.

Under this activity, the selected contractors are also implementing users' training on installed PV systems. This is expected to increase users knowledge and decrease the maintenance needs of the systems in the future. Reports are expected by the contractors on training provided, which should provide useful information to be used by both the solar and maintenance divisions of FUNAE.

Furthermore, a sub-activity planned under this activity is the provision of a number of energy based products to the beneficiaries, notably schools and healthcare centers, such as TV/DVD, computers, lamps, etc. This is reported as progress status briefs in RERD project operational/results reports. Since the provision of such products started in late 2014, it should be expected for Results Report 2015 in order to collect accurate data on the number and type of product provided. However, the progress of this activity is in good pace.

Regarded as an item with significant impact, was the installation of a number solar water pumps, which have significantly improved the livelihoods of the communities. The project did however face difficulties in the implementation of these solar water pumps, with regards to establishing the precise configuration that would allow for correct operation of the system without it being vulnerable to theft and vandalization. Moreover some aspects of the system have been improved e.g. change of type of taps, thus demonstrating that efficiency in responding to feedback from the users. Due to technical limitations, only 42 out of 45 planned solar water pumps will be installed. The progress to date (November 2015) is 28 water pumps installed and in operation.

As a side matter, it was noted during the evaluation that FUNAE is preparing a program for water pumps electrification throughout many rural areas. This would require a prior needs assessment and feasibility studies for electrification of manual pumping systems through solar energy. Care should however be taken to avoid replacing the existing manual systems but build the solar electrification system as complementary to manual system, whenever possible. In certain cases, due to technical limitations or water resource availability, a totally separate solar system and water pump may have to be installed in a certain distance from the manual water pump that is advisable to preserve

as back-up.

Another planned sub-activity is the construction of a hybrid system (solar/biofuel) for electricity generation. This has been advanced up to feasibility study and tender documents, however due to insufficient funding available and procurement requirements, the installation of this system could not completed and may be rolled over in 2016

Activity 1.4 Wind power resources assessment

Following the MTR, a decision was taken to abandon wind power systems installation specifically those associated with water pumps. However two sub-activities were re-planned and are expected to be completed in 2016, namely wind power resource assessment and a Feasibility Study on hybrid systems (wind/solar or wind/diesel). Both should result with production of respective reports in 2016.

Activity 1.5 Set up Maintenance Structure

The FUNAE Maintenance Database has been set up and is currently working both at central level and with a representation at delegation level. From the meetings that were held both at central and delegation level, the implementation of such a structure has greatly improved the work that FUNAE is currently doing. A report on overall Maintenance Activity (to be included in FUNAE Activity Report) is expected to be completed before the end of 2015.

Also linked to maintenance was the implementation of 600 Installation of monitoring devices for solar system. Although currently only 10 system are installed, this activity can be regarded as being significantly useful, as it is testing 3 different types of pilot monitoring system simultaneously. Before the end of the project, up to 100 systems are planned for installation

The table below summarizes the progress to date as given by the output indicators defined for this component.

Component 1	**Key Output Indicators**		
Investments	**Baseline (2011)**	**Current (2015)**	**Target* (2016)**
Total hydropower capacity installed	0	754 KW[22]	**1200KW**
No of mini HPP and min-grids built	0	3	**6**
Total PV solar power capacity installed	0	290kWp	**300kWp**
No of buildings (schools, health centres, administrative posts) electrified with solar systems installations	0	591	**625**
Number of solar water pumps installed	0	28	**80** (revised to 42)
Number of hybrid systems(solar/biofuel) for electricity generation	0	0	**1**

* The data refers to the initially planned target value.

[22] Muhoa 100 KW; Sembesia 62 KW and Majua 592 KW

Implementation of this Component has been strongly challenged in a number of occasions. Firstly, the assumptions made on robustness and accuracy of needs assessment and priority investments list to be provided by FUNAE had to be revised. This caused significant time slips for completion of the Activity 1.1, which sets the basis for investments. Secondly, procurement challenges with implementation of hydropower investments have slowed down not only the process but also the expected outputs rate. Lastly, re-planning of the activities as a result of the MTR (e.g. changes required to wind power activity, addition of maintenance activity, etc.) have necessitated further time for decision making, adaptation of resources and launching implementation.

Both time and output quantity wise, the efficiency ratio of this Component is low if the assessment was to be based on the face value of the indicators only. There are a number of activities that for one reason or another, have not resulted into a concrete investment as it was wished but however the outputs produced by such activities need to be taken into account in the present evaluation. These include baseline studies, a projects preparation pipeline for hydro power investments developed, studies on wind resources potential under way, etc., which if properly and in timely fashion re-used, these would offer significant efficiency gains to any future investment project made by FUNAE or another development partner. The outputs produced by these horizontal preparatory activities can balance out to some extent the lower level of outputs achieved in some areas of the project.

In the light of this and whilst considering the pilot nature of RERD project, the implementation efficiency of this component should be considered as acceptable although it remains lower than average, especially if considered the risk of non-utilization of the said project outputs in the near future.

Component 2: Support (marketing, financial and institutional) for promotion of small solar products
(overall budget weight 3%)

Activities	Expected Outputs/Deliverables	Outputs/Deliverables production status
Activity 2.1. Marketing Study	➔ Market Development Study	➔ Interrupted (to be reshuffled)
Activity 2.2 Promotion of small solar products	➔ Promotion activities (Progress status included in RERD Activity / Results Reports)	➔ Dropped
Activity 2.3 Institutional support to FUNAE	➔ FUNAE position (paper) on its role for promotion of small solar products ➔ FUNAE Partnership activities briefs (to be included in FUNAE Activity Reports)	➔ To be reshuffled ➔ Dropped
Activity 2.4 Financial Support	➔ Project Development Study Reports (on pico HPPs or large solar systems/plants) with potential for private financing ➔ Provision of project finance	➔ Dropped

Although the set-up proposed by the MTR for this project component was simple, it appears that it has not been fully understood during the project reformulation, as reflected

in the approved Action Plan 2013-2015. There is some inconsistency between the Component name (and therefore intention of the MTR that proposed it) and the scope and content of activities actually planned under this component, particularly with respect to Activity 2.4. The financial support to be provided under this component was meant to be for small solar products market development, which a quite different approach needs to be applied compared with project financing techniques required developing and structuring an infrastructure investment project. Besides initial investment, the latter would necessitate putting in place arrangements for O&M with the private sector, which on that occasion would be rendering a public service to the communities in return of payment of a price for electricity through a tariff system that leads to another issue concerning the uncertainty of the current legal and regulatory framework in this area. There also seems to be an overlapping with some sub-activities planned under Activity 1.2, concerning the engagement of private sector through PPP schemes for development of mini hydropower projects. In fact, all activities instrumental to preparation of (infrastructure) investment projects should have been grouped together under Component 1.

As a first step for implementation of activities falling under Component 2, the MTR had recommended to carry out a Marketing Study (Activity 2.1) which would define the most suitable promotional activities needed to tackle the rural market for small solar products. This implies that there is already a market (demand for small solar products). The Project instead launched a «market study» that would normally make a market assessment and recommend market development options, which is quite different of the original intention on marketing study.

A consultancy contract was concluded for the market development study for two lots: Lot 1 Small Solar Systems; and Lot 2 Pico and Micro-Hydropower Plants. The second lot complicates further the matter as the type of studies and expertise required for it is different from the first lot. The ToR for the first lot are well done, whereas for the second lot, these are not as good as for the first lot but the scope of activities is well defined. The Consultant has delivered an inception report where it appears to not have clearly understood the objectives and the scope of work for lot 2, whereas although the understanding for lot 1 was better, the actions proposed were not retained to be focussed and/or able to address the issue. The contract has been suspended and as a consequence, Activities 2.1, 2.3 and 2.4 that were reformulated as dependent on the findings and recommendations of Activity 2.1 have now been dropped. Instead Activity 2.1 has been redefined as it should have originally been and if it is completed within the timeline of the project, there could be room for partial completion of Activity 2.3 concerning the institutional role of FUNAE for promotion of small solar products. The Component 2 is currently redefined as below and new Terms of Reference for the study are prepared:

Activities	Expected Outputs/Deliverables	Outputs/Deliverables production status
Activity 2.1. Market Development of small solar products in rural areas with focus on the Role of FUNAE and how to engage with Private Sector	➔ Market Development Study	➔ Expected by 2016

A consideration must be made on the capacity of any external study to meaningfully define a role for FUNAE in this market for solar products. There is some institutional policy work to be done internally in this regard, where FUNAE must define its position

regarding the areas to focus on its future activities, i.e. solar/hydro power plants or individual solar systems or both.

Regarding the activity area of FUNAE with individual solar systems, the decision should be driven by cost-effectiveness of FUNAE operations compared with market options. Additionally, if the small PV solar installations have to be sponsored by the government for social purposes (e.g. for public institutions or least favourable households), the government may also consider the option of subsidizing the investment cost for such beneficiaries directly or through FUNAE. If the later, there could still be scope for FUNAE to make promotional activities for small PV solar products in the rural areas but for this to be successful, FUNAE may have to enter into the market as a possible wholesaler of such products otherwise it cannot be seen how FUNAE would take a keen interest in this activity, especially given other priorities and resource restrictions currently being faced.

The table below gives an overview of output indicators defined for this component.

Component 2	**Key Output Indicators**		
Promotion of small solar products	**Baseline (2011)**	**Current (2015)**	**Target (2016)**
Number of successful promotional activities for renewable energy products	0	0	**2**
Number of small solar products available (and easily tradable) in rural shops/markets	n/a	n/a	**4**

The current output ratio on this component is almost nil. Even if the lastly planned study is completed, it is questionable as to the extent to which it will be useful to support planning and launching of concrete intervention activities by FUNAE in the future. As the level of interest is low, the risk is a high for the output not to be utilised and therefore the resources used ineffectively. For the time being, the whole intervention concept for this component has remained in study phase that is well behind the expected result.

Component 3: Capacity Building Support for increasing the technical and administrative capacity of FUNAE
(overall budget weight 14%)

Activities	**Expected Outputs/Deliverables**	**Outputs/Deliverables production status**
Activity 3.1 Training and Institutional Development	➔ Report on the overall training activities ➔ Team Building Report ➔ FUNAE Institutional and Organisational Capacity Building Plan	➔ Expected by 2016 ➔ Completed ➔ Not initiated
Activity 3.2 Research and Development	➔ R&D Projects Report ➔ R&D Workshop Report	➔ Expected by 2016
Activity 3.3 Implementation of a GIS asset management system	➔ Progress Status Brief (included in RERD Activity / Results Reports) ➔ Report on GIS Database performance (to be included in FUNAE Activity Reports)	➔ Ongoing ➔ To be planned and delivered by 2016

Activity 3.4 Technical Assistance	➔ Activity Progress Reports (included in RERD Activity / Results Reports) and Final Project Report	➔ Completed to date, next expected by the end of 2015 and the last project report by 2016.
Activity 3.5 Setting up new delegations	➔ Activity Progress Reports (included in RERD Activity / Results Reports)	➔ Completed to date, next expected by the end of 2015 and in the last project report by 2016.

Activity 3.1 Training and Institutional Development

The main sub-activity planned under this Activity is funding the FUNAE staff attendance to short-term training courses and long-term postgraduate degrees. Comprehensive information on the training needs assessments, selected training programs, trainee performance assessment, quality of training and analysis of training benefits is expected to be available in the Overall Training Report to be produced by the end of the project. This activity is ongoing and analysis and review of information as well as assessment of benefits for the staff and the organization, as the whole, is in process. However, based on the information available, the evaluation team could assess that resources have been used in an efficient way. Training courses has been carefully selected with respect to the duration, location, subjects and costs as to optimize the use of available resources. Having said that, some comments on the effectiveness of training at a stage that the organizational and institutional development of FUNAE is in an evolving stance are made under the assessment criterion 2.6.

A sub-activity successfully completed is the team building exercise. A team building report has been prepared that includes information on activities carried out and synergies created between staff.

A pending activity is the preparation of FUNAE's Institutional and Organizational Capacity Building Plan that has not yet been initiated. The level of priority and interest attached to this activity seems to be low.

Activity 3.2 Research and Development

There are a number of five R&D activities which the RERD project envisaged to implement but could be advanced only as far as completing the technical research project reports for three projects, namely hybrid system study, battery-less vaccination fridges and the solar monitoring systems (*discussed in detail in Assessment Criteria 5.*1)

During discussion and interviews various possibilities were raised as to the reasons that may have resulted in non-completion of these activities, however a consensus remained that when the project was faced with financial hurdle (due to cash flow), the Research and Development activities were promptly regarded as those that would impact the less the overall project.

All research and development activities that have been planned under this activity have not yet been implemented until time of writing the report and can only be expected by 2016. A R&D Report is foreseen to be compiled by the end of the project.

Activity 3.3 Implementation of a GIS asset management system

The implementation of a GIS asset management system is regarded as an imperative

instrument for controlling and managing the large number of renewable energy systems that FUNAE has installed across the country. With this in mind, in 2013, FUNAE contracted a GIS consultant to improve the application of GIS tool within the institution and to support the already existing GIS department in design and implementing a GIS database structure so as to provide the necessary means to manager the existing assets and plan future activities.

FUNAE currently has over 1500 project mapped on its GIS database, which are unevenly distributed across the country. The majority of the mapped projects are electrified systems of which the vast majority are schools, followed by households and health facilities. Within this database there are also villages that are now electrified by EDM and therefore overlapping with FUNAE's systems.

One of the main recommendations of the consultancy work was to elaborate an Action Plan which would allow the improvement of the database, its content and the manner in which the GIS tool is managed and put to use. During the implementation of the Action Plan for 2014, this recommendation was implemented and a 12 month's working contract was signed with a specialized GIS consultant to work with the then GIS team composed by 3 people, which has presently grown to a total of 5 members.

Although there are clear gains on efficiency regarding the technical capabilities of the 5 GIS unit employees, which have increased their knowledge of the ArcGIS software and can now effortlessly operate the system and manage the data, which they have learned from the on-site job training there is a significant lack of effectively using the GIS software and its capabilities for planning of future projects as well as maintenance of existing ones.

As previously mentioned, although the database already consist of more 1500 projects, this actually only reflects a very small number of the total universe of systems which FUNAE has implemented (over 7000).

It has also noted that only the implementation of a GIS assets management system is not sufficient, as to ensure that this is efficiently used the associated tools and activities (accurate use of GPS system and recording of coordinates, recording of attributes that allow for identification of system (user, contact number, etc.) limit the extent to which the GIS system can be used, in fact it is noted that the GIS system is well underused due to a lack of capacity from its operators.

Activity 3.4 Technical Assistance

The TA has been acting with due diligence and in timely fashion throughout the project. TA members have been fully available to respond to changes in circumstances and challenges arising during the project. Most of the project management activities have been carried out or driven by the TA, including planning, budgeting, reporting and monitoring as well as assessing performance of the external consultants and contractors hired for specific project activities. Quarterly Operational Progress Reports and yearly Results Reports have been produced on time as well as the Monitoring Operations Tool has been maintained in good order and quarterly / biannual reporting ensured according to the requirements. The Results Report 2015 is expected in early 2016 as well as the Final Project Results Report by the end of 2016.

Activity 3.5 Setting up new delegations

The project has supported the launch of operations of new FUNAE delegation, e.g. in the Province of Inhambane. This included mainly the investment costs for office furniture, IT, vehicles, etc. Overall, the delegations have been strengthened with the acquisition of additional cars

and operational funds for field visits. In order to improve the accounting sheets prepared by the delegations for funds provided by the project, a specific in house training with participation of the RERD administrator was conducted.

Activity progress briefs are included in RERD Results Reports**.** The next progress brief is expected in early 2016 and in the last project report by the end of 2016.

The table below summarizes the progress to date as given by the output indicators defined for this component.

Component 3	**Key Output Indicators**		
Capacity Building	**Baseline (2011)**	**Current (2015)**	**Target (2016)**
Aggregate number of trained staff (i.e. trainees attended the different courses)	0	126*	**145***
Number of trainings	0	28*	**34***
Number of document research projects	0	3	**5**
GIS- tool for planning and asset management in place [0-100%]	0	40%	**70%**

** Data on trainees and trainings refer to those planned (target) and implemented (current) until 2014.*

The efficiency ratio of this Component in terms outputs produced against input resources used is considered good. The same cannot be said for the efficiency ratio of outputs against time planned for production, where one sub-activity in particular is lagging behind. This is the Preparation of FUNAE's Institutional and Organizational Capacity Building Plan, which is so crucial that its delay or non-completion would fade the effectiveness of other actions being carried out under the Activity 1.1 and consequently negatively affect the efficiency of the resources used for the entire activity.

Assessment Criteria 3.2: Cost-efficiency of the intervention[23]

As mentioned in the Mid-Term Review Report, in order to achieve the objective of the RERD project in providing energy access to rural areas, it is of crucial importance that most cost-effective solutions are adopted so as the highest number of beneficiaries can be reached out. Given that the low cost-efficiency ratio of the current investments under the project, the question is whether there are alternative approaches that would have required fewer resources to achieve the same level of outputs.

In this regard, it was useful to carry out a careful re-assessment of the issues identified and compile a summary of the cost efficiency hurdles still persisting. This is given below.

- Investments costs:
  - PV investment costs in Mozambique are double than world average market price;
  - Hydropower investment costs are within expected range, but can be further brought down through use of low-cost technologies, which may not be available in the country;
- Operation and Maintenance Costs:

[23] For producing, were there alternative approaches that would have required fewer resources (without affecting the quality and quantity)?

    - PV operation costs are considered high when comparison to world market prices;
    - Hydropower operation costs are also considered as they required qualified operators, which are a scarce resource within the country, and spare parts which are mostly not available in the local market.
- Logistical costs:
    - These are regarded as high both for PV and Hydro and are attributed to long distances required to travel for components (mostly being imported from overseas) and associated import tax/fees.
- Other factors:
    - Tenders prices both for PV and Hydro are much higher than expected which at time has led to the need of cancelation of tenders thus leading to significant delays and ultimately reducing the efficiency of the intervention;
    - Customs procedures to remove import equipment from the port both for PV and Hydro has also caused severed delays thus also hampering the efficiency of the intervention;
    - Lack of capacity, technical and financial, of local sub-contractors to properly install the systems has negatively impacted efficiency as at time installations have had to be re-done; and
    - Low maturity of the RE market, which translates into a lack of institutional and financial capacity of the players involved to ensure sustainability of projects.

Given that all the above-mentioned issues are inherent to the Mozambican context, the cost-efficiency of the RERD project investments has been accepted in the view of RERD being a pilot project being executed in high constrains locations whilst still managing to increase access to energy services in rural areas.

Although the success is not guaranteed, there are a number of alternatives approaches that can be explored which may lead in achieving the same outputs with fewer resources. A summary of these is given below:

- Investments costs:
    - Purchase agreement between the RERD project and FUNAE solar factory.
- Operation and Maintenance Costs:
    - RERD project making compulsory for users to take on ownership of the PV systems and associated maintenance costs;
    - Implementation of pre-paid metering system with hydropower projects thus guaranteeing users are paying for electricity as soon as they are connected.
- Logistical costs:
    - Obtain an exemption of tax import duties for RE components;
- Other costs:
    - Capacity building accompanying measures to strengthen local companies (subcontractors) as well their installation capacity;
    - Creation of a list of subcontractors of known reputation to facilitate partnerships with main (international) contractors working with FUNAE

Assessment Criteria 3.3: Efficiency of execution modalities[24]

Under the Relevance evaluation criteria, where considering the design of the project, it was assessed if the current management and implementation modalities were appropriate for achieving the expected outcomes of the intervention in an efficient and effective way. It was concluded that the declared execution modality for main project activities (i.e. co-management), as substantially changed through the amended TFF of 2011, could no longer offer a project environment that foster efficiency, because it lacked clarity.

However, it is useful to also consider as to what extent the execution modalities of RERD project as being applied and used in practice, are currently making an efficient use of the means of the intervention.

Given the way the main project execution modality was applied until 2013, the representative of one partner, FUNAE CEO, was found to be the central point for all project decisions (including on operational matters) for quite a significant time during the project life. Consequently, the project was overburden by the "no objection" procedure, which has inevitably resulted into inefficient project management.

Further to the MTR, it was realized that the project could no longer be operated at the level of the partners' representatives, which was not however meant to be so. The formal appointment of a FUNAE staff member as PM in 2013 has enabled the creation of a joint core team with the TA's, one member acting as co-PM. It must however be noted that only limited decision-making authority has been transferred to the newly reinforced PMT. Despite that, the appointment has come in a crucial point in time during the project life considering that the adopted Action Plan 2013-2015 was all way up to be delivered. The creation of a harmonious team (both FUNAE PM and TA's) dedicated to daily management of the project has finally allowed the project to make efficiency gains compared with the previous period.

As previously underlined, it is crucial to efficiency that the project is provided with a sufficiently empowered PMT. This has to some extent been achieved during the second half of the project thanks to efforts made by all parties in full recognition of the fact that the closer the project structures were aligned with the provisions of the execution modality foreseen in the original TFF of 2009, the higher would be the level of efficiency the project could attain.

The project management model applicable under a co-management modality (as foreseen in the original TFF 2009), encompassing a Project Manager and Co-Manager (or Directors) can be considered apt for achieving efficiency in so as it offers a sufficient operational autonomy to the PMT assigned with responsibility to deliver the project. The issue has been that a proper PMT structure (as originally intended) has taken long time to be put in place. Under the co-management modality, a two-headed structure increases the level of audibility of decisions as well as triggers a continuous improvement process of decision-making through active exchange of views and mutual consultations as to arrive to optimal solutions. The efficiency of the decision-making is however strongly dependent on the people involved in the process, mutual understanding and trust. In particular, the latter cannot be taken for granted and takes time to build. Once has to be aware that in such structures, in a number of occasions, the efficiency may suffer.

This been said, the project operational efficiency has significantly increased after 2013, whilst decisions and subsequent actions required lesser time and therefore resulting in

[24] Are the execution modalities fostering an efficient use of the means of the intervention?

better use of resources. This has enabled efficiency gains on major project activities under the Investment component and allowed achievement of a good rate of outcomes that was not evident until project mid-term.

Assessment Criteria 3.4: Efficiency of the Project Management System[25]

A system is an organised structure made up of the following inter-dependent and inter-related elements: People; Tools/Means; Procedures.

All the elements should be carefully intertwined in a project management system and coordination mechanisms in order to allow the system work efficiently and effectively.

People

The currently applied management structure (see Figure no. 5) is not ruled by the co-management modality as defined in the original TFF (2009) and as the co-management is actually supposed to be. RERD project is being managed according the partner institution's systems and standards, as it is actually foreseen in the amended TFF 2011, therefore closer to the national execution modality.

BTC involvement in project management is minor. Both management or co-management assume an active action / participation to management of a project. Right to "no objection" is by definition a passive action and cannot be taken as a (co-) management action.

At this stage the question to be raised is whether the partner institution's project management system is appropriate for efficiently and effectively achieving the stated outcomes of RERD project and/or any other similar project that FUNAE may undertake, regardless the source of funding.

Taking as an example the RERD project, the project management team is somehow melded with other (specialist or non) staff involved in project implementation. This is not unsurprising as the amended TFF (2011) is not clear on the PMT and assimilates it with all human resources implementing the project, among them the people in FUNAE headquarters in Maputo and in the delegations/ representation offices in the provinces in addition to TA staff contracted for the project. This appears to be the standard method FUNAE manages its projects.

It doesn't appear there is a properly defined PM model in FUNAE, where the typical role and responsibilities of the PM are well defined in addition to the delivery method in terms of planning and assigning the required human resources for implementation of project activities. The resources can normally be found in the specialized divisions and specific time allocations need to be assigned by the head of division for each member (specialist staff) for any project under way on a monthly basis. A project code is normally set up in the accounting system of the organization and each member would indicate the time spent on each project on the foregoing month in his/her monthly timesheet to be signed off by the concerned PM and the overall timesheet approved by the head of division. This is a basic requirement to ensure proper time management and resource / budget control on a project as well as a tool to support staff performance monitoring by the head of division. This been said, it is though not clear as to how the projects are managed in FUNAE.

[25] Extent to which the project management system and coordination mechanism have worked satisfactory

In the view of an execution modality that provides for one party to assume most of the decision making powers, e.g. national execution or regie, the most efficient and effective project management model would be based on a PMT that includes one single PM, coupled with another member to act as deputy PM. Depending on the size of the project, the later dos not necessary need to be full time on the project, and additionally a core team of specialists (2 or 3) may be assigned either full or part time to the PMT. Decisions must be taken preferably in common agreement by all PMT members and whenever this is not possible (e.g. all options involve unknown risks and consequently people views differ according to risk perceptions), the ultimate decision is to be left with the PM, who is ultimately responsible for overall project delivery and results. This is of course for decisions of an operational nature, whereas high level or strategic decisions should obviously be taken at the Board / CEO level.

The best project management practices worldwide show that the matrix organisation model[26] has proven to be the most successful for efficient and effective delivery of major infrastructure projects. The assigned PM should have sufficient seniority (preferably) in the organisation, have the right calibre and experience and be fully trusted and supported by the top management. It goes without saying that people responsible for the vertical functions of the organisations (e.g. head of divisions) should not be assigned to the role of PM in any project, nor Board members / CEO be directly or indirectly doing project management. The principle of subsidiarity should be applied to the decision-making in the project where decision responsibility is allocated to the lowest level possible capable of making a given decision, especially on operational matters.

The currently applied project management model in FUNAE appears vague, with non clearly defined responsibilities and reporting lines, tasks descriptions and time allocation (for each member called on to contribute to implementation of a project activity); limited decisional authority and financial authority for the PM, etc, which does not offer an enabling environment for project efficiency improvements.

Currently, RERD Project Manager and Co-Manager enjoy a very good level of mutual understanding and trust, which has enabled the project activities in the last two years to be carried out in an efficient fashion, to the extent these are dependent on PM and co-PM decisions.

PM Tools/Means

RERD project with support of the TA (Co-Manager and TA other members) has been maintaining a number of project management tools in accordance with BTC guidelines and standards, as well as developing state-of-the-art tools for planning and controlling specific project activities. Such tools include:

- Quarterly Operational Plan – Execution Reports and MONOP (Monitoring Operations) Tool, which is updated on quarterly basis. This includes:
- Project Work Plan, i.e. Activity Schedules

[26] The matrix organizational model is an organizational structure that facilitates the horizontal flow of skills and information. It is used mainly in the management of large projects (or product development processes), drawing employees from different functional disciplines (divisions) for assignment to a team without removing them from their respective positions. Employees in a matrix organization report on day-to-day performance to the project (or product) manager whose authority flows sideways (horizontally) across departmental boundaries. They also continue to report on their overall performance to the head of their department whose authority flows downwards (vertically) within his or her department.

- Project Budget Monitoring, including budget utilisation to date and projected for the coming periods, i.e. Financial planning
- Risk Management Plan, including planned (mitigation) actions
- Important Decisions Register, including follow-up actions planned and deadlines
- Procurement Register
- Human Resources overview
- Project Performance Monitoring Plan, including yearly achievement progress status
- Etc.

Building on the above-mentioned tools, six-monthly progress reports and budgeted work plans for the following period are prepared and submitted for consideration by the Steering Committee. Additionally a number of other documents such as specific output reports are submitted, presented and discussed in the Steering Committee meetings. Lastly Yearly Results Reports are prepared and submitted in timely fashion.

The two main components that impact on achievement of project outputs and eventually outcomes are planning and monitoring, where the latter feeds back to the periodic planning exercise and makes adjustments as required. In fact, the monitoring findings are presented to the Steering Committee, where decisions are made regarding the orientation of future activities that are then further translated into actions and reflected into the planning document. Planning and monitoring tools are well integrated and changes made on the activity schedules are visible and traceable.

The main PM tools are properly maintained, which significantly contribute to increasing project efficiency.

The issue remains though the level of appropriation by the partner institution of the PM tools designed and used by RERD project. Given that the project is owned and substantially managed by FUNAE, the challenge is (or would be) to transfer such tools and project management knowledge onto FUNAE organisation and make sure these are embedded into the project management system of FUNAE for further use on its other projects (regardless the source of funding). This can obviously be done only if there is acceptance by FUNAE of the added value of RERD PM tools compared with other tools that FUNAE uses for its projects. If there are other (and/or better) tools, the question can be raised as to why these were not adopted for management of RERD project, given that the project was to be integrated into FUNAE management systems under the “nearly” national execution modality.

One element that the current PM tool is missing in order to be suitable for integration into overall project management system of an organisation like FUNAE is the HR planning for the project.

A properly established Work Plan is made up of the following elements:

- Activity schedules
- Resource schedules
- Cost Schedules

In order for FUNAE to fully benefit from the existing PM tool, this should develop resource schedules per activity, which should indicate the FUNAE staff members (and respective time allocation) assigned to the implementation of each activity in addition to external resources (e.g. Consultants, Contractors, etc.). Whenever not possible to assign time (in terms of man-days of man-months) to external resources, a lump sum cost is indicated in the resource schedules. All resources (internal and external) are however converted into

costs and reflected in the cost schedules. This way the PM ensures to have full budget control on the project. There are many PM software that can facilitate the PM tasks.

One of the best capacity building actions that RERD project can possibly offer to the partner institution is to help FUNAE build a sound and efficient PM system, according to the best international standards, in order to apply it across all projects that FUNAE plans to develop in the future. This assumes a particular importance in the view of the ambitious goals that the government has assigned to FUNAE concerning rural electrification, which would necessitate FUNAE to develop, manage and implement some dozens and dozens of projects of similar or higher size than RERD in the coming five to ten years.

Procedures

The insufficient clarity on the PM structure along with the powers allocated to PM or other members have necessarily affected the project capacity for developing project management procedures. This includes the reporting lines, communication lines both internally with various divisions/units (e.g. defining modalities for allocation of resources or response time on a certain action) and externally with other stakeholders. For instance, it was understood that the PM cannot be officially communicating with other institutions (e.g. issuing an official letter) for the purpose of the project. These are all elements forming part of project procedures to be set up at the beginning of a project, presented to the Board/CEO and following approval, the concerned people are empowered to operate. This obviously comes a step after that the PM function has been formalised and the person in charge delegated the required decisional powers.

Procurement

As previously described, the project work plan would provide for implementation of a given project activity through either internal or external resources. It is well known that use of external resources has to be made following established procedures, namely public procurement procedures, in case of public entities like FUNEA.

This been said, it remains crucial that the PMT members are involved in decision making on resources to be used for implementation of activities of a project which they have main responsibility for achievement (or not) of the expected results. Rightfully, the TFF provides for the PMT to be a member of the Tendering Appraisal Committees.

It is understood that neither the Co-PM, nor any other TA's has been appointed as a member of the Tendering Appraisal Committees, and consequently the resources provided by the development partner for the RERD project, BTC, could not contribute to decision making for use of external resources for implementation of major RERD activities. With full respect to the Mozambican procurement rules that may put restrictions as to the eligibility of the members of the Tendering Appraisal Committees, this is another element that brings evidence that the concept of co-management modality has not (or could not) be applied as intended in the original agreement between partners. The TA members have been attending the tender evaluation sessions in the capacity of observers, which by definition does not allow them to have any saying on the decisions. Furthermore, on these occasions, the observer's role risks to have been perceived by the partner institution as the TA members acting on behalf of the BTC, i.e. to assist the later form its "no-objection" position. This obviously does not help the team spirit and the co-management principle of putting the resources in common for managing and implementing a project. Furthermore, the PMT itself has met with the impossibility to act as a single body on these occasions.

As to the PM that is a FUNAE member, it is reasonable to assume that the later would need to participate in all decisions on resources to be used for implementation of the project. It appears that the PM has not been involved in decision-making for all external resources (i.e. Contractors, Consultants, Service providers, etc.) engaged for implementation of the RERD project. The PM has been involved in Tender Committees for a number of RERD project activities dependent on his other functions held in the organisation, rather than his RERD PM function. This is another indication that the current FUNAE PM model has lapses that do not allow the PM to be involved in all decision making processes concerning the project that (s)he is assigned project responsibility. This restricts the PM authority on the project and consequently the level of ownership and responsibility and accountability on the results.

Lastly, the procurement procedures required for implementation of certain project activities are another aspect that affects the efficiency and eventually effectiveness of the project. Changes agreed on the project after the MTR regarding the procurement modalities to apply for different categories of expenditure, particularly increased utilisation of Belgian procurement procedures for a number of budget items, have improved the implementation time for the concerned activities. For implementation of major project activities, the Mozambican procurement procedures have been applied, which require a certain number of administrative steps. Although FUNAE and the PMT has significantly learnt and improved during the processes, the administrative time for procurement needs to be factored in the operational efficiency of a project, which remains restricted within lead-time between the different procurement steps that can be optimised only up to a certain extent.

Another factor that has impacted the project efficiency, as far as the implementation of certain activities is concerned, is the cancellation of procurement in some cases because no sufficient value for money was achieved. It must however be noted that a number of factors have influenced the value for money, which the procurement procedures cannot control, but perhaps slightly influence by increasing the chances of success. Some suggestions are made below that reinforce or complement those already made by the Value for Money audit report.

It is worthwhile for the PMT and FUNAE Board to further investigate and explore if there is yet room for improvements on application of the procurement procedures, thus leading to successful implementation of scheduled project activities. In fact, use of international “open” instead of “restricted” tender procedure for procurement of works may have caused an adverse effect on the market resulting into no or limited number of tenders. This is the contrary to what one would expect from an open tender procedure. The causes might have been the market entry barriers for RE (off-grid) market in Mozambique such as language barriers, little knowledge of the rural areas, difficulty to properly cost the bid, little, if any, knowledge of the Employer (i.e. FUNAE), etc. which would deter most of the international contractors to invest time and money in preparing a full technical and financial offer as the open procedure requires. A two-step approach may attract more interest insofar it costs little for the international contractors to present an EoI. With the shortlisted candidates, FUNAE should then engage itself further through invitation of bidders to an information day (also called bidders’ conference), providing as many clarifications and information (in a transparent manner) on the project as possible, invitation of local companies and/or rural community representatives in the bidders information day in order to facilitate local networking and partnerships, organise accompanied site visits, etc. All these actions help “opening up the appetite” to the private sector and increase their commitment to go through the entire procurement procedure with presentation of a final offer. Although the two-step approach may require more time, it allows FUNAE be more visible in the process and make the results more certain.

A tender value that can be considered small according to the procurement thresholds and consequently open tender procedure is to be applied; it can be big for the type of market under consideration and therefore there should be no hesitation to use a restricted tender procedure (normally foreseen for large size projects), should the Mozambican procurement rules offer this flexibility.

An effect opposite to the above-described one seems to have manifested for service (consultancy) tenders under Belgian procurement rules. Contrary to the works tenders for the RE (off-grid) in Mozambique that are perceived to be big for the size of the market, the international consultancy tenders of the size under 200K Euros, especially in English, are perceived to be small for many international consultants, especially given the distances from mature markets (e.g. Europe), unless the prospective consultants have an establishment (office, branch or other on-going projects) in Mozambique. A restricted tender procedure is not the best solution for small tenders (if there is no apparent interest for the market, country) given the fact that the prospective bidders have to prepare and provide two slots of documents, one for the EoI and another for final offer, which may cause them to loose interest given many other opportunities of higher value in the international market. It is about a threshold over 500K Euros that the international consultants would start taking a firm interest on the tender to the extent of committing time and resources to the two-step restricted tender procedure. For low value consultancy tenders, it is believed there are more chances to receive a higher response rate from the market if an open tender procedure is applied, provided that the support documentary requirements are simplified to a maximum possible.

Assessment Criteria 3.5: Ability of the project monitoring system to capture capacity building changes[27]

The CB actions at individual level carried out under the project mainly consist of formal training delivered by external training organisations. Of relevance is also the R&D activities carried out by the project.

The project monitoring system has set a number of outputs indicators on capacity building, such as:

- number of trained staff
- number training courses delivered or attended
- number of R&D projects developed

The issue is that output indicators for CB actions, excepting giving an indication on efficiency of use of resources, are of little help for measuring capacity improvements and therefore assessing the effectiveness of the CB actions. The later requires establishment of outcome indicators.

There is though an apparent difficulty to measure the effectiveness of any CB action in FUNAE as long as it is impossible to establish a meaningful capacity baseline. Let's take as an example, the formal training. Assuming that the organisational structure is appropriate and that people are assigned the right jobs, a training needs assessment would need to be carried out before a training plan can be drawn. The TNA will start with reviewing individual job descriptions and look at what the individual is expected to be able to deliver, meaning what skills and supporting knowledge is necessary. It then assesses what existing skills and knowledge the individual has, identify and prioritise the knowledge and skills gaps and define the specific level of knowledge, skills and abilities required to reach a given performance level. Where there is a difference, it then

[27] Do the existing monitoring tools allow to sustainably and effectively measure impact and improvements in terms of capacity building? Are there better alternatives?

considers if this difference is adversely affecting job performance and if so if the difference can be bridged through training to improve performance.

As it can be appreciated, even for the simplest CB activity, i.e. training, there are some underlying assumptions that need to be validated before CB monitoring indicators can be established. This includes: the organisational structure is appropriately designed to deliver the organisations' strategic plans; there are individual job descriptions that correctly reflect the activities that the individual actually performs; the individual performance assessments are based on objectively verifiable performance indicators, etc.

This reinforces the need to prepare as a priority an organisational and institutional development plan for FUNAE. This is an activity planned under RERD project but not yet initiated. Until such a time, it is not possible to set out meaningful training (or other CB) outcome indicators that can sensibly measure capacity changes in the organisation as far as the organisational and institutional development plan of FUNAE has not been prepared and enacted. Only if the competencies required for each function are well defined, an effective CB action plan can be drawn up and consequently meaningful capacity indicators be established for the monitoring system to be able to measure individual capacity improvements.

There are however a number of CB activities implemented at the overall organisational level such as: setting up the maintenance structure or setting up new delegations, both having the potential to bring about capacity improvements in FUNAE. These can be measured through establishment of respective outcome indicators at both output and outcome level. Examples of these include:

Output indicators:

- Timely production of adequately costed yearly maintenance plan
- Preparation and maintaining of a rolling five-year maintenance plan
- Securing financing for the proposed/approved maintenance plans in timely fashion (this would be an indicator for measuring the capacity of management staff)

Outcome indicators:

- Number of system failures reported in a given period
- Number of non-planned interventions (i.e. for replacement and repair) carried out
- Systems/installations average lifespan

3.4 Effectiveness

EQ 4	Has the project intervention been conducive to improving access to energy in rural areas
EQ Label:	*"Access to energy" enhancement*

Assessment Criteria 4.1 Increased access to renewable energy[28]

A question raised is whether the rural households have increased access to renewable energy and products, which is a fair question if considered that the recent government policy orientations on "access to energy" are focused on provision of complete and continuous energy services to the population[29]. Provision of complete energy service would mean, for example, enabling people's access to electricity in all most significant infrastructures they use in their private, social and economic life. This obviously includes households.

However, the remit of the RERD project is to clearly keep the focus on the community infrastructures. These include: administrative buildings, health centers, schools, water pumping systems and public lighting. These types of infrastructures were subject of direct investment actions financed by the project. Nevertheless, within the investment component, the mini-grids investment has enabled access to electricity to many rural households besides the institutional buildings situated in the concerned communities. A specifically designed project component targeting the rural households foresaw mainly promotional and facilitating actions complementary to investments that need to be done directly by the concerned beneficiaries.

Although the concept of 'access to energy" is broader than provision of electricity, it is perhaps good to start looking at electricity first. A straightforward indicator to measure the rate of increase of access to electricity would be the number of connections. However this is not as straightforward as one would think for RERD project. If FUNAE monitoring indicators are to be used, thus introducing the concept of "beneficiaries", this would result in unnecessarily overcomplicating the matter. For instance, beneficiaries of an electrified school are pupils that live in the same community where there is also an electrified health center and administrative building. Consequently, they risk to be counted more than once although as electricity installations have been completed, for instance, in a public building, it can be said that all the community has (potentially) access to the electricity and for the purpose of the statistics count only once the entire community population.

The monitoring indicators must be practically and objectively measurable and be able to communicate meaningful data otherwise they defeat the purpose of monitoring itself. Moreover the concept of "beneficiaries" does not seem to match well with the government policy objectives for provision of complete and continuous electricity to the rural population. In this regard, it should be considered to set monitoring indicators able to capture disaggregated data on categories of users (strictly linked to connections) as below:

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28 To what extent the rural households have increased access to renewable energy and products? Are all target groups using the energy or products provided by the project for the purpose these were intended to? Any factors that prevent the (proper) use?

29 'If people can't have electricity access at home, and on continuous basis, the change that electricity can bring about in people's lives is not sustainable and the likelihood of impact is low. From electrification of public infrastructures, the aim is to bring electricity to all households", Citation form meeting with Director of Planning and Cooperation, Ministry of Mineral Resources and Energy

- Institutional users (schools, health centres, administrative posts, police stations, etc.)
- Community users (water pumping systems, and others can be added in the future such: a social centre, theatre, etc.)
- Households users
- Commercial and industrial users

Consequently, both overall FUNAE and specific project targets can in the future be set consistently on clearly identified categories of users.

Notwithstanding the above discussion on monitoring indicators, the contribution that RERD project has given to increasing access to energy in rural areas is evident. A useful outcome indicator to measure it is the number of users, as given in the table below. The project baseline was nil for all categories of users considered whereas currently (by the end of the project), the change status would be:

Energy Users	***"Access to energy" Indicator (electricity connections thanks to RERD Project)***
Institutional users (schools, health centres, administrative posts)	– 625 connections (PV systems) – 9 connections from three mini-grids powered by mini HPP
Community users	– 42 connections (PV systems) to power water pumping systems
Households / commercial users	– Circa 150: 40-50 household/commercial connections for each of the three mini-grids powered by mini HPP

The project has electrified 625 institutional buildings. The project has also built 2 hydro power projects which have associated mini-grids and connections to institutional buildings as well as privately owned rural households and commercial activities. Another hydro power project to which the project has contributed to grid extension is also envisaged to contribute to increases access once it is completed at the end of the year. Through these systems there is significant evidence to demonstrate that the rural communities in areas where the project has operated have indeed increased their access to renewable energy. Lastly, one can always try to derive from the above indicator values the number of potential beneficiaries according to FUNAE's methodology.

Whilst the above indicator gives a quantitative measurement of "access to energy", other useful outcome indicators could be set for measurement of quality of "access to energy", i.e. the quality of service provided to users. At this stage of development of FUNAE, it is difficult to set practical and meaningful outcome indicators of that kind. The systems are just completed and in some areas the service is yet to be initiated.

However from the evaluation point of view, it is also interesting to look at the effectiveness of the energy investments made by the project, that is the actual use of energy or energy based products provided by the project. From information collected during site visits and observations, the findings can be summarized as below.

- Healthcare centers are properly and fully using the electricity capacity installed by the project as well as the energy-based products they were provided with. This has enabled improved health care services thanks to increased reliability on electricity and better lighting to perform interventions at night.
- For the time being, schools are making only limited use of the electricity capacity installed by the project, although there are indications that the number of schools

that are making extensive use of the supplied electricity, i.e. through introduction of evening courses is progressively increasing. The schools are making limited use of the energy-based products provided by the project, mostly for improving the school administration.

- Healthcare or school staff using the residence buildings are also benefitting from the provided access to electricity. The degree of use of electricity however varies from case to case depending on the people's capacity to purchase the desired electricity appliances. However evidence shows that there is a strong preference to priorities radio and TV appliances which give access to media and information. This is understandable especially given the calibre of people involved, i.e. teachers and healthcare personnel. It is believed that the uses that electricity is being made contributes not only to better living conditions but also increase to the intellectual knowledge and motivation at work.
- Local administrations using the administrative buildings electrified by the project seem to be making only limited use of the supplied electricity because of their timetable of work normally during the daylight. There is no evidence either whether the electricity has brought any change to the work routine and practices (e.g. enabling installation of IT equipment) and therefore services rendered to the communities.
- Local communities are making full use of solar pumping systems installed by the project. The water supply reliability has improved without any further effort for water pumping as well as chore time has reduced
- Households, are more and more eager to be connected to the electrical mini-grids built by the project. A good number of connections has been made and other households have applied for being connected and/or have plans for relocation closer to areas covered by the mini-grids. Furthermore, households have started to purchase electricity-powered appliances that improve their living conditions, such as food storage and safety, access to media through radio and TV.
- Commercial activities (shops) are fully benefiting from the mini-grid connected electricity that helps the business to further prosper. Lastly, on some occasions, there is interest to start-up businesses that would make productive use of electricity

A consideration must be made regarding limited use of electricity and/or energy-based products provided by the project for schools. There is a number of factors, unrelated to the project activities, which are limiting their use for the time being, although it is hoped that difficulties will be overcome in the near future. These include:

- Educational programmes planning made at a central level that requires time for adaptation, both for introduction of evening courses and adaption of means of instruction to the new technologies that electricity/IT based products can now enable.
- Availability and/or readiness of funding to finance the evening courses
- On certain communities, security issues related travel to/from school in the evenings
- Theft or damages caused to some systems in periods where there is no school activity.

With regards to the use of energy or products for the use to which these were intended by the project, the evaluation team as found that this is not always the case and unintended uses both positive and negative have been noted (this is further discussed under Assessment Criterion 6.3 Unintended effects)

Assessment Criteria 4.2: Creation of a viable market for renewable energy products[30]

Market for renewable energy products in the rural areas is still underdeveloped. The microcredit financing mechanism planned under the project did not work because of limited number of rural microcredit institutions in the country. Traditional banks did not show any interest because of the impact of the transaction costs for each microcredit operation to be made with a potential purchaser of the product. Additionally the banks would associate a high risk to the lending operations with wholesalers for start-up investment for distribution network expansion. Another impediment has been that the project would provide only financing with refunding obligation whereas the type of market (i.e. rural) and potential beneficiaries that the planned microcredit mechanism was targeted at would require a grant scheme, possibly in the form of co-financing.

The market development status for energy products, typically small PV solar kits or small installations, is already known. The MTR has made a clear analysis of it and suggested some options on how to tackle the rural market. It is uncertain if other studies on this subject would bring any added value. Additionally, experience gained by other development partners, such as GIZ, offer a good basis for planning concrete actions for promotion of small solar products in rural areas.

If the development partners' projects like RERD wishes to continue their efforts for development of a market for PV solar products in the rural areas, these should seriously consider to contribute to financing a portion of products price (e.g. up to 50%) for target beneficiaries. This can be done through Call for Proposals instrument whereby seeking the involvement of NGO's and other institutions (including microcredit) operating in the rural areas. It is crucial though that the CfP are properly designed and publicised with accompanying actions such as infodays throughout the provinces and training is given to local associations / NGO on how to design sound project proposals meritful of co-financing. The scope of the proposals should be to demonstrate on how to bring the products to the end beneficiaries with much reduced price thanks to the co-financing that will help cover a variety of costs like transport, distribution, retail sellers' stocking, transaction, etc. The CfP can be run by either BTC or an institution like FUNAE, if its statutory framework would allow so and FUNAE is still active with the individual solar systems activities.

Assessment Criteria 4.3 Improvements in planning and management capacity of FUNAE[31]

A clear need has been identified for FUNAE to have a full inventory of existing installations be these solar or hydro, located on public or private infrastructure. The RERD project has made a noteworthy contribution to initiate the steps to address this need by contributing to building an asset management system based on GIS system within FUNAE. This has enabled FUNAE to begin the exercise of mapping and geo-referencing of its current assets.

Various other entities running multiple projects that are directly involved in installing renewable energy systems on institutional buildings and developing energy grids for the purpose of rendering a public service at rural community level must also be mapped and recorded by FUNAE for (at least) planning and monitoring purposes.

[30] Why does not the private sector take off (and was not boosted by the result on the micro-credit of RERD)?

[31] To what degree have the investments (staff, software, hardware) in the GIS system contributed to better planning and management?

Apart from concerns that have been noted during evaluation regarding insufficient communication and coordination between these entities who are directly or indirectly contributing to FUNAE domain of activities, there is also a question of legal and administrative regularity of such energy systems that are being implemented even though the legal and regulatory framework for RE development and operation currently seem to be a grey area.

Looking at the improvements for planning within FUNAE, there is a need to further consolidate and streamline all existing databases that can turn into a comprehensive GIS Asset Management, Planning and Monitoring System for renewable energy. A integrated GIS management tool can be used to its full potential in terms of achieving better monitoring/reporting on all systems, sharing information within departments and other institutions (ministries and donors), and improved planning, as existing installations can be easily mapped out during the needs assessment exercise by cross-checking with public infrastructure (schools, hospitals, postos administrativos) list.

Some improvements have been observed in the quality of planning documents prepared by FUNAE thanks to GIS software. By the way of example, with support of the GIS unit, the Planning Division can now produce better quality maps showing the locations of the systems. However GIS system is still in development phase and as long as it is not integrated with planning and management in one single integrated system, no significant contribution can GIS system bring into improving the planning and management capacity.

A constrain that has to a certain extent hindered further improvements in the planning capacity of FUNAE is the lack of a parallel a capacity building activity focussing on planning which could have leveraged on the GIS activity to ensure its proper use for planning and operation.

Moreover the difficulty of access to other planning tools such as the Renewable Energy Atlas both from TA team as well as FUNAE technicians, central level and delegations, has further inhibited the potential to significantly improve planning and management.

Assessment Criteria 4.4 Better quality services delivered by FUNAE (thanks to capacity building provided by the project)[32]

Under RERD project, those activities, as strictly known as capacity building, have lacked a clear guide such as a comprehensive capacity building plan for all personnel with clear objectives, milestones and measurable indicators. Given this fact, it is impossible to objectively assess if capacity building measures (such as training activities) provided by the project have resulted (and the extent to which) into any improved quality services. As analysed under the assessment criterion 2.6, it is unlikely that the desired chain of capacity building effects can be triggered outside a structured organization-wide capacity building process driven by a results based management performance framework at both organizational and individual levels.

Having said so, for the purpose of this evaluation, a broader perspective to capacity building has been taken whereby considering other activities developed with support of RERD project which have strengthen FUNAE's overall capacity to provide better quality services to the beneficiaries.

32 To what degree has increased capacity building efforts led to higher quality of services / sustainable implementation of activities?

These activities can be summarised in firstly the setting up of maintenance division with technicians both at central level of FUNAE and represented in delegations. Having such a division in place has allowed FUNAE improve its planning for required maintenance of its vast universe of systems as well as to guarantee maintenance services at decentralized levels, throughout the country.

The second activity is the increased support by the project to FUNAE, to establish new delegations across the country which have not only brought FUNAE services closer to its end user but have effectively increased FUNAE quality of service in terms of response ability. During the site visit conducted by the evaluation team, reactions from both institutional beneficiaries and local communities demonstrated an increased satisfaction with the now local presence of FUNAE.

3.5 Sustainability

EQ 5	To what extent the renewable energy services developed with support of the project can durably contribute to provision of energy in the rural areas
EQ Label:	*Energy services sustainability*

Assessment Criteria 5.1 Appropriateness of the solar systems monitoring technologies[33]

As a recommendation from MTR, the RERD project has had to increase its electrification activities of schools, health centres, postos administrativos, etc. This intensification of installed systems has increased the need for close monitoring of systems, specifically those that are considered as a priority to the project (mainly larger systems).

The solar system monitoring project is in a pilot phase and experimenting with three different monitoring technologies, all of which have different technical capacities and associated costs.

1.1. Victorn Energy: South Africa Supplier
- Implemented in Manica and Zambeze, in 4 solar systems currently installed;
- It provides a better understanding of demand of users, as it is a comprehensive system;
- Cannot be integrated into EMS; and
- Regarded as expensive solution.

1.2. Belgian Campus: South Africa Supplier
- Custom made system designed in conjunction with the Technical University in South Africa;
- 4 systems currently being monitored in the province of Inhambane;
- Low cost systems estimated at ($100 per unit); however real cost has proved to be higher ($300 per unit);
- Development of monitoring system, included in Research and Development component of the project;
- Second batch of systems (10 in total) to be installed, where the project will only be charged for hardware costs. No labour costs as the university regards this as training; and
- Can become an integral part of EMS.

1.3. EMS : Supplier in Portugal
- Technology intensive – high quality;
- Custom made interface, where detailed analysis of system data can be carried out and any incident can be detected by the system;
- Integrated maintenance package;
- Includes alarms for both theft and low voltage of the system;
- Upgrade of the system may be required;
- Procurement of the monitoring systems unit, may prove a challenge in the future due to its complexity; and
- Regarded as the most expensive option.

[33] To what degree are the chosen monitoring technologies for solar systems appropriate to enhancing sustainability?

Having described the above systems which are currently in a testing phase, it is crucial that FUNAE can conclude its pilot phase by merging the various advantages that the three can offer and have as an outcome a system that appropriately address the monitoring needs for FUNAE but more importantly that guarantees value for money.

A general agreement amongst FUNAE staff exists that the cost benefit of the remote monitoring systems presently exists, due to improved response time and reduction of travelling costs, however the current agreement that FUNAE has with EMS, is described as only offering value for money for the first 100 systems to an acceptable level, but not for the additional 500 systems.

In order to guarantee the sustainability of monitoring systems, a parallel process needs to take place, where focused training is required for technicians to properly operate the monitoring systems

Assessment Criteria 5.2 Energy systems maintenance approach[34]

Within the current FUNAE set-up, the currently applied maintenance model involves two actors: Maintenance Unit at the HQ and the Delegation. All requests for maintenance are centralized at the HQ level, which decides as to when and what maintenance interventions be carried out. Consequently the Delegation is mobilized for precise maintenance mission with a defined budget (or authorization for use of resources) given on case-by-case basis.

Alternative approaches to the current model include:

1. More decentralisation of maintenance activities and intervention decisions. A yearly maintenance plan and budget (both ordinary and a provision for extraordinary/urgent interventions) should be drawn up for each province in conjunction with the concerned Delegation and a budget is allocated to it for use by the Delegation with no prior approval by the HQ. Ex-post monthly reporting and eventual verification/audit would be due. All maintenance requests are transferred and/or collected at provincial level.
2. Outsourcing of maintenance activities to private sector through performance based maintenance contracts. The performance of maintenance contractors will then be monitored at the provincial level by the responsible people at the Delegations, which will be required to prepare periodic monitoring reports and transmit to the HQ.

Assessment Criteria 5.3 Maintenance responsibility distribution/sharing[35]

Currently all solar systems installed by FUNAE are managed and maintained by it, save those recently installed which are still under the responsibility of the contractors for a two-year period. The mini hydropower plants and minigrids have been only recently completed and therefore still under the responsibility of the contractors within a two-year period. However FUNAE has the responsibility to monitor the contractors' performance during the two-year warranty and maintenance period.

[34] Within the current framework, would alternatives to the current maintenance approach be more appropriate?

[35] In terms of ownership and accountability, how can the distribution/sharing of responsibilities between the different administrative levels of beneficiaries and users be improved when it comes to maintenance and management of the installed renewable energy systems (hydro/solar)?

Given the current level of financial resources available, FUNAE maintenance resources (staff and material) are overstretched with the current workload of maintaining the backlog of only solar systems installed in the past and currently under its entire responsibility. This is estimated in the order of 4000 units. FUNAE total records indicate the solar installations assets to be in the order of 7000 units where it is assumed that some older installations are out of use and there is a certain number currently being maintained by the contractors, typically those installed with support of RERD project or other similar projects.

Once the contractors' responsibility for maintenance has ended for solar systems and mini hydropower plants and grids as well as solar power plants (built with support of other projects), FUNAE capacity for ensuring proper maintenance will be overwhelmed.

Regardless as to whether or not the systems are currently or will soon be under the responsibility of FUNAE, a consideration can be done regarding individual solar installations, which maintenance, for the time being, appear to be more a cost than a revenue stream for FUNAE. There is a rationale for transferring these to the actual users. This will increase ownership and accountability, reduce risk of theft and vandalism. Such users involve:

- Institutional users such as schools, healthcare centers, staff residence houses, and local administrative units. At least for the solar installation done with the support of RERD project, Ministry of Health and Ministry of Education have shown their commitment to take over ownership and responsibility for management and maintenance, as it has been stipulated in a MoU with FUNAE at the beginning of the project. It also appears that these Ministries have availability of funding to ensure maintenance that is currently done with either their in-house maintenance staff or outsourced to maintenance contractors. It can be logically assumed that the concerned ministries may be willing and ready to take over any other solar installations made on their buildings and currently managed by FUNAE.
- Private household users. A scheme of selling the solar installations to private households, based on instalments or even for a modest price, can be considered. The older installations can eventually even be donated.

Additionally, due consideration should be given to solar water pumps in respect of finding a balanced solution between costs and likely revenue. If a cost recovery solution cannot be found, consideration should be given to the option of transferring ownership and responsibility to local communities. For the time being, it seems to be that FUNAE will take care of the systems and maintenance, be it periodic, however for the extraordinary maintenance a system of tariff collection is being put place for a reserve. Whether FUNAE will have share in that tariff collection for emergency fund is still being discussed.

Operation and Maintenance of new systems

As a last consideration, if FUNAE is to implement an investment plan aiming at achieving the strategic goals for access to energy set out by the government in the next ten years, there should be seriously considered to transform the existing maintenance unit into an Operation and Maintenance Division.

Government goals of servicing 25% of population living in rural areas through RE off-grid solutions would translate in the order of hundreds of thousands of new electricity user connections, if the aim is to provide complete and continuous access to energy. It is reasonable to believe that a portion of the population will be covered by individual solar systems. Although this may appear too ambitious, it remains the fact that FUNAE, as the only institution mandated to operate in the rural areas, would have to increase its

operations at least ten folds in order to visibly contribute to achieving the government objectives. There is no indication for the time being that the private sector would be prepared to enter into the electricity distribution market in the rural areas, nor the regulatory framework is conducive of it, given the level of tariffs and affordability considerations in the rural areas.

It remains within FUNAE responsibility to not only make new investment projects for developing and installing new systems but also operate and maintain them. Given the prospected growing number of such systems, the O&M Division of FUNAE must be organized as a utility operator with a sufficient autonomy from the other divisions of FUNAE, with a view to perhaps split it out and create a proper public electricity utility operating in the rural areas.

It is crucial to ensure autonomy and possibly separation of O&M activities from projects development and investment activities of FUNAE in order to avoid a situation of cross subsidies or even funding diversion between the two core activities, e.g. funds provided for development partners for investment projects could go to tap in urgent maintenance and repair operations and vice versa, funds collected from users tariffs destined to cover O&M needs could be diverted to new investment, thus creating funding gaps for maintenance activities.

Financing of O&M activities

Financing of O&M activities should be secured ideally through tariffs collected by the users. In order to avoid the phenomena of free ridership, pre-paid metering system must be installed wherever possible and practical. Additionally, if needs be, the O&M must be further subsidized by the government under the same mechanism that main national grid O&M is currently being financed. The government challenges to subsidize the current O&M of national grid are known, so is the strain that further investment projects, like RERD or other sources of FUNAE, would bring to financing capacity of O&M of the added systems. More investments are done by development partners or the government in off-grid RE systems to reach the strategic objectives for access to energy in the rural areas, the higher the need for subsidizing the O&M of the increased RE assets base. This leads to a paradox situation that needs to be duly resolved before further investment can be made. Due consideration should be given to revision of the tariff schemes currently in place up to a level these can be fully reflective of O&M costs for provision of energy so as the government subsidy scheme could be progressively eliminated.

Assessment Criteria 5.4. Local Ownership[36]

With regards to local beneficiary institutions, information gathered through meetings with both the Ministry of Health and Ministry of Education, there is a clear understanding that the partnership created between these institutions and FUNAE assumed that once the energy systems have been installed these become the responsibility of the receiving institution.

Furthermore the beneficiary ministries have clearly indicated their readiness and commitment to indeed take ownership of the systems, and these institutions have also gone to ensure that there is funding available and arrangements in place to maintain the systems. As an example, they indicate that funds have been made available to contract a maintenance company for their PV systems.

[36] Do the partner institutions / local stakeholders possess sufficient ownership of the project outcomes and what is the likelihood of maintaining it after the end of the intervention?

With regards to local beneficiaries communities (rural households), the project has ensured mini-grid connection mainly through its hydro power projects, and for these specific cases the ownership of the system is regarded as being of FUNAE.

Currently there are evolving discussion between FUNAE, and local community representatives, to clarify the ownership of water pumps and how to share its costs and benefits.

3.6 Impact

EQ 6	To what extent has the development intervention contributed to rural development in selected areas of Mozambique
EQ Label:	*Rural Development*

Assessment Criteria 6.1: Economic and social improvements thanks to provision of "energy service" equipment[37]

RERD Project has rightfully considered to provide the beneficiaries with not only access to energy but also with "energy service", that is to say energy powered equipment such as: computers, TV, DVD players, lamps, refrigerators, etc. This is done in recognition of the fact that just access to energy is not enough to enable changes in a rural context where people or institutions have limited resources to fully rip the benefits that access to energy can offer, such as: access to information, educational and cultural programmes, communication and social networking, better teaching tools and educational environment, more educational options (thanks to introduction of evening classes), better healthcare services with possibly 24/7 service availability, better quality administrative services for communities, possibly based on modern technologies and/or available after normal working hours in urgent cases, etc.

However for changes to occur, some time must be allowed as these involve changes in the local practices and the way institutions have organized their work. Additionally it necessitates more time for effecting cultural changes. For instance, schools have required some time for panning the evening classes and filing the requests to the respective provincial directorates. Additional funding is required for such classes, which the Ministry is expected to include in the next scholar year planning. There is though a high demand for evening classes in the communities and the commitment is high by the school administrations to provide these. Regarding use of equipment, for the time being, this is limited to the school administration, which has resulted in some service improvements. However the scope is to make larger use of equipment as teaching aids. This requires not only a cultural change but also adaptation of the educational programmes to the new technologies that require Ministry's support and intervention. The effect that equipment provided to health centers is more direct and its use and value is straightforward.

Access to energy and particularly provision of energy powered equipment in rural areas are becoming determinants to effect the desired changes in terms of better health care services or better educated new generation which are key to the creation of an enabling environment for rural development.

The table below summarizes the progress of outcome indicators as defined by RERD project.

RERD Project	Key Outcome Indicators		
Access to energy as driver for rural development	**Baseline (2011)**	**Current (2015)**	**Target (2016)**
Number of electrified schools with evening classes	0	10*	**98**
Number of institutional births/month with access to	0	1000	**2370**

[37] Has the flexibility shown by the project in providing "energy service" equipment contributed to creation of an enabling environment for rural development?

quality illumination in electrified health centres			
Use of IT appliances in electrified infrastructures	0	200**	**500**

** The number is progressively growing. 2015 final surveys would provide a better value. This will be included in Results Report 2015*
*** The value is to be confirmed by 2015 final surveys and presented in the Results Report 2015*

Assessment Criteria 6.2: Overall economic and social development of rural areas[38]

The intervention is contributing to the partner countries objectives of promoting rural development insofar access to energy is a prerequisite for development. It enables not only educational and social development of societies but also offers a wide range of options for productive uses and application of efficient productive technologies that can in short-medium term bring about economic development.

However access to energy alone is not sufficient for achieving rural development, but it has a great potential if used as a catalyst for rural development. It must be associated with other government or development partners' programmes aimed at rural development across various axes of intervention such as education, health, public administration modernization, private sector development in rural areas, agriculture and food, access to water, public utilities, and transport networks. In other words, access to energy must be part of an integrated rural development approach translated into concrete Integrated Rural Development Plans coordinated under the auspices of the government.

Assessment Criteria 6.3 Unintended effects[39]

Through the evaluation it was possible to ascertain that there are a number of unintended both positive and negative effects on both intended beneficiaries and non-intended individuals and groups.

Unintended effects include mobile charging in the electrified institutional buildings. This can be considered as positive to some extent insofar it helps people to improve their communication means and therefore contribute to better social and professional life. Cell phones are used to convene meetings at administrative buildings, inform parents at schools, communicate faster with government entities and public services, including maintenance services.

Furthermore, lighting at night of public institutions has increased security for communities where beneficiaries can congregate. It must be noted that public lighting seems to have been an intended effect or activity foreseen in the original TFF although no direct investment activity was planned under the project. For this reason, it has been considered under the unintended effects.

Beneficiaries of the above mentioned unintended effects are however the project intended beneficiaries.

There are though some unintended effects, which non-intended groups have benefitted. For instance, on one occasion, temporary connections for public lighting at security check points were made by security police forces. Also, use of electricity for mobile charging or

[38] Is / will the intervention contribute to the partner countries objectives of rural development?
[39] Are / will there be unintended positive or negative effects of the intervention on the intended beneficiaries or on non-intended individuals and groups?

access to media is now possible for a number of non-intended individuals, such as commercial activities that has in some cases proven to become a source of revenue.

Unintended negative effects include the incorrect disposal of solar batteries and other electrical components which can contain hazardous materials and lead to environmental damaged once they have reached its end-of-line or become faulty. As a mitigation measure in this regard, it is important to note that FUNAE has visited a certified South African company who had demonstrated interest in creating centralized collection points throughout the country for the recycling of batteries. Additionally, FUNAE has included contractual obligations for its contractors to ensure that batteries are dully and correctly disposed of.

3.7 Transversal themes

Gender

FUNAE has a multidisciplinary Gender team responsible to develop gender activities. The multidisciplinary team is composed by one coordinator and representatives of technical departments.

No specific funds of RERD project were allocated to this team due to constraints also mentioned in the MTR such as government fiscal framework being defined according to sector priorities thus there being impediments to allocate a budget to gender activities.

Overall the evaluation can conclude that due to the above reasons coupled with lack of technical skills of a gender expert, gender has not form an integral part of the project from the outset and only mainstream actions in implementations such as monitoring and recording of female and male beneficiaries have at times taken place.

On the other hand there are inherent activities that the RERD project has financed and implemented which have a direct effect on gender issues, focusing on female beneficiaries. These include provision of quality illumination for institutional births in electrified health centres and reduction of water chore time that is an activity typically carried out by women in the rural areas.

Environment

FUNAE is a certified ISO 14001 institution thus having an environmental management system in place. The Quality and Environmental Division within FUNAE handles all environment related matters, from licensing which includes the contracting of environmental impact assessment studies, to monitoring of contractors so as to ensure the implementation of Environmental Management Plans and the maintenance of its internal environmental management system which allows FUNAE to maintain its ISO certification

Having the environmental framework already set up, the RERD project has benefited by ensuring that all of its projects, specifically the hydro power plants, have undergone the necessary studies and carry the necessary licenses to operate.

During discussion it was also made known to the evaluation team, that FUNAE has contacted and is establishing mechanisms to ensure that its sub-contractors are contractually obligated to ensure collection facilities for systems components once these have reached the end-of-life.

3.8 Horizontal issues

Results Oriented Steering

The PMT regularly maintains a project monitoring tool that includes a set of performance indicators at output, outcome and impact levels. Progress is reported on a six-monthly basis to the Steering Committee along with other relevant information on planning, budgeting and progress of specific activities. Operational/activity execution reports are also submitted together with specific output reports (e.g. studies) carried out in the foregoing period. These are discussed thoroughly during the Steering Committee meetings, where strategic decisions such as changing the activity scope, suppression of certain activities and introduction of others, budget reallocations as well as strategic orientations of the project are made. The PMT maintains a register of Steering Committee and other important decisions that incudes an action line indicating the responsible person and time line for implementation of each decision. Review and reporting on the progress is made on the following Steering Committee meeting.

Generally, the Steering Committee, the partner institution and the PMT have given due consideration to the recommendations of Mid-term Review, value for money audit and backstopping missions. However among the still applicable recommendations, the following are yet pending:

MTR

- For the SC, to enforce the agreements between FUNAE and the Ministries of Health and Education for transfer of the systems and therefore maintenance responsibility to the lines ministries, Also discuss maintenance funding with the Ministry of Public Administration – This is taken further as a recommendation of the ETR
- For the partner institution/PMT, propose measures for private sector involvement – Measures have been planned in the Action Plan 2013-2015 but activities not implemented. This is taken further as a recommendation of the ETR
- For the partner institution/PMT, prepare an “Institutional and Organizational Capacity Building Plan for FUNAE - This is taken further as a recommendation of the ETR
- For the PMT, ensure involvement of FUNAE Gender focal point and gender mainstreaming since project preparation stage and during implementation - This is partly implemented and taken further as a recommendation of the ETR
- For the PMT, ensure proper recycling of end-of-life components - This has been considered though further reinforced as a recommendation of the ETR

Backstopping Reports

- For the partner institution/PMT, GIS/planning/maintenance systems integration - – This is taken further as a recommendation of the ETR
- For the PMT, ensure proper recycling / waste treatment of end-of-life components - This has been considered though further reinforced as a recommendation of the ETR
- For the PMT, develop a “best practice” manual of solar installation – This has not been completed and taken further as a recommendation of the ETR

VfM Audit Report

- For the PMT, the investment choice should not be technology-driven but based on energy demand and economic feasibility – this has been taken further as a recommendation of the ETR
- For the partner institution/PMT, ensure a transparent communication on the contract currencies and tax treatment – this has been considered but can be

further reinforced. Need to be taken into account in future projects/procurements. Currency fluctuation is also an issue to be addressed in order to increase the chances of a successful procurement

- For the partner institution/PMT, include pre-bid conference as a mandatory step and create conditions for formation of partnerships between international and local contractors – This has not been implemented, apparently due to restrictions posed by the Mozambican procurement rules

Monitoring

The project includes since its design a logical framework, where the results framework can be derived. The PMT has further developed it in a proper Results Monitoring Framework including a monitoring plan and persons responsible for collection and analysis of data. These are mainly the TA members supported by FUNAE members for data collection activities.

Extensive baseline studies were carried out during the first two years of the project which defined the initial situation, the monitoring data to be collected, data collection methods, baseline values of the indicators as well as target values. Completion of baseline studies however took much longer than usual due to the fact that initial studies were based on the assumption that data and information collected and available at the local intuition partner were sufficiently robust and accurate. Inconsistencies were found which necessitated a thorough verification mission which given the huge number of sites and the country geography required significant time and resources to complete. Further to baseline studies, the project is regularly carrying out impact monitoring surveys as part of the monitoring process.

The Monitoring Framework is integrated in the Project Operational Monitoring Tool that is updated on a quarterly basis. This was found to be of a good quality and up to date. Besides performance monitoring, the Project Operational Monitoring Tool includes sections on project activity planning, financial planning, budgeting, etc. on the basis of which upwards quarterly reporting is made to the project partners (BTC and FUNAE). Additionally, a yearly Results Reports is produced and project progress review meetings are taking place regularly.

Further to the MTR, important changes are brought to the project logical framework due to reshuffling of some project activities. These were duly approved by the Steering Committee leading to the production of an Action Plan 2013-2015 that can be considered as nearly a project reformulation document.

As a result of project modification, the results framework has been adapted at the level of both results description and corresponding indicators, particularly for result area 2 and to some extent result area 1. Indicators at impact level had also to be reviewed in order to focus on those more practical and presenting a closer link with the intervention.

The results levels are clear and in harmony with MoRe Results guidelines. A comment can be made though on the result area 3.

This is currently defined as: *'Technical and administrative capacity of FUNAE is increased"* This is to be considered as the expected outcome of single capacity building activities planned under the concerned project component. It cannot be considered as a result because the link with the objective of the project "increase access to energy services" is not direct. Increased capacity of an organization remains an internal matter until/unless it is reflected to the outside stakeholders/beneficiaries of the services rendered by the organisation.

The following can be considered as an appropriate result definition: *"Increased quality of services provided by FUNAE in rural areas"* and appropriate indicators be subsequently set. There are obvious difficulties to set meaningful indicators at the current stage of the institutional and organizational development of the partner institution, which still needs to take strategic decisions on the reorientation of its activities and internal organizational set-up. An important project activity planned to prepare the Institutional an Organizational Development Capacity Building Plan has not been initiated and consequently it is impossible to define a comprehensive organizational performance framework on the principles of results based management, which would be the vehicle leading to setting meaningful results indicators for the above described result area.

This been said, the current results framework reflects the intervention strategy to a good extent and is able to measure the progress towards the results for most of the project activities at both output and outcome level. Most of the project activities however relate to result area 1, whereas none has been completed on result area 1 and the ability of indicators to capture progress on result are 3 is commented above.

The project will be able to achieve an acceptable level of outcome on result area 1, none on the result area 2 and to some extent on the result area 3 by the end of the intervention.

3.9 Specific evaluation questions

On Implementation modalities:

1. ***To what degree are the implementing and management modalities of the RERD appropriate for achieving efficient and effective outcomes in the area of rural development through electrification?***

The original project formulation document (TFF of 2009) provides for a co-management modality, appropriately designed and described in the said document. However the amended project formulation document (TFF of 2011) appears to have changed the above mentioned management modality to an execution modality that can no longer be qualified as "co-management". The project is in fact being executed through two modalities:

- the majority of project activities corresponding to a large budget amount is executed through an ad-hoc modality that is very close to the national execution by the partner country institution, albeit "no-objection" mechanism provided for the development partner.
- a limited number of project activities corresponding to a minor budget amount is executed through own-management (regie) modality by the development partner

Project efficiency has been hampered by the lack of clarity surrounding the applicable management modalities due to the way it is designed and described in the TFF of 2011. If in the future, the co-management modality is the desired execution modality by both partners, TFF of 2009 provides the most appropriate model.

Please refer further to the analysis provided under the Assessment Criteria 2.4.

Co-management modality put aside, even under the so-modified modality (closer to the national execution), the way the project was implemented until 2013 with no real delegation of powers, notably those relating to project operational matters, to the PMT has heavily affected the project efficiency and effectiveness. Only after the appointment of a FUNAE staff member as PM in 2013, the PMT has started functioning, albeit with very limited decisional autonomy. This has significantly improved the management of the project at an operational level. An appropriate PMT structure, including roles, responsibilities and decision-making authority, is provided for in the TFF of 2009. This provides a good basis for an efficient management and implementation of a project regardless the chosen execution modality. Depending on the later, if, for instance, national execution is chosen, some adjustments may have to be brought on the composition of the PMT (i.e. members of local partner vs. international TA), but not on its role, powers and authority.

2. ***How and why could the implementation arrangements between BTC and FUNAE be improved for future activities? For instance, co-Management and/or regie depending upon the type of activity; this specifically applies to activities in results areas II and III: Private Sector Development and Capacity building (would it be more efficient to apply sort of Financial Agreements / grants?)***

On a generic note, the implementation arrangements between BTC and FUNAE can be improved in the future operations if the partners fully express their intents, clearly state the project execution modalities and implementation arrangements, help each other to fully understand and appreciate the workings and effects of each chosen modality and

ensure there is a common understanding before signing an agreement and starting the implementation of a project

There is a need to have the projects ruled by clearly known execution modalities, without alterations of the standard ones and to the extent possible, it must be avoided to have a project ruled by more than one modality.

Please refer further to the analysis provided under the Assessment Criteria 2.5.

In this respect, it may prove more effective to set up separate projects for different intervention areas. This will enable creation of separate PMT's (or simply a PM for smaller projects) fully focused on respective result areas, although close coordination and synergies among all interventions must be ensured. A common Steering Committee would be the appropriate forum to ensure the overall strategic direction in addition to periodic coordination meetings between the PM's. Complex interventions with several result areas, requiring a mix of specific skills that often cannot be found in single individuals, have shown to be lagging behind in one or more areas whilst doing well on others. At times, the PMT's attention is often drawn by urgent matters one area, typically those with higher weight on the project budget.

Since all interventions will come under an overarching strategic direction, it is important to adopt an approach, similar to the programme approach, where not only the overall objective is the same but possibly the specific objectives of the various interventions have some elements in common.

The choice of the most appropriate management modality for each intervention can be made on the basis of the following elements, but not limited to:

- Each partner's availability of staff with the required knowledge and partners' experience with implementing similar interventions. Additionally, the likelihood of the intervention to succeed if driven from inside out or from outside. An outside change agent is sometimes needed to initiate the desired change, provided that it is supported by a number of key insiders to help adjusting the change to the conditions locally and support implementation.
- Market recognition (name and reputation attributed by market players to the Contracting Authority) and expediency of procurement procedures for specific activities that each intervention entails. Additionally the applicable tender currency.

Specifically, capacity building interventions are more effective is centrally run and enjoys full support of the top management. A change agent is needed in order to ensure efficiency of the measures that is a must to be implemented within the scheduled timeframes. If momentum is lost, the capacity building programs often lose effectiveness. Current FUNAE's environment indicates that if change is stimulated from outside through a execution modality like regie, this could prove more efficient, provided that there is top management's full buy-in since the outset, otherwise there is little point to even initiate any capacity building intervention.

Regarding market development for RE/solar products, given the current developments in the rural markets, the Call for Proposals instrument, involving grants, seem now to be mature for implementation. This is better implemented through the regie modality, especially given the experience of the development partners in running such procurement modalities and the restrictions posed to FUNA by the national legislation to offer grant money to private sector entities.

Please refer further to the analysis provided under the Assessment Criteria 4.2.

Regarding private sector participation in delivering public utility services, i.e. in the electricity distribution market, or in investment and operation of electricity generation power plants, projects must be managed by the partner government institutions (e.g. FUNAE) according the PPP models allowed by the national legislation, the concession law. PPP projects assume formation of long terms partnerships, where the public partner will be entering into a PPP/concession agreement with a private sector partner that go beyond the timespan of a typical development partner intervention. Furthermore these involve a combination of various factors such as regulatory, (at times) subsidies, risk allocations between PPP partners, transfer of ownership and handback modalities, social, etc. The role that a development partner (donor) in PPP projects can play is to act as advisory to the government and perhaps provide grant money to the public sector partner that can be used as the contribution of the public partner to the PPP deal (e.g. equity participation or guarantee to hedge the demand risk to top up losses due to low level of tariffs, etc.).

3. ***To what degree would a more geographically 'centralised' approach (less provinces, less districts) have been beneficial/more effective?***

Operating in these four provinces has meant a wide spread presence across the country and the fact that these provinces are not adjacent to one another has also meant a need to widely spread resources across great distances which may have limited the project capacity to generate visible impact. An evaluation finding points towards a possible option of RERD project to concentrate its efforts and activities into a smaller number of provinces and restrict its geographic boundaries so as to increase the likelihood of the project impact.

Please refer further to the analysis provided under the Assessment Criteria 2.2.

<u>On results area I: access to solar hydro and wind energy systems</u>

4. ***Within the current framework, would alternatives to the current maintenance approach be more appropriate?***

Alternative approaches to the current model include:

- More decentralisation of maintenance activities and intervention decisions.
- Outsourcing of maintenance activities to private sector through performance based maintenance contracts.

Please refer further to the analysis provided under the Assessment Criteria 5.2.

5. **In terms of ownership and accountability: how can the distribution/sharing of responsibilities between the different administrative levels of beneficiaries and users be improved when it comes to maintenance and management of the installed renewable energy systems (hydro/solar)?**

Regarding individual solar installations, which maintenance, for the time being, appear to be more a cost than a revenue stream for FUNAE, there is a rationale for transferring these to the actual users. This will increase ownership and accountability, reduce risk of theft and vandalism. Such users involve:

- Institutional users such as schools, healthcare centers, staff residence houses, and local administrative units. At least for the solar installation done with the support of RERD project, Ministry of Health and Ministry of Education have

shown their commitment to take over ownership and responsibility for management and maintenance, as it has been stipulated in a MoU with FUNAE at the beginning of the project.

- Private household users. A scheme of selling the solar installations to private households, based on instalments or even for a modest price, can be considered.
- Additionally, due consideration should be given to solar water pumps in respect of finding a balanced solution between costs and likely revenue. If a cost recovery solution cannot be found, consideration should be given to the option of transferring ownership and responsibility to local communities.

Please refer further to the analysis provided under the Assessment Criteria 5.3.

6. To what degree are the chosen monitoring technologies for solar systems appropriate to enhancing sustainability?

The monitoring technologies assessment for the solar system is in a pilot phase and the RERD project is experimenting with three different monitoring systems, all of which have different technical capacities and associated costs. It is still early to come to a conclusion but it can anticipated that it is crucial that FUNAE can conclude its pilot phase by merging the various advantages that the three can offer and have as an outcome a system that appropriately address the monitoring needs for FUNAE but more importantly that guarantees value for money

Please refer further to the analysis provided under the Assessment Criteria 5.1.

7. Has the flexibility shown by the project in providing "energy service" equipment contributed to creation of an enabling environment for rural development? [40]

The project has provided "energy service" equipment in recognition of the fact that just access to energy is not enough to enable changes in a rural context where people or institutions have limited resources to fully rip the benefits that access to energy can offer. However for changes to occur, some time must be allowed as these involve changes in the local practices and the way institutions have organized their work. Additionally it necessitates more time for effecting cultural changes. There is though a high demand for evening classes in the communities and the commitment is high by the school administrations to provide these. Access to energy and particularly provision of energy powered equipment in rural areas are becoming determinants to effect the desired changes in terms of better health care services or better educated new generation which are key to the creation of an enabling environment for rural development.

Please refer further to the analysis provided under the Assessment Criteria 6.1.

8. To what degree would there have been more appropriate technologies for improving the energy services of the rural Mozambican population (i.e. grid extension, individual solar systems for households; diesel generators; others)?

[40] The specific question of the ToR was slightly modified. This was: What impact has the flexibility shown by the project in providing "energy service" equipment such as TVs, DVDs, Computers, drilling of wells for SPV water pumps , spare parts, consumables (lamps, CDSs, toner) to electrified infrastructures?

Concerning investments in hydropower, the constructed mini-grids in locations with significant hydropower potential can be regarded as an appropriate choice. Mini grids based on hydro power allow for the distribution of high quality energy to beneficiary institutions and surrounding communities and have been constructed adhering to technical specifications and standards that will allow the connection to the national grid (operated by EDM) once this has reached the site locations.

Concerning investments in photovoltaic installations, individual solar systems have been provided by the project mainly to institutional/public buildings for which solar technology provides the required energy needs. An argument can be made for institutional buildings such as administrative posts, health centres and schools, which as the population grows, their energy needs are also projected to grow, and should it be case, the use of PV technology would prove once again appropriate choice if there is an ease to increase the installed capacity of the current systems.

In the light of the above, closer collaboration with EDM must be sought both from a perspective of connecting renewable energy generation projects to the main grid, thus strengthening the capacity of the national grid and saving EDM investment costs, as well as connecting renewable energy mini-grids in areas where the EDM grid has reached and such facilities can be used to feed in the national grid or for back-up power.

Please refer further to the analysis provided under the Assessment Criteria 2.1.

<u>On results area II : Increased access of rural households to renewable energy products</u>

9. To which extent rural households have increased access to renewable energy ?

The remit of the RERD project has been on the community infrastructures. These include: administrative buildings, health centers, schools, water pumping systems and public lighting. Provision of complete energy service would mean enabling people's access to electricity in all most significant infrastructures they use in their private, social and economic life. This obviously includes households. The project has electrified 625 institutional buildings. The project has also built 2 hydro power projects which have associated mini-grids and connections to institutional buildings as well as privately owned rural households and commercial activities. Another hydro power project to which the project has contributed to grid extension is also envisaged to contribute to increases access once it is completed at the end of the year.

Regarding the effectiveness of the energy investments made by the project, that is the actual use of energy access provided by the project, the findings can be summarized as below.

- Healthcare centers are properly and fully using the electricity capacity installed
- For the time being, schools are making only limited use of the electricity capacity installed by the project, although there are indications that the number of schools that are making extensive use of the supplied electricity.
- Healthcare or school staff using the residence buildings are also benefitting from the provided access to electricity.
- Local administrations using the administrative buildings electrified by the project seem to be making only limited use of the supplied electricity because of their timetable of work normally during the daylight.

- Local communities are making full use of solar pumping systems installed by the project. The water supply reliability has improved without any further effort for water pumping as well as chore time has reduced
- Households, are more and more eager to be connected to the electrical mini-grids built by the project.
- Commercial activities (shops) are fully benefiting from the mini-grid connected electricity that helps the business to further prosper.

Please refer further to the analysis provided under the Assessment Criteria 4.1.

10. Why does the private sector not take off (and was not boosted by the result on the micro-credit of RERD) ?

Please refer to the analysis provided under the Assessment Criteria 4.2.

<u>On results area III: Capacity Building</u>

11. Are the type of trainings and tools provided efficient and effective to enhance the competencies and skills of the staff? Do post-graduate courses of staff contribute to a higher extent to better/ more sustainable performance of services (e.g. less qualified staff turnover) than short term courses? Would have there been more efficient means/tools?

The project has sponsored a number of specialized training courses in a number of disciplines, both technical and managerial. It is undoubtedly expected that the specialized trainings would contribute to enhance the competencies and skills of the beneficiary staff since it is supposed that the knowledge acquired would find a direct application in their daily job. This is less evident for long-term postgraduate academic degrees, which an organization would normally make the financial effort to finance only if the competence is not available in the market. This been said, the question to be raised on individual capacity building is not only on effectiveness of short term versus long term training provided but rather as to whether any type of training that FUNAE would possibly provide to its staff under the current stage of organizational development would be effective at all.

Until/unless a thorough institutional and organisational assessment of FUNAE has not been completed resulting in a comprehensive Capacity Building Plan, complemented with an organizational and individual performance assessment framework (on results based management principles), it is questionable if any capacity building / training actions would prove to be effective.

As to the efficiency of training or other CB activities, in terms of use of resources compared with the expected capacity outputs, besides formal training, due consideration could be given to such CB actions as: technical seminars delivered in-house by external experts or lecturers, accompanied by practical exercises; management workshops facilitated by external experts; on-the-job training; couching and mentoring by TA experts; establishment of knowledge practice groups and knowledge leaders; peer review mechanisms for junior staff; study visits to learn from experience of similar organisations; etc.

Please refer further to the analysis provided under the Assessment Criteria 2.6.

12. To what degree has increased capacity building efforts led to higher quality of services / sustainable implementation of activities?

Under RERD project, those activities, as strictly known as capacity building, have lacked a clear guide such as a comprehensive capacity building plan for all personnel with clear objectives, milestones and measurable indicators. In this context, it is unlikely that the desired chain of capacity building effects can be triggered outside a structured organization-wide capacity building process driven by a results based management performance framework at both organizational and individual levels.

Please refer further to the analysis provided under the Assessment Criteria 4.4 and 2.6.

13. Do existing monitoring tools allow to sustainably and effectively measure impact and improvements in terms of capacity building? Are there better alternatives?

The project monitoring system has set a number of outputs indicators on capacity building, such as: number of trained staff; number training courses delivered or attended; number of R&D projects developed. The issue is that output indicators for CB actions, excepting giving an indication on efficiency of use of resources, are of little help for measuring capacity improvements and therefore assessing the effectiveness of the CB actions. The later requires establishment of outcome indicators. There is though an apparent difficulty to establish outcome capacity indicators to measure the effectiveness of any CB action in FUNAE as long as it is impossible to establish a meaningful capacity baseline. The latter requires preparation of an organisational and institutional development plan for FUNAE. This is an activity planned under RERD project but not yet initiated.

Please refer further to the analysis provided under the Assessment Criteria 3.5

14. To what degree have the investments (staff, software, hardware) in the GIS system contributed to better planning and management ?

The RERD project has made a noteworthy contribution to initiate the steps to address the need for FUNAE to have a full inventory of existing installations be these solar or hydro, located on public or private infrastructure. The project is contributing to building an asset management system based on GIS system within This has enabled FUNAE to begin the exercise of mapping and geo-referencing of its current assets.

Looking at the improvements for planning within FUNAE, there is a need to further consolidate and streamline all existing databases that can turn into a comprehensive GIS Asset Management, Planning and Monitoring System for renewable energy. A integrated GIS management tool can be used to its full potential in terms of achieving better monitoring/reporting on all systems, sharing information within departments and other institutions (ministries and donors), and improved planning, as existing installations can be easily mapped out during the needs assessment exercise by cross-checking with public infrastructure.

Please refer further to the analysis provided under the Assessment Criteria 4.3

4 Conclusions

4.1 Relevance

The generic evaluation questions addressing the Relevance criterion are:
EQ1: To what extent the project intervention strategy is in line with the Mozambican government policies in the energy sector and takes into account the priority needs for rural development?
EQ2: Is the project (currently and in the view of possible future phases) structured in a way that can adequately address the energy needs of the target beneficiaries?

Conclusion 1.1 Strategic Alignment and Beneficiary needs

RERD project is well aligned with the known Government of Mozambique policies and strategic objectives for off-grid energy provision, notably through renewable energies, in rural areas. However the overall energy policies for provision of electricity (national grid and off-grid) require further clarity regarding the renewable energies.

RERD project provides a valid response to the beneficiary needs for access to energy. However, it is not evident that access to energy could be to be ranked as priority need for some of the institutional beneficiaries, notably administrative buildings. Prior needs assessment studies should have demonstrated this. The assumption made at formulation stage concerning availability of existing needs assessments for solar or hydro systems and installations and/or specific action plans required a thorough reconsideration at the start of the project.

Conclusion 1.2 Project Design

The most appropriate technological option for increasing access to energy in remote rural areas, where there is no plan for main grid extension in the foreseeable future, is through off-grid renewable energy technologies. Among these, the most effective is mini hydropower plants or solar power plants accompanied with mini-grids for electricity distribution. Individual PV solar installations can be considered on case-by-case basis. Additionally solar water pumps are a very appropriate solution for the isolated communities.

Given the available resources by the development partner, further geographic concentration is needed in order to increase effectiveness of the actions and eventually the likelihood of making an impact on the socio-economic development of the selected areas. The later would require designing, planning or coordinating actions geared towards integrated rural development. Simple provision of energy-based products, albeit necessary, is not sufficient.

The only government institution mandated to provide off-grid renewable energy solutions in the rural areas is FUNAE. Partnering with FUNAE for delivering the ambitious goals of the RERD Project was the right choice in order to ensure that the work undertaken by the project was carried out within the legitimate institutional framework of the partner country and set the basis for achieving ownership of results.

Conclusion 1.3 Appropriateness of the chosen Execution Modalities

The legal and administrative framework defined in the TFF (as amended in 2011) provides for an execution modality that cannot be qualified as “co-management”. The project is in fact being executed through two modalities: an ad-hoc modality that is very

close to the national execution for the majority of project activities; and regie modality for a limited number of project activities. With due respect to considerations that might have brought to actual alteration of the execution modality foreseen in the original TFF (2009), it would have been far better if clarity was made on the amended TFF (2011) regarding the real execution modalities that the project was intended to be executed. Keeping its denomination as 'co-management" was detriment to the requirement for clarity on project authority and responsibility lines that is critical for achieving efficiency.

In the light of the above, accountability for achieving (or not) the intended project results must be sought at the local partner that was in charge for the project delivery and had the overall (incl. financial) decision making powers. If anything, BTC is responsible to the degree of having agreed to change the substance of the 'co-management' modality foreseen in the original TFF (2009) to an execution modality that can be qualified as ad-hoc, rather than being clear on the (prevailing) intents to apply the "national execution" modality for most of the project activities. From that point onwards, the BTC involvement in project delivery is minor and cannot be considered as a co-management partner.

4.2 Efficiency

The generic evaluation questions addressing the Efficiency criterion is:
EQ3: Does the project have an adequate capacity as to ensure delivery as planned?

Conclusion 2.1 Outputs delivery rate and efficiency ratio

Outputs delivery status against planned is lower than expected. This is mainly due to Component 2 failing to produce any useful output and numerous planning and re-planning exercises and procurement challenges that Component 1 underwent. RERD project had to undertake a comprehensive and thorough Needs Assessment for each site further to the findings of the Verification Mission. This has created significant activity schedule slippages in the first two years of the project. Implementation efficiency improved in the second half of the project and a number of major outputs are being achieved.

The efficiency ratio measured as quantity of outputs produced against input resources used is lower than average. There are a number of activities that for one reason or another, have not resulted into a concrete investment as it was wished but however the outputs produced by such activities need to be taken into account in the context of an evaluation made on not only quantitative but also qualitative aspects of the intervention.
If such outputs (e.g. studies) are properly and in timely fashion re-used, these would offer significant efficiency gains to any future investment project made by FUNAE or another development partner. In the light of this and whilst considering the pilot nature of RERD project, the implementation efficiency of this component should be considered as acceptable.

Conclusion 2.2 Efficiency of execution modalities

Efficiency of the project execution modalities has been hampered by the lack of clarity surrounding the applicable management modalities of the RERD project. One element is clear though concerning the management powers conferred to the BTC Representation by the amended TFF (2011), which do not allow the later to play a co-management role in the project. Both management or co-management assume an active action / participation to management of a project. Right to "no objection" is by definition a passive action.

A perceived reluctance by the local partner to set-up the PM structures in accordance with the co-management modality as defined in the original TFF (2009) coupled with insufficient clarity on the execution modalities as amended in the TFF (2011) have significantly affected the implementation efficiency of the project in the first three years. After 2003, awareness was gained by all parties on the need to reinforce efficiency for timely implementation of the project activities. Appointment of a PM by the partner institution enabled creation of a true PMT, albeit with limited powers compared with the original provisions of the TFF 2009.

The increased efficiency pace of RERD implementation in the last two years shows that regardless the execution modality chosen between partners, project operational efficiency is dependent on whether there is a dedicated PMT, empowered with an adequate level of authority, decisional powers and autonomy to act on the project. In the case of co-management, it should be noted that this modality would additionally require some extra organisational and coordination efforts and is to a large extent people-dependent.

Conclusion 2.3 Efficiency of Project Management and Implementation Systems

For a long time, there has been no clarity on the PMT structure for RERD project, where appointments have been changing from project coordinator to project manager but however the project has never come under the direction of a project director as intended in the original TFF. No resource has been assigned by the partner institution as full time to the RERD project, nor the currently assigned PM has a formalised and well-defined role and responsibility where the decision-making powers can be derived from. This affects the level of project appropriation, and responsibility and accountability on achievement rate of results.

Neither PM has been provided with a written mandate and delegation of powers to act on project operational matters, nor the co-PM has the “institutional” authority to replace the PM, nor it was intended so. This has slowed down the overall implementation efficiency.

The PM tools developed by the project are of high quality and to the international standards. However, the level of appropriation (and replicability) by FUNAE of such tools is to be seen, especially given the assumption under the current implementation modality that the project is supposed to be integrated into FUNAE management systems.

Despite the difficulties encountered due to the insufficiently empowered PM structure, a sort of equilibrium has been found after 2013, which has allowed the current Project Management System to work satisfactorily, also thanks to efforts made by all actors at an interpersonal level. This is mainly based on practice established over time between the current staff, which is not sustainable if other people were to take over for a reason whatsoever.

4.3 Effectiveness

The generic evaluation questions addressing the Effectiveness criterion is:
EQ4: Has the project intervention been conducive to improving access to energy in rural areas

Conclusion 3.1 Increased access to energy

There is evidence that the use of renewable energy based services have increased in the areas where the project has operated. However, this varies between different beneficiary groups. Schools have not yet been able to make full use of the provided services due to

planning and financing constraints for implementing the additional activities (such as evening courses), which they seem committed to resolve by the next scholar year.

Conclusion 3.2 Market for renewable energy products

Market for renewable energy products in the rural areas is still underdeveloped. The microcredit financing mechanism planned under the project would provide only financing with refunding obligation whereas large scale launching of renewable energy products in the rural areas require a grant scheme, possibly in the form of co-financing.

Conclusion 3.3 Planning and Management capacity of FUNAE

Some improvements have been observed in the quality of planning documents prepared by FUNAE thanks to GIS software. However GIS system is still in development phase and as long as it is not integrated with planning and management in one single integrated system, no significant contribution can GIS system bring into improving the planning and management capacity of FUNAE.

Conclusion 3.4 Capacity building

Any capacity building action (as strictly known as such, e.g. training) at the individual level that can be carried out under the present institutional and organizational development stage of FUNAE would hardly prove to be effective. These would lack a clear guide such as a comprehensive capacity building plan for all personnel with clear objectives, milestones and measurable indicators. It is unlikely that the training activities provided by RERD project could trigger the desired chain of capacity building effects outside a structured organization-wide capacity building process driven by a results based management performance framework, at both organizational and individual levels, that is eventually linked to indicators leading to improved quality services for the end users.

However other capacity building actions at the organisational level, such as setting up of maintenance structure and new delegations have increased FUNAE capacity to better service its base of beneficiaries and users of its services. There is evidence that proximity to the users has increased the quality of service, which is further confirmed by the feedback collected from rural communities that indicate satisfaction with the quality of service being provided by FUNAE, although the tariff level to be paid is still to be agreed on.

4.4 Sustainability

The generic evaluation questions addressing the Effectiveness criterion is:
EQ5: To what extent the renewable energy services developed with support of the project can durably contribute to provision of energy in the rural areas

Conclusion 4.1 Solar systems monitoring technologies

The selected solar systems monitoring technologies are still in testing phase. This definitely contribute to better control and maintenance of the systems but benefits should overweigh the costs. An assessment needs to be done at the end of the testing phase.

Conclusion 4.2 Systems Operation and Maintenance

The requirements for O&M of the systems developed by the project seems to have

initially been underestimated and/or FUNAE's actual organisational and financial capacity to carry out such activities might have been overestimated. The assumption which an adequate funding level for O&M could be secured by the government seems compromised, so is the expectation that it could be covered by the users' tariffs.

As foreseen, maintenance responsibility should be allocated at a level as close as possible to the users, which involves, whenever possible (and feasible), transfer of maintenance responsibility of individual systems onto the beneficiary institutions or user communities. This would also ensure local ownership. Appropriate financing should be secured for maintenance especially if private sector involvement is also sought. In order to avoid the phenomena of free ridership, pre-paid metering system must be installed wherever possible and practical. Considering the current level of applicable tariffs and willingness to pay or affordability issues faced by the users (institutional, community, households), the O&M of off-grid RE systems should be able to benefit from the government subsidy mechanism in the same way as the national grid system does.

4.5 Impact

The generic evaluation questions addressing the Effectiveness criterion is:
EQ6: To what extent has the development intervention contributed to rural development in selected areas of Mozambique

Conclusion 5.1 Creation of an enabling environment for rural development

RERD intervention will make a contribution, though modest given its current size, to increasing energy access in the rural areas, which is a pre-requisite for rural development Further to provision of access to energy, RERD project has also supplied energy-based equipment, mainly for schools, but also health centers, in order to make the benefits that energy can bring a reality in the rural areas. Access to energy service and products that RERD project has facilitated has a great potential to make a change in forming a better educated and skilled new generation, but visible only in the long term.

It must be noted though that access to energy alone is not sufficient for achieving rural development, but it has a great potential if used as a catalyst for rural development, if considered as a part of an integrated rural development approach translated into concrete Integrated Rural Development Plans coordinated under the auspices of the government.

4.6 Gender

Although gender monitoring activities have taken place, it is necessary that Gender issues are indeed addressed as transversal theme of the project since its set-up, thus guaranteeing that concrete and planned gender interests are adequately considered in planning of the intervention and results are oriented to be gender-equitable in a measurable way.

4.7 Environment

Although the project has not had any major environmental impacts of concern, to date, specific and appropriate measures for the "end-of-life" of some components as well as the structures, external and internal, to deal with such waste are required to be put in

place and/dor the enforcement mechanisms to be strengthened so as to avoid the risk of FUNAE installed systems be the root cause of possible environmental damage.

4.8 Results Oriented Steering

The project monitoring tool includes a set of performance indicators at output, outcome and impact levels. Progress is reported on a six-monthly basis to the Steering Committee along with other relevant information on planning, budgeting and progress of specific activities. Steering Committee has made strategic decisions such as changing the activity scope, suppression of certain activities and introduction of others, budget reallocations as well as giving strategic orientations to the project.

4.9 Monitoring

The PMT has developed a proper Results Monitoring Framework including a monitoring plan and persons responsible for collection and analysis of data. This is integrated in the Project Operational Monitoring Tool that is updated on a quarterly basis and upwards reporting produced regularly. Additionally, a yearly Results Reports is produced and project progress review meetings are taking place regularly.

Further to the MTR, important changes are brought to the project logical framework due to reshuffling of some project activities. These were duly approved by the Steering Committee leading to the production of an Action Plan 2013-2015 that can be considered as nearly a project reformulation document.

As a result of project modification, the results framework has been adapted at the level of both results description and corresponding indicators, particularly for result area 2 and to some extent result area 1. Indicators at impact level had also to be reviewed in order to focus on those more practical and presenting a closer link with the intervention. The current results framework reflects the intervention strategy to a good extent and is able to measure the progress towards the results for most of the project activities at both output and outcome level. Most of the project activities however relate to result area 1, whereas none has been completed on result area 1 and the ability of indicators to capture progress on result area 3 needs to be strengthened.

4.10 Summary of main conclusions

- The most appropriate technological option for increasing access to energy in remote rural areas is the development of mini hydropower plants or solar power plants accompanied with mini-grids for electricity distribution. Individual PV solar installations can be considered on case-by-case basis.
- Further geographic concentration is needed in order to increase effectiveness of the actions and eventually the likelihood of making an impact on the socio-economic development of the selected areas.
- The intervention is being managed by an execution modality that cannot be qualified as “co-management”. The project is in fact being executed through two modalities: an ad-hoc modality that is very close to the national execution for the majority of project activities; and regie modality for a limited number of project activities. The project efficiency has initially suffered from lack of clarity on the management responsibilities.
- The increased efficiency pace of RERD implementation in the last two years shows that regardless the execution modality chosen between partners, key to

efficiency is creation of a dedicated PMT, empowered with an adequate level of authority, decisional powers and autonomy to act on the project.

- Outputs delivery status against planned is lower than expected. This is mainly due to Component 2 failing to produce any useful output and numerous planning and re-planning exercises and procurement challenges that Component 1 underwent.
- Thanks to investments made under Component 1, the use of renewable energy based services has increased in the areas where the project has operated. However a challenge of funding the operation and maintenance of the newly built systems is now being faced. Considering the current level of applicable tariffs, the O&M of off-grid RE systems should benefit from the government subsidy mechanism in the same way as the national grid system does.

5 Recommendations

For the Steering Committee:

1. MIREME to ensure smooth coordination between EDM and FUNAE with respect to current and future investment plans and exchange of data and information. Additionally, facilitate the decisions regarding the responsibility for operation of the power generation facilities (hydro/solar power plants) constructed by FUNAE (through RERD or other funding), when the national grid has reached the concerned areas. If it s FUNAE to operate, facilitate agreements on the feed-in tariff to the main national grid.

2. MIREME to issue clear instructions to FUNAE concerning the tariff setting mechanism for users of off-grid electricity, possibly in line with those applicable to national grid users. Additionally, include FUNAE in the same subsidy mechanism as it is currently done for the main national grid in order to obtain funding for good operation and maintenance of off-grid energy systems.

3. Facilitate the decision for transferring to the Ministry of Health and Ministry of Education the facilities (individual solar systems) installed by RERD on benefit of their users in full respect of the agreements taken in the beginning of the project. Also discuss possible transfer of systems or maintenance funding with the Ministry of Public Administration.

4. Ensure implementation as soon as possible of the activity foreseen in the RERD Action Plan 2013-2015 for preparation of the “Institutional and Organizational Capacity Building Plan for FUNAE”

5. Ensure the implementation of activities planned in the Action Plan 2013-2015 concerning furthering private sector involvement, starting from the PPP Knowledge Building Workshop and build further on the recommendations of the Norway funded study on the private sector involvement with FUNAE.

For the partner institution, FUNAE:

6. In consideration of the strategic goals for access to energy, as set out by the government for the next ten years, prepare a comprehensive long term investment program and ensure that the core activity remains centered on projects development, financing and implementation as it is intended for a government development / fund managment agency

7. Give serious considerations to the need to initially transform the existing maintenance unit into an Operation and Maintenance Division, organised as a utlity operator that can work quite autonomously (managerially and financially) with a view to separation from the agency if/when the operations grow to a critical mass.

8. Prepare a rolling long-term O&M Plan, properly costed and ideally stretching over a 5-year period and presented to the Ministry for facilitating funding allocations on yearly basis.

9. Ensure installation of prepaid meters, specifically for mini-grids users, where costs can easily be absorbed, as to ensure a fair and reliable tariff collection system.

10. Further deepen the decentralisation process, particularly with regards to the maintenance activities and intervention decisions. A yearly maintenance plan and budget should be drawn up for each province in conjunction with the concerned Delegation and the funding is made available to the Delegation for use according to the approved plan without requiring prior authorisation for each intervention by the HQ. Additionally, establish procedures that facilitate and render more efficient the communication between central departments in FUNAE and their respective representatives at the delegation level, whilst also empowering technicians at the delegation level through providing access to important information such as contracts and project status data, as well as providing access to planning tools such as Renewable Energy Atlas.

11. Consider outsourcing of maintenance activities to qualified private sector contractors through performance based maintenance contracts to be monitored by head office with support of the Delegations.

12. Give priority to completing the establishment of the asset management sytem. In this respect, ensure that the necessary skills for feeding the GIS system are provided, including recording of coordinates and attributes. More importantly implement a systematic approach to data input onto a shared GIS database for both the planning and maintenance department. Focus on systems integration.

13. Ensure better financial planning of the agreed contributions to the projects financed by the development partners. Particularly ensure to plan and obtain on time funding required for VAT and other tax duties payable to third parties related to investments made by the development partners' projects.

For the Project Management Team:
(Given that the project is coming to an end, some of the recommendations are not necessarily applicable to the current team but are however useful for teams that may be involved in implementation of future similar projects)

14. Give more consideration to the appropriateness of technology to be implemented in a specific project. This should be strongly supported by a thorough needs assessment and feedback from future users with regards to their energy demands and financial capabilities. Project investments must be supported by comprehensive feasibility studies, not only techncial but also financial/economic feasibility, in addition to social and environmental impact assessments.

15. Should there be a project that demonstrates a potential for productive energy use, consider implementation of a hydro power system with an associated grid which can have a back-up from a solar power system.

16. Complete the testing phase of solar monitoring systems and assist the decision as to whether and what system to roll out. This should be supported by a cost/benefit analysis considering investment costs for monitoring systems vs. cost savings for maintenance, which should then be furtehr reflected by FUNAE in its long term O&M Plan.

17. Strengthen the gender and environmental considerations at planning phase of projects. Regarding environment, take into account the environmental sustainability of project activities that have the potential to cause environmental damage, especially inappropriate waste treatment systems. Generally, prioritise

development of hydro and solar power plants of a certain size and capacity as to ensure cost-effectiveness of the investment.

18. Evaluate the Research and Development initiative regarding remote solar monitoring systems, and acquiring a system that truly responds to FUNAE need, at the level required, whilst remaining cost effective with regards to investment cost, installation and maintenance.

19. Develop a “best practice” manual of solar installation

For the BTC HQ:

20. Given the available resources, consider further geographic concentration of project area in order to increase effectiveness of the actions and eventually the likelihood of making an impact on the socio-economic development of the selected areas.

21. Establish clearly known management modalities with the partner institution, without alterations of the standard ones. Avoid having a project ruled by more than one modality. This may lead to uneasy situations for people assigned with responsibility to decide on a modality, if the same people are involved in management or implementation of activities ruled by the other modality. In case of co-management, make sure to assign a Programme officer from BTC to be involved in the high level decisions of co-management with the representative of the partner and free up the TA team from any perceived conflict in which they may be seen as acting on behalf of one partner. The aim should be to have the TA members acting as a single body with the PM of the partner institution in a joint PMT responsible for daily project management and operational decisions. The Programme Officer from BTC should be acting as observer in the tendering sessions whereas the TA must rather be appointed as member of the tender appraisal committees in the spirit of the joint PMT.

22. Until/unless a thorough institutional and organisational assessment of FUNAE has not been completed resulting in a comprehensive Capacity Building Plan, complemented with an organizational and individual performance assessment framework (on results based management principles), avoid funding of additional capacity building / training actions as these would not prove to be effective. However, if CB projects / activities are to be used as a vehicle for funding the establishment or strengthening of structures for decentralised operations and maintenance activities, such CB activities can be considered ad interim until the Institutional development and Organisational Plan is available.

23. One of the best capacity building actions that a project like RERD can possibly offer to the partner institution is to help it build a sound and efficient project management system, according to the best international standards, in order to apply it across all projects that FUNAE plans to develop in the future.

6 Lessons learned

With respect to the sustainability of the investments, a lesson learned is to give due consideration to the partner country absorption capacity, both human and most importantly financial, before embarking on ambitious investment projects. Although the funding for investment projects may come as a grant, the infrastructures built under the development partners' projects, as any other infrastructure, leave the partner country with the obligation and the financial burden to operate and maintain it. At the formulation stage, it must be taken into account the partner country financial capacity to properly maintain the proposed new infrastructures as well as full life costing of investment projects must be made at the planning/feasibility stage in order to prove the financial feasibility of the investment before it is approved for funding.

Many public infrastructures are developed for social purposes or however have a social aspect, which limits the application of full cost recovery tariffs for users. The government may often have to intervene with (direct or indirect) subsidy schemes in order to sustain the operation and maintenance costs of the infrastructure. The result is that the more the investments done by development partners, the higher the need for government subsidy schemes. This leads to a paradox situation that needs to be duly resolved before further investment can be made.

Annexes

Annex 1 Evaluation Framework (Questions, assessment criteria and methodological approach)

The tables below provide, for each EQ:

- the rationale and scope of the question by the way of an explanatory comment;
- the link with the intervention logic and the evaluation criteria;
- the assessment criteria to be used for answering the EQ.

EQ 1	**To what extent the project intervention strategy is in line with the Mozambican government policies in the energy sector and takes into account the priority needs for rural development?**
EQ Label:	*Strategic Alignment*
Scope of the question	The scope of this question is to assess whether the project is in line with the strategy of the Government of Mozambique in the energy sector and in particular with the vision and strategic plans for development of renewable energies, with focus on rural areas, of both Government of Mozambique, Belgian Development Cooperation and other donors active in the sector. The merit of this question is also to verify whether the support provided by the project corresponds to the real needs of the beneficiaries in the rural areas and whether it is aligned to the priorities of the beneficiary groups. It aims to verify whether a quality needs assessment has been undertaken and whether interventions selected are consistent with the identified needs and have the potential to address them in both short and medium-longer term.
Link with Intervention Logic and evaluation criteria	This EQ relates to the **Relevance** evaluation criterion in so as it examines the link between the overall policy objectives, strategic plans and the overall project objective as well as the link between the overall and specific objectives and the results expected by the project.

Assessment Criteria	**Information source**
1.1 Response to the beneficiaries' problems, needs and priorities Is the intervention in tune with the problems, needs and priorities of beneficiaries? Is the intervention strategy an adequate answer to the needs and to the reality/living conditions of the beneficiaries? *1.2 Consistency with partner country priorities and policies* Is the development project for rural renewable energy relevant if considered that the traditional energy sector (high voltage) is highly subsidized by the State and is largely used for export? Can the national priorities and policies in the energy sector be adjusted to give better consideration to Renewable energies? *1.3 Complementarity with other interventions* Is the project consistent with an approach that promotes complementarity to relevant other actors working on the same subject?	• Indicative Cooperation Programme • Appreciation Report • PRSP • Government Strategy for the development of New and Renewable Energies • FUNAE (Strategic Pans • Interview Meetings

EQ 2	**Is the project (currently and in the view of possible future phases) structured in a way that can adequately address the energy needs of the target beneficiaries?**
EQ Label:	*Project Design and Structuring*
Scope of the question	Whilst the previous question assesses the overall coherence of the project with policy and strategic goals, the scope of this question is to assess the internal consistency of the project with the stated project objectives and expected results, its intervention logic in terms of consistency of different levels of objectives (if there isn't any contradiction), clarity of and feasibility of activities (if there isn't any duplications or any impediments). The question will provide an assessment of the robustness of the overall design of the project (including implementing structures and modalities) in terms of its capacity to deliver what was set to. It covers the degree of the stakeholder participation in the project design and their role in the implementation as to assure an adequate level of ownership. It will also look into the absorption and implementation capacity of partner institution. It will examine the project management and coordination arrangements, implementation strategy, the strategic options recommended for implementation and whether the nature of the problems originally identified have changed and the degree of flexibility and adaptability of the project structures to facilitate rapid responses to changes in circumstances.
Link with Intervention Logic and evaluation criteria	This EQ relates firstly to the **Relevance** evaluation criterion in so as it examines the consistency of the project design as well as the appropriateness of the implementation modalities in relation to the realities prevailing in the beneficiary country. It has also a bearing on the **Efficiency** evaluation criterion. According to a strict definition of efficiency, this looks at "how well the inputs were transformed into outputs", within a given project framework (project set-up, implementing structures and modalities, internal and external constraints posed by the environment where it operates, etc.). However, for the purpose of this EQ, a broader definition of efficiency will be taken in so as looking at how the choices originally made when design the project and carried out through the implementation have impacted on the implementation efficiency. The assessment is forward looking in the sense that it will be made considering possible future continuation of the development intervention in the sector.

Assessment Criteria	Information source
2.1 Appropriateness of the chosen technologies for provision of access to energy To what degree would there have been more appropriate technologies for improving the energy services of the rural Mozambican population (i.e. grid extension, individual solar systems for households; diesel generators; others)? *2.2 Project geographic boundaries* To what degree, a more geographically 'centralised' approach (less provinces, less districts) would have been beneficial/more effective? *2.3 Adequacy of the choice of the implementing partner institution* Can the choice of an energy investment fund (as FUNAE) offer the required framework for full life cycle management of a	• RERD TFF 2009 • RERD TFF Complement 2011 • FUNAE Strategic Plans • MTR Report • Interview Meetings • BTC-FUNAE correspondence • SC Minutes • Result Reports • Training Plans • Semi structured

project like RERD that, besides investments, requires maintenance, network management and ensuring accessibility to households? *2.4 Appropriateness of the current management and implementation modalities* To what degree are the management and implementing modalities of the RERD appropriate for achieving efficient and effective outcomes in the area of rural development through electrification? *2.5 Suitable Implementation arrangements between FUNAE and BTC for possible future activities* Why and how could the implementation arrangements between BTC and FUNAE be improved for future activities?[41] *2.6 Appropriateness of the selected Capacity Building tools* Are the type of trainings and tools provided efficient and effective to enhance the competencies and skills of the staff? Do post-graduate courses of staff contribute to a higher extent to better/ more sustainable performance of services (e.g. less qualified staff turnover) than short term courses? Would have there been more efficient means/tools?	Interviews • Focus Group Discussions

EQ 3	**Does the project have an adequate capacity as to ensure delivery as planned?**
EQ Label:	*Project Implementation*
Scope of the question	The aim of this question is to assess the outputs production rate and as to whether any changes during implementation have positively or adversely affected the overall project delivery. The question will cover implementation aspects such as: activity planning adequacy; activity management; procurement schedule; budget control; outputs production and reporting; quality and timeliness of outputs; internal performance monitoring mechanism; support and flexibility of project coordination mechanism; cost-effectiveness of project outputs, etc.
Link with Intervention Logic and evaluation criteria	This EQ relates to **Efficiency** evaluation criterion, as it assesses the link between the (quantity and quality of) inputs/resources provided to implement the activities and outputs delivered as well as the sound management of resources in terms of quantity, quality and timeliness.

Assessment Criteria	**Information source**
3.1 Quantity, Quality and Timeliness of delivered outputs Are all outputs delivered or likely to be delivered as scheduled and of required quality? In case of delays or substandard quality, have corrective measures been taken in timely fashion? *3.2 Cost-efficiency of the intervention* For producing the same level of outputs, were there alternative approaches that would have required fewer resources (without affecting the quality and quantity)? *3.3 Efficiency of execution modalities*	• RERD TFF 2009 • RERD TFF Complement 2011 • MTR Report • RERD *Action Plan. 2013-2015* • RERD Activity Plan 2015 • SC Minutes

[41] For instance, co-Management and/or regie depending upon the type of activity. This specifically applies to activities in results areas II and III: Private Sector Development and Capacity building - would it be more efficient to apply sort of Financial Agreements / grants?

Are the execution modalities fostering an efficient use of the means of the intervention? *3.4 Efficiency of the Project Management Systems* Extent to which the project management system and coordination mechanism have worked satisfactory? *3.5 Ability of the project monitoring system to capture capacity building changes* Do existing monitoring tools allow to sustainably and effectively measure impact and improvements in terms of capacity building? Are there better alternatives?	• Results Reports 2012, 2013, 2014 • MONOP 2015 • RERD *Operational Plan, Quarterly Execution Reports* • Value-For-Money Audit Report • Semi structured Interviews • Focus Group Discussions

EQ 4	**Has the project intervention been conducive to improving access to energy in rural areas**
EQ Label:	*"Access to energy" enhancement*
Scope of the question	This question will cover the extent to which the project interventions have, on one hand, brought about any changes/improvements regarding access to energy by the target beneficiary groups and, on the other hand, delivered benefits in terms of capacity enhancements to FUNAE. The question will consider not only the support provided so far but also the ability of the overall planned interventions to produce the intended effects by the end of the project and/or the period immediately after[42].
Link with Intervention Logic and evaluation criteria	This EQ relates to the **Effectiveness** evaluation criterion with specific focus put on the extent to which the development intervention is contributing to the generation of the expected results (i.e. resulting into increased access to energy by rural population, creation of a market of renewable energy products, increased service levels and service quality provide by FUNAE in rural areas).

Assessment Criteria	**Information source**
4.1 Increased access to renewable energy To what extent the rural households have increased access to renewable energy and products? Are all target groups using the energy or products provided by the project for the purpose these were intended to? Any factors that prevent the (proper) use? *4.2 Creation of a viable market for renewable energy products (supported by micro-finance mechanisms)* Why does not the private sector take off (and was not boosted by the result on the micro-credit of RERD)? *4.3 Improvements in planning and management capacity of FUNAE* To what degree have the investments (staff, software, hardware) in the GIS system contributed to better planning and management? *4.4 Better quality services delivered by FUNAE (thanks to*	• MONOP Report • Result Reports • Backstopping reports • Semi structured Interviews • Focus Group Discussions • FUNAE Activity Reports • Technical meeting reports

[42] If applicable, it will also consider if there has been any negative effects and how these were mitigated? Likewise, it will consider any unplanned positive effects and contributions of these positive effects to the results of the intervention.

capacity building provided by the project) To what degree has increased capacity building efforts led to higher quality of services / sustainable implementation of activities?	

EQ 5	**To what extent the renewable energy services developed with support of the project can durably contribute to provision of energy in the rural areas**
EQ Label:	*Energy services sustainability*
Scope of the question	This question will attempt to identify evidence that the energy generation capacities as well as human and institutional capacities being built by the development intervention can successfully and durably operate in their own environments. It will also verify whether such capacities have the ability to pursue and effectively contribute (though some changes require time for materializing) to achieving the overall goal of rural development in Mozambique. The question will make an assessment of the prospects for the sustainability of benefits in terms of ownership of project results and achievements, and in all cases where results have been achieved, it will be verified whether the achievements can be maintained without any further external support.
Link with Intervention Logic and evaluation criteria	This EQ firstly relates to the **Effectiveness** evaluation criterion as it assesses the efficacy of certain outcomes or structures / arrangements resulting from the development intervention. Additionally it considers the robustness of such structures / arrangements to sustain the positive outcomes of the project and as to whether the flow of benefits are likely to continue after intervention ends. Thus, it strongly relates **Sustainability** evaluation criterion in so as it examines the link between outcomes and the likelihood of long-term benefits.

Assessment Criteria	**Information source**
5.1 Appropriateness of the solar systems monitoring technologies To what degree are the chosen monitoring technologies for solar systems appropriate to enhancing sustainability? *5.2 Energy systems maintenance approach and practices* Within the current framework, would alternatives to the current maintenance approach be more appropriate? *5.3 Maintenance responsibility distribution/sharing* In terms of ownership and accountability, how can the distribution/sharing of responsibilities between the different administrative levels of beneficiaries and users be improved when it comes to maintenance and management of the installed renewable energy systems (hydro/solar)? *5.4 Local ownership* Do the partner institutions / local stakeholders possess sufficient ownership of the project outcomes and what is the likelihood of maintaining it after the end of the intervention?	• MONOP Report • Result Reports • Backstopping reports • Semi structured Interviews • Focus Group Discussions • FUNAE Activity Reports • Technical meeting reports

EQ 6	**To what extent has the development intervention contributed to rural development in selected areas of Mozambique**
EQ Label:	*Rural Development*

Scope of the question	This question aims at assessing whether the development intervention is contributing to social and economic development of population living in rural areas. It will assess whether the results being (or likely to be) produced by the project have the potential to contribute to achieving the rural development objectives as set out by the government strategy.
Link with Intervention Logic and evaluation criteria	This EQ relates to the **Impact** evaluation criterion in so as it examines the chain of effects triggered by the results produced by the development intervention in the longer term.

Assessment Criteria	Information source
6.1 Economic and social improvements thanks to provision of "energy service" equipment Has the flexibility shown by the project in providing "energy service" equipment contributed to creation of an enabling environment for rural development? *6.2 Overall economic and social development of rural areas* Is / will the intervention contribute to the partner countries objectives of rural development? *6.3 Unintended effects* Are / will there be unintended positive or negative effects of the intervention on the intended beneficiaries or on non-intended individuals and groups?	• Government Strategy for the development of New and Renewable Energies • FUNAE Strategic Plans • Results Reports • Semi structured Interviews • Focus Group Discussion

Transversal themes

The ToR provides a set of sub-criteria which transversal themes can be assessed. The Evaluation Team will consider in its analysis those relevant to the intervention and elaborate on lessons learnt if any.

Gender
1. Were practical and strategic gender interests adequately considered in the intervention strategy? And did gender receive substantial attention in the planning of the intervention? 2. Has gender been mainstreamed during the implementation? Are results being delivered in a gender-equitable manner as planned, and have adjustments been made in the case this was needed? Is data collected disaggregated by sex, and has action been taken to address inequalities and shortfalls? 3. Is capacity being built within the intervention structure and among stakeholders to ensure gender equality achievements can be maintained after the end of the intervention? 4. Is gender budget scan being effectively used?

Environment
1. Have environmental constraints and opportunities been considered adequately in the intervention strategy? Did environmental mainstreaming receive substantial attention in the planning of the intervention? 2. Are good environmental practices followed in the intervention ? Does the intervention respect traditional, successful environmental practices? 3. Has environmental damage been caused or likely be caused by the intervention? What kind of environmental impact mitigation measures have been taken? 4. Is the achievement of the intervention's results likely to generate increased pressure on fragile ecosystems and scarce natural resources?

Horizontal aspects

The ToR provide a set of sub-criteria which the hoorizontal aspects of the intervention can be assessed. The Evaluation Team will consider in its analysis those relevant to the intervention and elaborate on lessons learnt if any.

Results Oriented Steering
1. Is the intervention analysing it's progress towards the outcome and it's likely contribution to the impact level at least annually? 2. Is the intervention making use of the recommendations of Mid-term review (MTR), value for money audit and backstopping missions? 3. Is the intervention using progress information to report to the steering committee and to propose decisions needed to re-orient the intervention at strategic level, in case needed? 4. Is the steering committee steering the intervention on strategic level? 5. Is the intervention implementing decisions taken by the steering committee?

Monitoring
1. Is the baseline report complete and are monitoring data collected as foreseen? 2. Is the intervention results framework of good quality? Are the results levels clear and in harmony with MoRe Results guidelines? Is the outcome achievable at the end of the intervention? 3. Is the operational monitoring tool up to date? 4. Is the intervention regularly meeting with the RR on the progress of the intervention? Is reporting upwards done following the "management by exception" principle? 5. In case needed, has the results framework been adapted after the annual results reporting exercises? If this has been the case, does the report clearly sets out why modifications were needed? And do the minutes of the steering committee confirms the decision for modification? 6. Is the results framework reflecting the intervention strategy and is it able to measure the progress towards the results, as well as the results achievement on outcome level? And the achievement of the results at output level? Is there a need to change aspects of the results framework at this stage?

The Evaluation Team will pay special attention to the assessment sub-criterion concerning the use by RERD Project Management Team and other parties involved of the recommendations of Mid-term review (MTR), value for money audit and backstopping missions.

Annex 2 List of consulted documents and information sources

The list below includes a selection of the most important documents. The Evaluation Team benefitted from access to many work tools, templates and routine reports that the RERD project and/or FUNAE have put in use.

Indicative Cooperation Programme (PIC) between Belgium and Mozambique 2009-2012 and 2013-2017;

BTC (2011) *Appreciation Report bilateral cooperation between Belgium and Mozambique preparatory document for Joint Commission 2011*

Government of Mozambique (2006) *Poverty Reduction Strategy Paper (PRSP) of Mozambique 2006-2009*

Ministry of Energy (2010) *Strategy for the development of New and Renewable Energies of Government of Mozambique/Ministry of Energy, 2011-2025*

FUNAE (2007) *Strategic Plan 2008-2010 and 2010-2014*

BTC. (2009). *Renewable Energy for Rural Development*, Mozambique - *Technical and Financial File*

BTC. (2011). *Renewable Energy for Rural Development,* Mozambique - *Dutch Complement to the Initial Project*.

RERD. (2011). *Operational Planning Year 2011 (Q3) Execution Report*.

BTC. (2011). *Renewable Energy for Rural Development, Backstopping Report* 2011 and 2014

BTC; FUNAE. (2013). *Results Report 2012- Renewable Energy for Rural Development*. Mozambique.

BTC. (2013). *Baseline Report on Impact Assessment - Renewable Energy for Rural Development.* Mozambique.

BTC. (2013). *Mid-Term Review Report - Renewable Energy for Rural Development.* Mozambique.

BTC. (2013). *Renewable Energy for Rural Development* Mozambique*, Action Plan. 2013-2015*

FUNAE. (2014). *FUNAE proposed response to Recommendations in the Mid-Term Review report*. Mozambique.

MONOP (2013). Template and Users Guide for the Operational Monitoring Dashboard

MONOP (2015) Monitoring Results Tool, 2015 Q4

RERD. (2013). *Operational Planning Year 2013 (Q3) Execution Report*.

FUNAE. (2014). Plano de Actividades 2015.

BTC; FUNAE. (2014). *Results Report 2013- Renewable Energy for Rural Development*. Mozambique.

BTC. (2014). *Value-For-Money Audit Report - Renewable Energy for Rural Development. Mozambique.*

BTC; FUNAE. (2015). *Results Report 2014- Renewable Energy for Rural Development*. Mozambique.

FUNAE (2014, 2015) Activity Reports 2014 and 2015 (first semester)

BTC. (2015) CMO Addendum.

BTC. (2015). *Technical and Financial File Capacity Development of the Ministry of Mineral Resources and Energy and of the CNELEC*. Mozambique.

SC Meeting Minutes:
VII Steering Committee RERD Mozambique (0901811/1002211) 18/06/2013
VIII Steering Committee RERD Mozambique (0901811/1002211) 03/04/2014
IX Steering Committee RERD Mozambique (0901811/1002211) 12/06/2014
X Steering Committee (SC) RERD Mozambique (0901811/1002211) 15/12/2014

FUNAE Letter (2013). Estrutura e Gestão Financeira do Projecto RERD.

Annex 3 List of persons consulted and Meeting Notes

Meeting No.01

Venue: BTC Representation Maputo, 12 Nov 2015

Organization:	***Attendees:***
BTC Representation	Paul Van Impe – Resident Representative Matilde Pinamonti – M&E Specialist
RERD TA Team	Irene Novotny – Project (Co-)Manager / Socio-economic Expert Jan Cloin – Renewable Energy Expert Erik Van Malderen – Hydropower Expert
Evaluation Team	Ted Sheldia – Lead Evaluation Expert Ricardo Costa Pereira – Renewable Energy Expert Martha Silva – National Expert

Issues discussed:

1. One of the purposes of the End-term Review is "demonstrating accountability to the donor and partner (country)". Since the project is being implemented under the co-management modality, accountability of both parties responsible for the implementation (BTC and FUNAE) needs to be assessed.

2. Implementation arrangements:
   - BTC has to advance funding of VAT in relation to payments made to the contractors under the project because either FUNAE has not properly planned it in its yearly budget or the Ministry of Finance has not allocated it on time, or both. VAT related funds advanced from the project budget need to be refunded by FUNAE at some point. Government (Ministry of Foreign Affairs) has stated that the VAT issue has to be looked upon in any future project arrangements and that VAT payback will be required to be included in financial planning
   - FUNAE decentralization process: New CEO Director is looking at the various levels of FUNAE organization for delegation of powers, as appropriate
   - Appointment of a Project Manager (Director) by the partner institution for RERD project with a clear mandate has been vital. Likewise it is crucial that persons appointed to such a position for any project have the required level of qualifications and quality
   - Principle of subsidiarity should be applied to the decision-making in the project where decision responsibility is allocated to the lowest level possible capable of making a given decision, especially on operational matters.
   - Significant efforts have been made to establish institutional trust between BTC and partner institution.
   - TA Team has been assisting FUNAE on other matters related to the overall business or other projects, internal or donor funded. This assistance is provided as part of the CB component of RERD project (i.e. in the form of coaching and mentoring).
   - TA Team has been involved in facilitating FUNAE coordination with other donors, e.g. alignment of project activities with the WB project on solar power, creation of Energy Working Group.

3. Formulation of RERD Phase II project is ongoing. There is a need for concentration of donors active in renewable energy sector in Mozambique.

4. There is no sufficient clarity on the legal framework concerning private sector involvement in the energy sector, which is perceived as/ the first barrier for putting in place PPP arrangements and overall private sector development in the sector.

5. Funding of maintenance of the installed systems. Assess if the current set-up is viable / sustainable, both financially and in terms of ownership/accountability. A commercial approach to maintenance of installed systems could be a possible solution

6. An option could be contracting out the maintenance to the private sector. What does it take to create a critical mass in order to make a maintenance contract feasible. Rural population is located quite dispersedly across the territory. Concentration is needed in order to create enabling conditions for provision of public services (not only energy) in an efficient manner.

7. FUNAE would and should still play an important role in monitoring performance of maintenance contractor. Remote monitoring systems are vital for effectively playing the monitoring role. A register of end user (customers) is required / being developed including contact details.

8. The prospects for Private Sector involvement in RERD II. e.g. planning a pilot investment project of a reasonable size to enable a feasible PPP arrangement. To this end, FUNAE should envisage assigning a staff member with responsibility of promoting private sector participation in provision of renewable energy to rural populations.

9. Capacity Building

    - Creation of skilled labour force: technical schools, training of mid-level technicians, maintenance training, vocational training curriculum.
    - Strengthening of FUNAE human capacity: staff retention, working conditions, etc.
    - Strengthening FUNAE role as funds manager, i.e. streamlining of funds coming from the various financing sources and channeling to appropriate projects.
    - Planning and monitoring capacity.

10. With the end of the programme approaching in December 2016, the formulation of the next phase and transition has to be a smooth process.

Meeting No.02

Venue: BTC Representation Maputo, 12 Nov 2015

Organization:	***Attendees:***
RERD TA Team	Irene Novotny – Project (Co-)Manager / Socio-economic Expert Jan Cloin – Renewable Energy Expert Erik Van Malderen – Hydropower Expert
Evaluation Team	Ted Sheldia – Lead Evaluation Expert Ricardo Costa Pereira – Renewable Energy Expert Martha Silva – National Expert

Issues discussed:

1. Initially, RERD project did not make an independent Needs Assessment but based the project development and planning on the basis of overall FUNAE planning documents and other information provided by FUNAE, such as the priority list of sites with RE development potential. The assumption was that prior needs assessment made by the partner, FUNAE, which its overall planning documents were developed, were still valid, up-to-date, and corresponding to the local realities

2. Once implementation of certain activities started, notably procurement and commencement of works contracts, it was soon realized that situation on the ground on a number of sites had changed since FUNAE overall planning was made. A lot of efforts were required to adjust activity definition and planning while implementation was ongoing, with known consequences on rescheduling and at time delays.

3. In order to make a comprehensive project re-planning, TA Team together with FUNAE specialists undertook a Verification Mission in 2012 in order to adjust/update/validate the needs assessment. Example of this includes verification on whether conditions survey and security measures in the residence buildings selected for solar systems installation. A list of improvements was compiled. Given the time pressure (since some works contracts were awarded), it was impossible (time-wise) to make a detailed appraisal of the socio-economic aspects as well as financing aspects of maintenance. The original agreements and/or understanding with the line ministries (Heath, Education, etc.) on expectations and/or actions required by them were not re-assessed or questioned, on the trust that all actors will play the respective roles, when time comes.

4. The compilation of Energy Atlas with data on sites with RE development potential should help improving future FUNAE planning documents

5. There is a need for FUNAE to have a full inventory of existing solar installations on public buildings and most importantly, minigrids plus respective hydro and solar power plants made by different entities (e.g. donors, NGOs, etc.) as well as improvements/expansions made on existing installations of FUNAE. There is a serious issue of insufficient communication in an official form to FUNAE or Ministry of Energy by various entities making RE installations/upgrading on public/government buildings and/or developing energy systems/grids for the purpose of rendering a public service at rural community level. At the very least, such systems or installations need to be recorded by FUNAE for planning and monitoring purposes. This also poses the question of legal and administrative regularity of such systems although the legal and regulatory framework for RE development and operation currently seem to be a grey area.

6. With support of the TA team, FUNAE has put in place a Monitoring Check-list that feeds the database register, being used for the purpose of RERD project but also with application to all other projects and RE facilities currently maintained by FUNAE.

7. There is a need to further consolidate and streamline all existing databases that can turn into a comprehensive RE Assets Management and Monitoring System.

8. The information collected through the Monitoring checklist is also used by the TA team to update the Project Planning and Monitoring System, regularly. (A real time demonstration of the Project Planning and Monitoring System was done to the Evaluation Team)

9. When the EDM Grid has expanded to the areas where there are existing RE minigrids, these can always be used for back-up power and/or to feed the grid, if EDM finds it attractive cost-wise.

10. FUNAE Human Capacity. There is need to ensure staff retention especially after having been invested in training and skills upgrading. This is a particularly acute issue with young talented engineers (3-5 years of experience).

11. For all installations, site visit is carried out to establish a baseline and after 7 – 8 months later, a second visit is carried out to conduct and impact assessment, and the data collected is then inserted into a georeferenced database.

Meeting No.03

Venue: FUNAE Representation Maputo, 12 Nov 2015

Organization:	***Attendees:***
FUNAE	António Saide (CEO) Mario Batsana (RERD Project Manager)
RERD TA Team	Irene Novotny – Project (Co-)Manager / Socio-economic Expert
Evaluation Team	Ted Sheldia – Lead Evaluation Expert Ricardo Costa Pereira – Renewable Energy Expert Martha Silva – National Expert

Issues discussed:

1. The CEO of FUNAE Mr. Antonio Saide showed total availability to contribute to the ETR evaluation by putting at disposal all key staff to provide information to the evaluation team

2. Mr. Mario Batsana was appointed as communication focal point to interact to the evaluation team.

3. Meetings with the department representatives were arranged for the week after.

4. The CEO also showed availability to facilitate a meeting with the former CEO Miquelina Meneses.

5. As a result of the introductory meeting, another meeting with the CEO was scheduled to Wednesday 18th November at FUNAE facilities.

Meeting No.04

Venue: GIZ-Energizing Development (EnDev)-Office Maputo, 13 Nov 2015

Organization:	***Attendees:***
GIZ EnDev Project	Véronique Stolz – EnDev-Mozambique Programme Director
Evaluation Team	Ted Sheldia – Lead Evaluation Expert Ricardo Costa Pereira – Renewable Energy Expert Martha Silva – National Expert

Issues discussed:

1. GIZ is implementing a multi-donor funded program, covering 24 countries, called "Energizing Development Partnership (EnDev)" which objective is to facilitate sustainable access to modern energy services, i.e. access to off- and on-grid electricity and improved cook stoves.

2. Regarding grid-connected systems, EnDev supports grid densification in peri-urban areas in cooperation with the Mozambican public utility, EdM. The project targets poor households that cannot afford the connection fees.

3. Regarding off-grid connected systems, EnDev focus on micro hydropower and small solar systems. Lastly the programme also includes a component focusing on biomass energy, notably improved cooking technologies through introduction of more efficient and clean cook stoves.

   HYDROPOWER

4. 11 off-grid micro hydro sites financed and developed in the province of Manica, the set-up of 4 additional ones financed by the NGO Practical Action and 1 by FUNAE were supported by EnDev. The sites have a capacity of 20-30 KW each and the minigrids are managed by community based private operators.

5. The ownership of the sites is not formally and legally recognized. Attempting to clarify this with the Ministry and DIPREME, EnDev was told that the projects could be developed without the need to formalize the legal status because they – MIREME/DIPREME – were already informed. Whenever we suggested that a kind of concession system should be put in place, the MIREME never accepted it. We also made a proposal to the Ministry of the Environment, with knowledge of the MIREME, to simplify the legal environmental evaluation procedures for MHP, because they are very expensive for such small projects. They never replied back although we followed up the issue for about two years.

6. EnDev is operating in a fragile legal framework in the energy sector, prevailing in Mozambique. The legal ownership of the systems (power plant, minigrid, etc) needs to be looked upon at the end of the project.

7. Energy users payment: The tariff system is based on a flat tariff agreed on with the community that is collected by the assigned operator, with support of the community leaders (if required). There are obvious difficulties as not all the users are paying or have the capacity to pay. It appears that this tariff collection system has serious challenges with a view to sustainability of the operation. However, with the operators increasingly becoming aware of the need for payments to cover regular O&M costs, payments by users are lately being more enforced, with disconnection of users occurring. A prepaid system could be a better option, but

its feasibility and practicability in very small communities / grids need to be taken into account.

8. Maintenance is made by the operator and mainly financed by the collected tariffs. Furthermore an association of (11) operators has been created in order to set up a common maintenance fund which was fed by back-payments of 10% of the investment costs by the operators. This mutual fund is to be used as a solidarity fund in order to intervene in case of major investment needs for maintenance or other community-related projects.

9. A lesson learnt is that future projects should duly take into account during the site and grid planning the number and spreading of households in the project area in order to improve cost-efficiency and sustainability of the entire operation, including after-the-project period (maintenance). This may leave out implementation of projects in very small sites with widely spread households' locations.

10. Projects may have to focus on larger sites development in order to achieve a critical mass where there are economies of scale, existing or prospective production activities, metering installation is feasible, and include combined systems, because hydro alone cannot always guarantee continuity of services.

SOLAR

11. The EnDev works mainly with private sector partners, but also with NGO and educational institutions to develop the market for picoPV and Small Solar Home Systems (SHS). It support commercialization of small solar systems that comes from lanterns to small solar house systems. The programme does not directly subsidize product prices but helps the private sector overcome market entry barriers and reach out to rural communities.

12. Challenges include: scarcity of big vendors/importers, lack of consolidated distribution chain; lack of availability of quality, ready-made systems (i.e. systems that compose of all the components as opposed to having to assemble systems with a solar panel, battery, charge controller etc.)

13. EnDev focus is on supporting quality certified products that provide a 2-year warranty period, training / know-how support to rural retailors on marketing but also on transferring knowledge on correct use of the products, start-up funds for product stocks, etc. The programme has being developing a project with TOTAL, supporting the set-up of end-mile retail networks in rural areas which can get their stock from the TOTAL filling stations in the cities.

14. GIZ has a mechanism to support private sector firms by financing 50% of project costs provided the project objectives contribute to the companies as well as to broader developmental goals. In the solar component EnDev uses this tool to support private sector in distribution network development, marketing, training, etc. This is been done through Call for Proposals with respect to GIZ public procurement rules.

15. Regarding private investment in the sector, there are aspects like country/market size that significantly impacts on the transport costs, security issues, linguistic barriers for large foreign companies, high customs duties and procedures that negatively influence the investors' decision.

COOKSTOVES

16. EnDev is implementing projects to facilitate the access to more efficient (at least 40% better than baseline technology), clean and safe cookstoves. In order to achieve this objective EnDev facilitates the improvement of local production of stoves (helping on standardizing and production scale) as well as the import of industrial technologies – currently working with U.S and S.A based partners. Further to that distribution, awareness creation as well as the introduction of quality standards are being supported.

Meeting No.05

Venue: LIVANINGO/ FEDESMO Office Maputo, 13 Nov 2015

Organization:	***Attendees:***
LIVANINGO NGO / member of FEDESMO	Domingos Pangueia - Project Coordinator, Sustainable Energy and Climate Change Joana Nhassengo
Evaluation Team	Ted Sheldia – Lead Evaluation Expert Ricardo Costa Pereira – Renewable Energy Expert Martha Silva – National Expert

Issues discussed:

1. FEDESMO is energy and sustainable development forum based in Beira province, grouping together many NGO's active in the field of renewable and sustainable energies. A number of projects are being implemented in Gaza, Inhambane, Beira and Quelimane provinces.

2. The most notable challenges that NGO's face today is securing project financing. The level of communication and relations with government energy entities is also perceived as a barrier. There is also recognition of the challenges faced in coordinating efforts between various NGO's working within the same sector.

3. From experience, a lesson leant that may prove key for the success of a project is adoption of a social approach since the outset. Solidarity is essential for sustainability of a project in rural areas since often people do not have sufficient means to afford a product or service. It is important to look not only to the economic but also to the social impact that a project can make.

4. Regarding financing of energy products or systems in rural areas, one could also consider the existing internal community agreements, such as mutual lending schemes, which are presently used for many purposes by the rural communities.

Meeting No.06

Venue: FUNAE Maputo, 16 Nov 2015

Organization:	***Attendees:***
FUNAE	Edson Uamusse (Head of Studies and Planification Division) Filipe Mondlane (Studies and Planification Division)
Evaluation Team	Ted Sheldia – Lead Evaluation Expert Ricardo Costa Pereira – Renewable Energy Expert Martha Silva – National Expert

Issues discussed:

1. There are two approaches used in planning activities to select intervention points:
    - The list of places needing electricity received from other government entities;
    - The requests from local communities.
2. The department has access to ATLAS and other databases that uses to location selection based in aspects like access capacity, etc.
3. One of the challenges is the non-geographic actuation focusing in places with more population density.
4. Gender is one observed aspect when selecting locations for project implementation and is assessed trough a baseline study.
5. On the 7000 installed systems the users are supposed to pay the consumption, one of the solutions that can improve it is the installation of meters

Meeting No.07

Venue: FUNAE Maputo, 16 Nov 2015

Organization:	***Attendees:***
FUNAE	Jan Cloin (Research and Development)
Evaluation Team	Ted Sheldia – Lead Evaluation Expert Ricardo Costa Pereira – Renewable Energy Expert Martha Silva – National Expert

Issues discussed:

1. The project planned eight research and development activities.

2. Some pre-feasibility studies were developed in order to develop research and development activities.

3. One of them is the remote monitoring systems installation. The project is ongoing and aims to install a total of 600 remote monitoring devices. For the pilot phase 10 devices were installed; 100 will be installed at phase one and the other 500 at phase two according to the project response.

Meeting No.08

Venue: FUNAE Maputo, 17 Nov 2015

Organization:	***Attendees:***
FUNAE	Anacleto Fernandes (Maintenance coordinator)
Evaluation Team	Ted Sheldia – Lead Evaluation Expert Ricardo Costa Pereira – Renewable Energy Expert Martha Silva – National Expert

Issues discussed:

1. The main challenge of the maintenance department is to have 7000 systems that need both corrective and preventive maintenance, facing financing problems.
2. BTC has released funds to spare parts acquisition in order to improve both corrective and preventive maintenance. The fund released had not covered all the necessities but helped a lot.
3. For 2015 was scheduled repairing 600 systems and they are in 40% of the work. The criteria of systems maintenance is based in life span of system components. Two things that contributed to the not achievement of the objectives in 100% were the financial problems and the delay in the procurement process.
4. There's a maintenance strategy been developed by an external consultant.
5. There's a georeferenced database being created in coordination with GIS department.
6. The installation of remote monitoring systems is in progress and is a common sense that will help to reduce maintenance costs.

Meeting No.9

Venue: FUNAE Maputo, 17 Nov 2015

Organization:	***Attendees:***
FUNAE	Miquelina Meneses (Former CEO)
Evaluation Team	Ted Sheldia – Lead Evaluation Expert Ricardo Costa Pereira – Renewable Energy Expert Martha Silva – National Expert

During the meeting the following topics were discussed:

1. Electricity needs and strategies
2. Renewable energy market
3. Private partnerships:
    - Micro-finance
    - Investments
4. Capacity building of FUNAE
5. FUNAE development
6. Infrastructure system
7. FUNAE coordination with other government entities

Meeting No.10

Venue: FUNAE Maputo, 17 Nov 2015

Organization:	***Attendees:***
FUNAE	Mussa Mane (Head of Accounting and Finance Section)
Evaluation Team	Ted Sheldia – Lead Evaluation Expert Ricardo Costa Pereira – Renewable Energy Expert Martha Silva – National Expert

Issues discussed:

1. There is budget available to develop the project activities but there's a problem connected to the cash flow that tends to be late.
2. In 2012 were contracted companies to carry out maintenance but were financing problems with cash flow and most of the companies had quit.
3. In 2015 FUNAE decided to do maintenance and a plan was approved to that.
4. Current FUNAE funding is enough to carry out running and maintenance operations, but not to develop new projects.
5. Regarding the VAT aspect FUNAE will return the amount to BTC until March 2016.
6. For next activities there's an agreement between Ministry of Mineral Resources and Energy and Ministry of finance, to ensure budget for VAT.
7. There are challenges as improving planning with all technical departments and also with Government.

Meeting No.11

Venue: FUNAE Maputo, 17 Nov 2015

Organization:	***Attendees:***
FUNAE	Anabela Nhantsave (Gender Unit Coordinator)
Evaluation Team	Ted Sheldia – Lead Evaluation Expert Ricardo Costa Pereira – Renewable Energy Expert Martha Silva – National Expert

Issues discussed:

1. FUNAE has a multidisciplinary team called “Gender Unit” responsible to develop gender activities. The multidisciplinary team is composed by one coordinator and representatives of technical departments.
2. The first actions of the Gender Unit consisted in top management awareness on the necessity to incorporate gender activities in FUNAE projects.
3. The Gender Unit has been supported by a Norwegian fund and the first activities were developed during 2013-2014; an evaluation phase will take place this year.
4. No specific funds of BTC RERD project were allocated to that team but the project was covered by the general activities of the Gender Unit.
5. Regarding RERD project technical departments were auscultated in order to identify ways to develop gender activities but it was not carried out specific project activities. In 2016 they plan to identify and benefit more girls/women and improve gender equality.

Meeting No.12

Venue: MIREME Maputo, 17 Nov 2015

Organization:	***Attendees:***
Ministry of Mineral Resources and Energy	Eugénio Guilaze Simbine (Director of Planning and Cooperation)
FUNAE / RERD Team	Irene Novotny – Project (Co-)Manager / Socio-economic Expert Mario Batsana (Project Manager)
Evaluation Team	Ted Sheldia – Lead Evaluation Expert Ricardo Costa Pereira – Renewable Energy Expert Martha Silva – National Expert

During the meeting the following topics were discussed:

1. Challenges of Energy sector; Need for further sector wise integration of energy policies and plans

2. Country potential, production and energy consumption;

3. Solar systems expansion and quality; Perception that solar energy is expensive compared to other sources is changing. However combined systems should be favored in order to provide access to electricity on a continuous basis.

4. If people can't have electricity at home, and on continuous basis, the change that electricity can bring about in people's lives is not sustainable and the likelihood of impact is low. From electrification of public infrastructures, the aim is to bring electricity to all communities /households.

5. Public - Private partnerships;

6. EDM and FUNAE coordination;

7. Regulatory framework;

8. FUNAE current capacity: Need to focus on developing and installing new systems and expanding the off-grid energy provision. The O&M challenge that FUNAE will be facing is noted.

Meeting No.13

Venue: FUNAE Maputo, 18 Nov 2015

Organization:	***Attendees:***
FUNAE	Antonio Saide (CEO)
RERD Team	Irene Novotny – Project (Co-)Manager / Socio-economic Expert Jan Cloin – Renewable Energy Expert Erik Van Malderen – Hydropower Expert
Evaluation Team	Ted Sheldia – Lead Evaluation Expert Ricardo Costa Pereira – Renewable Energy Expert Martha Silva – National Expert
Formulation Team	Frederik van Herzeele – formulation manager RERD II investment programme Gülten Aka – formulation manager Capacity Building FUNAE)

Issues discussed:

1. Private partnership, sustainability and capacity building were the main points of discussion.

2. There's a need to find ways to involve private sector in renewable energy marketing. The use of local resources to promote private sector should be considered.

3. Is important to link investment with capacity building to improve projects sustainability. FUNAE needs to have people able to deliver innovative solutions to respond projects daily difficulties. Capacity building should be looked not only as training activities but also as a way to improve staff personal capacities. Involving community resources in capacity building activities is an aspect to consider.

4. From the beginning to now installed systems are making a huge positive impact in communities, one example is the water pumping that is facing a high demand.

5. At the moment maintenance is one of the most important issues, is important to find solutions to improve maintenance response.

6. Is also important to align activities with government and improve the regulatory framework regarding grid and non-grid sectors.

7. For future projects a more balanced approach of investment areas should be implemented.

Meeting No.14

Venue: FUNAE Maputo, 18 Nov 2015

Organization:	***Attendees:***
FUNAE	Jornal Rodriges (Solar and wind division) Jorge Muchanga (Solar and wind division)
Evaluation Team	Ricardo Costa Pereira – Renewable Energy Expert

Issues discussed:

2. Outlook on the RERD Project:

- Overall positive evaluation of the project and its achievement
- For the Solar department a perception of 93% of the objectives achieved (255 systems installed)
- Manica 8 out of 10 planned water pump systems have been installed
- Wind – study on wind potential commissioned, preliminary results demonstrated positive evaluation
- Due to reallocation of funds, some projects have been commissioned , design but not implemented

3. Modalities/Procurement

- The requirement to acquire “No objection” is a process take can take significant amount of time, specifically with regards to the formal communication e.g. letters. The co-management modality and the fact that the TAs are present within the department have facilitated this process in preempting the necessary steps should the outcome be positive or negative

4. Maintenance

- The installation of the pilot project for remote monitoring units is divided into 2 phase (phase 1 – installing of 100 units; phase 2 – installing 500 units); however a pilot phase has been put in place where 10 systems have been installed.

- The remote monitoring system are regarded as a benefit for reduction of response time to malfunctioning systems, as well as the increase of quality and control of the systems.

5. Required Improvements

- Administrative:
  - The procurement process for approval of projects is seen as a bureaucratic process which could be simplified
- Social Impact:
  - The impact of the project in schools is regarded as not being significant as evening classes are not taking place in the majority of the electrified schools.
- Shift in focus:
  - A shift from individual systems to mini-grid systems is regarded as more sustainable to the project; however the implementation of pre-paid systems is seen as a crucial component.

- Capacity Building :
    - There is a need to train technicians on two important aspects, these being technical aspects of new technologies that will allow the technicians to better design and implement new projects, and project management training that will allow technicians to properly manage the projects they are responsible.

Meeting No.15

Venue: Norwegian Embassy Maputo, 18 Nov 2015

Organization:	***Attendees:***
Norwegian Embassy	Camilla Fossberg (counsellor)
Evaluation Team	Ted Sheldia – Lead Evaluation Expert Ricardo Costa Pereira – Renewable Energy Expert Martha Silva – National Expert
Formulation Team	Frederik van Herzeele – Formulation Manager RERD II Investment Programme Gülten Aka – Formulation Manager Capacity Building for FUNAE

During the meeting the following topics were discussed:

8. Renewable energy sector in Mozambique

9. Norwegian Embassy experience and projects on renewable energy in Mozambique

10. Energy working sector group

11. Norwegian Embassy and FUNAE collaboration in renewable energy sector:

    - Strategy for the Involvement of the Private Sector in Electrification Rural and Access to Renewable Energy in Mozambique)
    - Maintenance plan development for solar panels

12. Private sector involvement in renewable energy market

13. Capacity Building: MIREME and FUNAE

14. Community approach in the develop renewable energy projects

Meeting No.16

Venue: FUNAE Maputo, 19 Nov 2015

Organization:	***Attendees:***
FUNAE	Herminio Massinge (Solar and Wind division)
TA	Jan Cloin
Evaluation Team	Ricardo Costa Pereira – Renewable Energy Expert

Issues discussed:

1. Monitoring Systems:

- Currently there are three monitoring systems running in parallel, described below:

2. Victorn Energy:

- Implemented in Manica and Zambeze, in 4 solar systems currently installed
- It provides a better understanding of demand of usesrs, as it its vert comprehensive system

3. Belgian Campus:

- Custom made system designed in conjunction with the Technical University in South Africa
- 4 systems currently being monitored in the province of Inhambane
- Low cost systems estimated at ($100 per unit); however real cost has proved to be higher ($300 per unit)
- Development of monitoring system, included in Research and Development component of the project
- Second batch of systems (10 in total) to be installted, where the project will only be charged for hardware costs. No labour costs as the university regards this as training.
- Can become an integral part of EMS.

4. EMS : Supplier in Portugal

- Technology intensive – high quality
- Sorted by province or clusters
- Custom made interface, where analysis of system data can be carried out and any incident with the system can be detected.
- Maintenance package of the system is integrated
- Includes alarms for both theft and low voltage of the system
- Upgrade of the system may be required
- Procurement of the monitoring systems unit may prove a challenge in the future due to its complexity

Overall Conclusions:

- Value for money for the first 100 systems is acceptable, however the additional 500 systems would not be
- Focused training would be required for technicians to properly operate the monitoring systems

- General agreement that the cost benefit of the remote monitoring systems exist, due to improved response time and reduction of travelling costs, however the appropriate technology still needs to be identified.
- Future aspiration to have a control room, where monitored systems are monitored on continuous bases and operators can identify required intervention immediately.

Meeting No.17

Venue: FUNAE Maputo, 20 Nov 2015

Organization:	***Attendees:***
FUNAE	Abel Boane (Hydro division)
Evaluation Team	Ricardo Costa Pereira – Renewable Energy Expert

Issues discussed:

Outlook on the RERD Project:

- RERD project has financed two projects. Muhoa (100 kw) and Sembesia (62 kw)
- Third study has been done Nitulo (108kw), however the procurement phase could not be completed as there was an increase in contract price and budget was not sufficient.
- The project also finances the extension of the grid for a third project , Majaua (595 kw);
- TA of the project has provided a training on job and transfer of knowledge e.g. Concept of EPC and therefore allow FUNAE to go from pre-feasibility stage to procurement.

Project Milestones

- Studies to identify potential have been carried out, and 20 – 25 potential site have been identified.
- The process for identification of potential sites begins with the identification of the site through the use of Atlas for resource potential, and demand through GIS database.
- Pre-fesability study is then conducted by consulting company , where the identification criteria is validated and recommendations are made
- Fesiabilility study is followed , also by consulting company, where the design of the hydro plant should be included
- From feasibility study, FUNAE can go directly to procurement of construction of the site.
- Of the 20 – 25 identified potential sites, 5 studies have been completed (pre-fesability and feasiability studies)

Maintenance

- Currently as projects are still to be finalized, there will be under the contractor guarantee for 2 years, however once those 2 years have been completed it is envisaged that the Maintenance department will have to ensure maintence of the systems.

FUNAE:

- All projects undergo an environemtnal impact assessment study, which is carried out by FUNAE. The EIA study has a environmental management plan that is included in the EPC contract, and that contractors must ensure to maintain.
- Quality Control and Environment department is responsible for environmental monitoring of the projects

Tariff Collection:

- Currently, no hydro project is charging tariffs for consumption. The aim is to charge a flat fee rate. However the introduction of pre-paid meters would improve the operation of the system as it would ensure that payments are made according to consumption.

Meeting No.18

Venue: FUNAE Maputo, 20 Nov 2015

Organization:	***Attendees:***
Ministry of Health	Sergio Mate (Maintenance Engineer from National Directorate of Technical Assistance)
Ministry of Education	Arq. Filipe Samuel Munhena (National Directorate of Infrastructure and School Equipment)
Evaluation Team	Ricardo Costa Pereira – Renewable Energy Expert

Issues discussed:

Outlook on the RERD Project:

- Education has been involved with RERD project for the last 3 years (2012)

Obstacles

- Education has been involved with RERD project for the last 3 years (2012)
- There is illegal commerce of solar panels in Niassa province, and here schools have been vandalized and panels have been stolen.
- Architectural project of primary schools being altered to include a battery room, and solar panels cost to be included in the overall construction cost of the school.

Ministry of Health

- Only work with solar energy
- Each provincial directorate of health has a maintenance department,
- Communication with FUNAE and Ministry of Health was continuous until 2 years ago, where even trips where organized between the institution and technicians would travel together with FUNAE team. This communication and coordination has now stopped.
- Ministry of Health has contracted Afritool to carry out all maintenance work on the systems on health centers.

Maintenance:

- Understanding from the beginning of FUNAE is that once the systems are installed they belong to the Ministries and they must look after maintenance.
- Ministry of Health and Education both have budget lines for maintenance and have signed contract with company, Afritool to carry out all maintenance work on the systems on health centers.
- Ministry of Health at provincial level has technicians that are capable of installing, maintaining and supervise installation of systems

Improvements

- To include the houses of nurses living close to the health centers and teachers living close to the schools is seen as necessary improvements to the project.

- The involvement of the community in the areas where the installation of systems are more required is seen as a flaw in the project, which leads to community discontent and eventual vandalizing.
- Migration from individual systems to centralized systems with higher production capacity is seeing as required improvement.

Financial Sustainability

- Currently, both school and health infrastructure does not collect tariffs, as this is seen as a public service. The cost of maintenance for the systems is already included in the budget of the Ministries which has enabled them to contract a company to service the systems.
- The Ministry of Education is thinking on a collaborative approach between the Schools where the systems are installed, Technical schools where RE technicians are trained and FUNAE, whereby the installation of the systems could be done by FUNAE, but the maintenance would be done by RE technicians as a learning exercise.

Meeting No. 19

Venue: FUNAE Manica, 23 Nov 2015

Organization:	***Attendees:***
FUNAE Manica	Jose Quelhas (Delegate)
FUNAE Maputo	Jorge Muchanga (Solar and Wind Division)
RERD Team	Irene Novotny – Project (Co-)Manager / Socio-economic Expert Jan Cloin – Renewable Energy Expert Erik Van Malderen – Hydropower Expert
Evaluation Team	Ted Sheldia – Lead Evaluation Expert Ricardo Costa Pereira – Renewable Energy Expert Martha Silva – National Expert
Formulation Team	Frederik van Herzeele – Formulation manager RERD II Investment Programme Gülten Aka – Formulation manager Capacity Building for FUNAE Patrick Levaux – Operation Advisor, BTC Headquarter

Issues discussed:

1. FUNAEs delegation in Manica is working in own installations since 1st June 2011, before that was implementing actions through the Provincial Department of Energy of Mozambican Energy Ministry. From 2008 solar systems were being installed by FUNAE and several hydro and solar feasibility studies were developed.

2. FUNAEs delegation was created to follow up province ongoing projects identify and develop new renewable energy projects. The delegation activities are developed apart from FUNAE specific goals according to Government objectives. For planning FUNAE proposes activities for the Ministry and the Ministry proposes them to the parliament for approval.
   Every year a Social and Economic Plan (PES) is provided by the government. The PES contains Government electrification goals used as a guide to FUNAE activities/projects.

3. The delegation has no specific structure. The team is composed of one delegate that works with a technical team. Delegation departments set is composed by:

   a. Solar, hydro and biomass department;
   b. PACs department;
   c. Maintenance department; and
   d. Administrative department.

4. Maintenance team is responsible to support emergency situations, routine maintenance and installation of new projects. Spare parts (modules, inverters and batteries) used in maintenance are acquired from FUNAE solar panel factory, that acquires from external suppliers.
   The maintenance team is actually facing financial and human resources difficulties which limits their response capacity in 20%. Is to note that FUNAE has under maintenance team responsibility more than 80 schools and 50 health centers to maintain.

5. Capacity building is an important aspect to consider in order improving FUNAE performance. Maintenance area is a priority.

6. The procurement process is developed by FUNAE in Maputo with involvement of Manica's FUNAE delegation in all process phases. A project manager based in Maputo is responsible to conduct the call of proposals. Site visits and coordination with local authorities is developed by FUNAEs delegation.

7. Energy payment by consumers is a critical point. To improve payments installation of pre-paid meters seems to be the better solution to apply. An estimate of 500 pre-paid meters will be needed.

8. Is important to note that Manica's FUNAE delegation has a strict relationship with communities and local authorities and under the projects several community management committees were created. For all projects, community auscultation and public participations were developed.

Meeting No. 20

Venue: European Union Maputo, 20 Nov 2015

Organization:	***Attendees:***
European Union	Jesus Galivan Marin (Programme Officer – Civil Infrastructure Sector)
Evaluation Team	Ted Sheldia – Lead Evaluation Expert Martha Silva – National Expert

Issues discussed:

1. In the last years EU was more focused in infrastructure, transport and water sectors. Regarding energy sector, E.U were accompanying projects from the ACP energy facility that provided grants for EDM and FUNAE for various projects in a total of 20 million and 3.5 million € respectively.

2. EU has developed three projects with EDM and two with FUNAE. Has also supported NGOs has ADPP for solar lanterns distribution and solar panel for health centers electrification.

3. Now EU is looking to the energy sector more broadly and is identifying future energy programs to support from 2015-2020. The main objective is to provide rural development and electrification to improve connected services such agriculture.

EU is now working with partners to identify how to act in the sector, supporting both EDM and FUNAE. First thoughts are that EDM can be supported in generation and transmission projects; and FUNAE can be supported in the development of rural areas with non-grid systems.

EU is considering acting geographically more concentrated and Nampula and Zambezia are the candidate provinces.

Is also considering projects in order to improve institution capacity of the Ministry to improve energy sector legal framework and attract investment.

4. The collaboration with FUNAE started in 2010 with two projects, one for provision of solar panels for school and health center electrification, and other for Majaua hydro power plant construction.

5. U.E gave a grant for Majaua HPP development. Bureaucracies connected to the procurement rules delayed the project implementation and linked to another factors as inflation, resulted in financial gap.
Due to that financial gap, cooperation between U.E and BTC started, and BTC fulfilled the financial gap regarding project completion.

6. WB is developing a policy note – “Design of Rural Electrification Masterplan for Mozambique”, that is thought that will help the energy sector and coordinate effort between institutions working in the sector.

Annex 4 Comparative Analysis of TFF 2009 and amendments of 2011

The table below includes a comparative assessment of TFF 2009 and amendments made in the complement to TFF in 2011, highlighting the most significant changes between the original and amended formulation documents.

Original TFF 2009	Amended TFF 2011
(High level) Decision making / Approval powers	
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 the Chief Executive Officer (CEO) of FUNAE, responsible for authorising expenditures on the Belgian Contribution. The BTC Resident Representative in Mozambique is responsible, as Authorizing Officer, for approving the expenditures chargeable to the Belgian contribution of the budget of the Project.	The Specific Agreement specifies that the Mozambican party designates: The Chief Executive Officer (CEO) of FUNAE, as the Authorising Officer responsible for approving expenditure chargable to the budget 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.
Comment: The provisions seem apparently the same but there is a fundamental aspect that affects the spirit of partnership, which the co-management is supposed to be based on. In the first case, both partners are involved in the decision-making. In the second case only one partner makes decisions whilst the other seem to be assuming a monitoring role, where at best, it can object the decisions but is not supposed (or expected) to be involved in making the decision, (as to the substance or content of it). The logical result of this change is that the project is managed by one party and there is little room for using the term 'co-management' that appears, to say the least, "confusing".	
Project Management Team	
The human resources of the Project will comprise: A Project Management Team (PMT) formed by the Project director and the Technical Advisor* and a project accountant and administrative assistant…	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.
Comment: There is none listed in item 4.1 of the TFF 2011. One can reasonably assume that the item is wrongly referenced and look at item 3.1, or rather 3.2. Human Resources.	
Human Resources	
The technical and financial follow-up of the project activities will be carried out by the project management Team (PMT). The Belgian contribution will finance two international Technical Assistants (TA) and a Local and Administrative Accountant assigned to the project. … FUNAE commits itself to put any extra human resources needed for the proper execution of the program at the disposal of the project direction, and if necessary recruit new human resources for the program (in coordination with the TA), at	As for the initial project, the main part of human resources implementing the project is supplied (and financed) by FUNAE. Among them are the people in FUNAE headquarters in Maputo and in the delegations/ representation offices in the provinces. The project will directly finance 4 people : - one accountant and administrative officer, dedicated to the project - one socio-economic expert (international TA) under the capacity building component

<table>
<tr><td>their own expense.</td><td>- two energy experts (international TA) under the capacity building component</td></tr>
<tr><td colspan="2">Comment: TFF 2009 well defines the role and the composition of the PMT as well as the requirements for other resources to be made available on needs be basis (by BTC) or put at disposal of the PMT (by FUNAE. This perfectly aligns with the spirit of partnership for project delivery (where partners put resources in common) as well as the principles of co-management.
TFF 2011 gives the impression that the project is to be staffed by resources of one partner, which additionally uses the project funds to recruit a number of other staff, including international TA's to advise and/or assist during the project implementation. There is no clarity on the composition of the PMT, especially on those sections of TFF 2011 specifically dedicated to the PMT or HR.</td></tr>
<tr><td colspan="2">Financial Management</td></tr>
<tr><td>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 of the programme…
The main project account …. shall operate by dual signature of both the Project Authorising Officer (CEO of FUNAE) and Co-Authorising Officer (BTC representative).
A second account operating on dual signature of the Project director (Director of the "Divisão de Estudos e Planificação") and the Project co-director (the international technical assistant)
(TFF also includes a table specifying the financial thresholds which delegation of powers (signature) is to be given to each concerned member, including PD and co-PD)</td><td>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,
The main project account …. 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 …
For payments from the above accounts BTC will have to give a no-objection.</td></tr>
<tr><td colspan="2">Comment: The above reinforces the comments made on decision making / approval powers including financial decision powers being assigned to one partner only, where the other partner can at best object but is not expected to assume an active role in making a financial decision as the co-management principles would logically require. Furthermore, the way that it is put, where one partner will have to give a no-objection, is not correct. From a legal standpoint, this seems precluding the eventuality for the partner to object a decision made by the other partner.
Most importantly, TFF 2011 provides for no delegation of financial powers to any other member, including those assumed to be responsible for the project management.[43]</td></tr>
</table>

[43] It must be noted that a provision of TFF 2009 under the section 'Financial Management" is kept on through the TFF 2011, as follows: "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." Nevertheless, in the light of changes made in the section dedicated to the "Project Management Team" and absence of delegation of any (financial) powers to the concerned members (PD and co-PD), it can be concluded that this provision cannot have any practical application. In fact, this provision assigns "responsibility" without giving to people any "authority", i.e. power to act. It is well known in the project management literature that no one can be held responsible for a result, if not vested with an adequate authority (including means) to enable him/her achieve the intended result.

In the light of the above analysis, it can be concluded that the project legal and administrative framework (as amended in 2011) provides little room for co-management.

Annex 5 Synthetic presentation used for the workshop debriefing

Annex 6 Terms of References