



**RESULTS REPORT**

**2022**

**RENEWABLE ENERGY FOR RURAL  
DEVELOPMENT PHASE 2 - RERD2(+)**



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## Acronyms

AFD	French Development Agency ( <i>Agence Française de Développement</i> )
ANAMM	National Association of Municipalities of Mozambique ( <i>Associação Nacional dos Municípios de Moçambique</i> )
ARENE	National Energy Regulatory Authority ( <i>Autoridade Reguladora Nacional da Energia</i> )
BCI	Bank of Commerce and Industry ( <i>Banco de Comercio e Industria</i> )
BRILHO	Bringing Energy to Off-Grid Households and Businesses in Mozambique (FCDO funded project implemented by SNV)
CB	Capacity Building
CBMIREME	Capacity Building Ministry of Mineral Resources and Energy
CEO	Chief Executive Officer
CNELEC	National Electricity Council ( <i>Conselho Nacional de Electricidade</i> )
COP	Conference of the Parties - UN Climate Change Conference
DEP	Research and Planning Division ( <i>Divisão de Estudos e Planificação</i> )
DMH	Mini-Hydro Division ( <i>Divisão de Mini-Hidricas</i> )
DPAP	Provincial Directorate of Agriculture and Fisheries ( <i>Direcção Provincial de Agricultura e Pescas</i> )
DPCA	Provincial Directorate for the Coordination of Environmental Action ( <i>Direcção Provincial para a Coordenação da Acção Ambiental</i> )
DPREME	Provincial Directorate of the Ministry of Mineral Resources and Energy
DSO	Distribution System Operator
DSSE	Solar and Wind Systems Division ( <i>Divisão de Sistemas Solares e Eolicos</i> )
DUAT	Right to Use and Benefit from the Land ( <i>Direito do Uso e Aproveitamento da Terra</i> )
EDM	Mozambican Power Company ( <i>Electricidade de Moçambique</i> )
Enabel	The Belgian development agency
ENE	The National Electrification Strategy
EPC	Engineering, Procurement and Construction
ESWG	Energy Sector Working Group

EU	European Union
EUR	Euro
FAT	Factory Acceptance Test
FCDO	Foreign, Common Wealth and Development Office of the United Kingdom (ex-DFID)
FNDS	National Fund for Sustainable Development ( <i>Fundo Nacional de Desenvolvimento Sustentavel</i> )
FUNAE	National Energy Fund ( <i>Fundo de Energia</i> )
GCF	Green Climate Fund
GET.fit	KfW funded direct support programme facilitating private investments in renewable energy projects.
GHG	Greenhouse Gas
GIS	Geographical Information System
GIZ	German Agency for International Cooperation (GIZ) GmbH ( <i>Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH</i> )
GSSA	Office of Social and Environmental Safeguards ( <i>Gabinete de Salvaguardas Sociais e Ambientais</i> )
HCB	Cahora Bassa Hydro Power Plant ( <i>Hidroeléctrica de Cahora Bassa</i> )
HQ	Headquarters
HR	Human Resources
IM	Intervention Manager
IMU	Intervention Management Unit
INIR	National Institute of Irrigation ( <i>Instituto Nacional de Irrigação</i> )
IPP	Independent Power Producer
IT	Information Technology
ITA	International Technical Assistant
JE	Junior Expert
KfW	German state-owned investment and development bank ( <i>Kreditanstalt für Wiederaufbau</i> )
LCEO	Levelized cost of energy

MADER	Ministry of Agriculture and Rural Development ( <i>Ministerio de Agricultura e Desenvolvimento Rural</i> )
MDG	Millennium Development Goals
MEF	Ministry of Economy and Finance ( <i>Ministerio de Economia e Finanças</i> )
MGCAS	Ministry of Gender, Children and Social Action ( <i>Ministério do Género, Criança e Acção Social</i> )
MIC	Ministry of Industry and Commerce ( <i>Ministerio de Industria e Comercio</i> )
MIREME	Ministry of Mineral Resources and Energy ( <i>Ministério dos Recursos Minerais e Energia</i> )
MO	Market Operator
MONOP	Operational Monitoring report of the Country
MOPRH	Ministry of Public Works, Housing and Water Resources ( <i>Ministério das Obras Públicas, Habitação e Recursos Hídricos</i> )
MRV	Measurement, Reporting and Verification
MTA	Ministry of Land and Environment ( <i>Ministerio da Terra e Ambiente</i> )
MTR	Midterm Review
MV	Medium Voltage
MW	Megawatt
M&E	Monitoring and Evaluation
n/a	not available
NAMA (facility)	Nationally Appropriate Mitigation Actions <sup>1</sup>
NDA	National Designated Authority
NGO	Non-governmental organization
NRECA	National Rural Electric Cooperative Association (USA)
NSO	NAMA Support Organisation <sup>2</sup>
PAYG	Pay-As-You-Go systems
PROLER	Renewable Energy Auctions Programme ( <i>Programa de leilões de energias renováveis</i> )

<sup>1</sup> Concrete measures to achieve the objectives of Nationally Determined Contributions (NDCs) that were adopted through the Paris Agreement at COP21 in December 2015

<sup>2</sup> NSOs are responsible and accountable for the proper delivery of funds and/or services, the financial and administrative management of the NAMA Support Project (NSP)

PPP	Public Private Partnership
PSI	Provincial Services of Infrastructure (previously DPREME)
PV	(Solar) Photovoltaic
RE	Renewable Energy
RES	Renewable Energy Sources
RERD1	Renewable Energy for Rural Development Phase 1
RERD2	Renewable Energy for Rural Development Phase 2
SA	Specific Agreement
SC	Steering Committee
SDPI	District Service of Planning and Infrastructure ( <i>Serviço Distrital de Planeamento e Infra-Estrutura</i> )
SE4All	Sustainable Energy for All
SNV	Netherlands Development Organisation
SPA	Provincial Environment Service ( <i>Serviço Provincial de Ambiente</i> )
RR	Resident Representative
TA	Technical Assistant
TFF	Technical and Financial File (=Project Document)
ToR	Terms of reference
TSO	Transmission System Operator
UGEA	Unidade Gestora Executora De Aquisições ( <i>Procurement Executing Unit</i> )
UM (O&M)	Operations and Maintenance Unit ( <i>Unidade de Manutenção</i> )
VAT	Value Added Tax

# 1 Intervention at a glance (max. 2 pages)

## 1.1 Intervention form

Intervention title	Renewable Energy for Rural Development Phase 2 (RERD2)
Intervention code	MOZ 15 034 11 / DGD Code 3016524
Location	Mozambique
Total budget	22.000.000 EUR (12.000.000 EUR for RERD2 and 10.000.000 additional EUR for RERD2+)
Partner Institution	Fundo de Energia (FUNAE)
Start date Specific Agreement	16 March 2018 (7 years)
Date intervention start / Opening steering committee	1 July 2018
Planned end date of execution period	31 December 2024 (78 months)
End date Specific Agreement	- Initial end date of the RERD 2 Specific Agreement: 15th of March 2024 = 6 years (72 months) - New end date of the RERD 2 Specific Agreement covering the additional component: 15th of March 2025 = 7 years (84 months)
Target groups	FUNAE, rural population in intervention provinces who do not have access to reliable and adequate energy services (households, institutions and small businesses)
Impact <sup>3</sup>	Contribute to rural economic and social development by increased sustainable access to energy
Outcome	Increase access to energy in rural areas by investments in renewable energy systems and support mechanisms ensuring sustainability <sup>4</sup>
Outputs	1. Mini-grids provide reliable and adequate energy services
	2. Technical and financial sustainability of existing systems is improved
	3. The capacity of FUNAE in planning and project management is improved
	4. <i>Pro memoria, technical budget line for VAT</i>
	5. The new legal framework is influenced by FUNAE
	<i>Added outputs RERD2+ (addendum to the TFF formulated in Q3-Q4 2020)</i>
	6. Sustainable solar powered irrigation systems are taken up by selected farmers in 2 provinces
	7. The technical and financial capacities of farmers, institutional partners and market actors for a sustainable use of solar powered irrigation systems are enhanced
8. Initiatives to foster an enabling environment for private and public investments in the irrigation sector are supported	
Year covered by the report	2022

<sup>3</sup> Impact refers to global objective, Outcome refers to specific objective, output refers to expected result

<sup>4</sup> With the extra RERD2+ component on Solar Powered Irrigation Systems (SPIS, see further below) the addition to the specific objective is in italics in the following specific objective statement "Increase access to energy - *for irrigation purposes (or productive water)* - in rural areas by investments in renewable energy systems and support mechanisms ensuring sustainability



## 1.2 Self-assessment performance

### 1.2.1 Relevance

	Performance
Relevance	A

The Mozambican government's 2020-2024 five-year plan prioritizes the development of economic and social infrastructure as a strategy to stimulate national productive activity and economic growth. Energy plays a key role in the development of productive and income-generating activities and as such the Mozambican government launched an ambitious plan for 'Energy for All' in 2030, in which renewable energy plays an important role.

With its objective of increasing access to energy in rural areas through public and private investments in renewable energy and support for mechanisms to ensure sustainability, the RERD2 project is well aligned with public policies and responds to the needs of beneficiaries. The RERD2 partner institution, FUNAE, is engaging in a new strategy (2021-2030). In November 2020 its new organic structure was gazetted. The project is firmly anchored in FUNAE and continues to support the organization in accomplishing its - partly new - mission. The project intervention logic is still appropriate. It is geared at (a) the development of mini-grids, b) improving technical and financial sustainability of systems and c) improving planning and management capacity. Planning for off-grid electrification remains very complex in Mozambique. The selection of sites for isolated mini-grids is among the main difficulties of the government and an increased number of donor projects. Off-grid electrification planning is part of the intervention where the project is making a significant contribution through the development of local skills in the use of Geographical information Systems (GIS) and a methodology for selecting sites that takes into account national priorities, local needs and affordability.

The design of the project component RERD2+ of 10M€, approved by the Belgian Minister of Development Cooperation in December 2020, came about as a result of the availability of an additional Enabel budget and a new energy need, *to supply pump systems for irrigation*, communicated by the partner. Since the objective of the RERD program is rural development, this added component of solar powered irrigation systems is relevant in the context of the strategies of the country and Enabel, even if the integration of the intervention is slightly out of step (new type of energy solution and new partner) with previous interventions that were focussed on rural electrification with FUNAE. The integration of the component is justified by the ease and rapidity of expanding the scope of the ongoing intervention instead of devising a new intervention. Solar powered irrigation systems (SPIS) are excellent examples of productive use of renewable energy (and water) and in line with the national irrigation strategy defined in 2012. The strategy plans to double the amount of land under irrigation (with particular focus on Zambezia and Manica provinces, both considered to be high agricultural productive zones of the country). The RERD2+ component is also well integrated to the government policy priorities defined under the national irrigation plan approved in 2015 which underlines the need to strengthen community resilience to climate change through innovative irrigation solutions. The RERD2+ component is implemented in partnership with a new national partner, the Mozambican Irrigation Institute (INIR).

The legal context of the renewable energy domain has considerably improved in 2022 but

continues to require attention from the government and FUNAE. This is further detailed in the section on sustainability. The project remains highly relevant.

### 1.2.2 Effectiveness

	Performance
Effectiveness	B

The institutional anchoring of RERD2 staff in FUNAE HQ facilitates collaboration with the counterpart. The “capacity building” component makes it possible to compensate for possible limitations of the partner. Participation of counterpart staff is always assured in all field missions. The international rural development expert(s) leading RERD2+ works closely with the province based national irrigation and agronomy experts. These staff are all firmly integrated within INIR. The embedding of the implementation team in national partner organisations has increased effectiveness in terms of coordination and potential to provide prompt backstopping support for partner institutional capacity strengthening and market positioning.

While the RERD2 team worked in FUNAE until March 2020 the Admi-Fin support was, and still is, based in the Enabel representation. Due to the lack of space in the FUNAE building and the COVID pandemic, the Enabel project team had to leave FUNAE in March 2020. This began to hamper necessary daily face-to-face meetings. Such face-to-face meetings were especially needed in a crucial year like 2022, when hundreds of decisions had to be taken on technical changes proposed by the EPC companies<sup>5</sup>, which always had to be decided jointly by FUNAE, Enabel and the NRECA supervisory entity.

For the solar mini-grids envisaged with the electrification component of the project the documents for the call of tenders were designed to ensure quality components, systems and installations by international EPC companies. The approach is to build “solar power plants” with high storage capacity and limited use of generators, rather than developing “hybrid power plants” where generators provide a significant portion of the energy during the evening peak. This approach is more expensive at the investment phase (the price of storage is high) but it avoids the various problems associated with using generators, even partially (the difficulty of sourcing diesel fuel, the complexity and cost of maintenance and repairs of generators, delicate management of switching between energy sources to optimise the solar portion, etc.). Overall, the systems will consist of high quality robust equipment that will require little maintenance, thereby offering a good guarantee of service in the event of inadequate maintenance management (for a certain period of time). For the irrigation component (RERD2+), the technological choices and technical specifications still need to be developed, in particular to avoid theft at isolated sites.

At the same time, we may note that if electricity demand has been overestimated in the study phase or the tariffs end up too high, the 5 mini-grids may remain underutilised (which is one of the main risks of off-grid systems) with a limited customer base and uncertain consumption unless the project will be successful in incorporating activities to encourage the use of electricity from productive and/or income generating activities.

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<sup>5</sup> in response to supply chain difficulties that emerged in 2022 due to the international energy crisis and the Russia Ukraine war

The partner organisation of the electrification component of the project, FUNAE, remains a compartmentalized and centrally run organization with a lot of bureaucracy. Lines of communication remain long and less important decisions are easily passed on to the CEO. As such decisions tend to take a lot of time. Moreover, RERD2 is only one out of many externally funded renewable energy projects and has, at times, to ‘compete’ for the attention of FUNAE's leadership. As regards investments in infrastructure, a change in FUNAE’s strategy means that the project now fully focuses on solar mini-grids while it also concentrates its sustainability-oriented actions on those systems. FUNAE indeed requested the project to shift its attention away from isolated solar power systems to existing and newly to be developed micro- and mini-grids. Most small solar power systems were transferred to sector ministries. The results obtained in 2022 indicate progression to the achievement of the project outputs and outcomes. The chances of achieving the specific objective remain real and significant.

### 1.2.3 Efficiency

	Performance
Efficiency	B

The management of the project's resources is generally satisfactory but financial execution remained low. Budget lines and activities had to - and were - adapted to respond to various changes that arose during implementation. Factors such as: a) the partner’s commitment to take charge of VAT and duties of all mini-grid components (amounting to a total of approx. 1.5 Mio Euro), b) the opportunity to obtain extra budget from an additional 10 M€ project component, c) the lessened needs of budget for investment in information systems and d) reduced prices of a planned remote monitoring system all freed funds for investment in an extra (5th) mini-grid. It also provided an opportunity to respond positively to FUNAE’s need for full-time technical assistance in the area of climate finance and for which a national expert was recruited for an initial period of two years. All changes to budget and activities were justified and recorded in the Steering Committee proceedings and budget transfers received non-objection from the Enabel head office in Brussels.

The main factors of delays and a low level of financial execution to date are mainly at 2 levels.

Procurement procedures: Drawing up technical documents, consultations, evaluations and award of contracts take up time which is difficult to predict on account of the fact that there are some complex stages whilst mini-grid projects are technically very complicated. Validations and ‘non-objections’ at different levels (sometimes coming from HQ in Brussels) add to the risk of delay. In 2020, the project had to - and did – respond rapidly to the need to cancel a mini-grid tender<sup>6</sup> conducted under national legislation (under the co-management modality). In order to avoid further difficulties with procurement - notably for mini-grids and remote monitoring systems - the Steering Committee approved a radical change towards direct management (*regie*) by Enabel.

Implementation of the works: The need for the selected EPC companies to respond to external factors such as the COVID 19 pandemic, unfavourable developments in the

<sup>6</sup> that had obtained offers from 9 companies but all declared non-compliant due to lacking documents or absence of translations into Portuguese

international and national context<sup>7</sup> affecting supply chains and the lack of timely local conditions in Mozambique to start work slowed down the progress.

The slow pace of financial implementation is also linked to a near doubling of the budget in 2021 with the added irrigation component and a long start-up phase due to two failed partnerships (FNDS and SNV) and repeated changes in the leadership of this component. The originally recruited rural development expert who had joined the project on the 1st of May 2021 to lead the irrigation component resigned and left on 30 September, 5 months after the start of his assignment. His replacement was contracted on the 15th of October but suffered delays in the granting of his entry visa to Mozambique. This ITA in turn rescinded his contract a year later as per 28 October 2022. Enabel then reached out to the candidate reserve pool. The reserve candidate was interviewed on the 21st of October 2022 and took up her position on January 16th 2023. With these changes precious implementation time in the RERD2+ component was again lost.

For the irrigation component, despite the above-described phenomena, most of the critical activities have been launched (new component lead, involvement of INIR, identification of beneficiaries, identification and collaboration with SPIS suppliers, etc.) and the planning, whist tight, can be kept in place at this stage.

The entry of service of the 5 mini-grids is delayed until the second part of 2023 due to cumulative delays since the start. The RERD2+ component needs to accelerate to catch up on lost time as several inception and project take-off activities that were supposed to have been concluded in 2022 have been extended for completion early 2023. There are no signs however that the outputs of two components will not be achieved.

#### 1.2.4 Potential sustainability

	Performance
Potential sustainability	B

The sustainability of infrastructure projects in the energy sector, in particular for off-grid electrification, is always a central concern. There can be many and varied causes of disruption.

Regarding sustainability of off-grid energy projects, like RERD2, the Government of Mozambique made important steps by approving new legislation notably the new Regulation for Off-Grid Energy Access. This regulation is the result of the Government’s efforts to recognise the importance of the sector to catalyse rural socio-economic development, leveraging private sector investment and improving the living conditions of notably Mozambique’s rural folk. Implementation of the new regulatory framework results in greater clarity to all actors in the off-grid energy sector. It will guarantee the necessary conditions for the private sector to develop its activities and protect investments in a diverse set of technologies applicable to the off-grid context such mini-grids. This regulation is the result of committed work of the Government of Mozambique, with special reference to all the institutions involved, namely the Ministry of Mineral Resources and Energy (MIREME), the Energy Regulatory Authority (ARENE), and the National Energy Fund (FUNAE). The approval of this regulation represents a big step and sets high expectations for the sector. This is reflected in the positive response from various key

<sup>7</sup> see also Ch. 2.3.3, \* tightened greenhouse gas targets in China, \* the war between Russia and Ukraine, \* insecurity in northern Mozambique and \* slow responses from the local level

stakeholders in the sector and the increased international attention to Mozambique, both from new development finance initiatives (DFi) and private companies.

In practical terms the RERD2 project sustainability remains dependent on whether innovative approaches involving the private sector can be developed for the management of the 5 mini-grids that will be commissioned in 2023. FUNAE will be the owner of the grid and in the absence of a clear management model c.q. contract FUNAE staff<sup>8</sup> will have to take care of operations and maintenance for at least a transitional period. The limitations of the partner FUNAE in this area justify its restructuring and the search for independent operators. Following institutional reform FUNAE is indeed supposed to evolve into an accredited fund and eventually cease its activities as an operator of off-grid infrastructure, to make way to the private sector. This requires adaptation. Regarding the management of mini-grids, FUNAE points to the responsibility of ARENE and its regulatory function and its role in paving the way for these adjustments and the entry of the private sector into the management of mini-grids.

Sustainability of mini-grids also depends to a significant extent on the capacity of households to pay the tariffs and on stimulating demand (productive and income-generating activities) to increase and at least cover operating expenses.

For RERD2+ the component on solar irrigation, sustainability seems promising at this stage given (i) the awareness raising and capacity building efforts both on the side of the partner INIR and of the future investors (farmers or farmers' organisations) and owners of the solar irrigation systems and also (ii) the setting up of financial mechanisms to provide innovative financial tools for investors (PAYG, funds).

Among activities completed or in progress and relating to the sustainability of autonomous systems in isolated sites the project has worked on what follows:

- Support for regulatory and institutional reforms for the emergence and attractiveness of private operators: the project, like other donors, is actively involved in supporting the government in putting in place an environment which is conducive for fostering private operators. Not initially envisaged, a national expert in 'blended finance & climate finance models' has been recruited to support FUNAE in its restructuring towards a genuine fund.
- Awareness-raising among public and private actors for the funding and operation of infrastructure: for example, the project has organised workshops on SPIS pump and solar irrigation systems with beneficiaries, developers, operators and government officials.
- Support for the private sector to develop their businesses: business plans, site selection, technical and commercial management. The project developed procedures and trained the partner in the use of GIS tools, open-source datasets (often based on satellite imagery) and drones for identifying and selecting sites.
- Technical training of operators on the O&M: the project provided specific training on the hydroelectric plants, solar irrigation and remote monitoring.
- Training and support for the partner: installation of innovative tools to improve

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<sup>8</sup> that needs to be available or recruited and added to FUNAE's operational budget-

remote monitoring and tracking of operational performance.

- Development of an institutional capacity building plan: the sustainability of RERD2+ activities require tailored support to be provided to INIR to secure sufficient human and operational capacity to be able to steer irrigation investments in the country. In this respect, an institutional capacity building plan promoted by the project is in an advanced stage of development to ensure that at project end, INIR will have been supported to secure requisite skills to promote the sustainable growth of the SPIS sector.

- Development of dialogue platforms: RERD2+ will also support interventions designed to promote an enabling environment for SPIS sector growth. This will have to be achieved through local level, provincial and national dialogue platforms bringing together sector stakeholders. Creation of these platforms has been started by the project. Key issues that require attention include level of import taxes for equipment sourced outside Mozambique, risk sharing incentives to promote increased public - private sector investments and footprint in project locations as well as continuation of SPIS demand activation through tailored awareness campaigns and educational partnerships.

### 1.3 Conclusions

Below is a summary of the main highlights of this report:

- The regulatory framework for the (renewable) energy sector has been significantly improved with the publication of the new National Electricity Law and the Regulation on Energy Access in Rural Areas. Both aim to adapt the legal framework to the challenges of universal energy access and create the conditions for opening up the energy sector to private investment.
- New policies and legislation developed in the last two years will further evolve and become reality in the present and next term of government, thus paving the way for innovative solutions in mini-grids as foreseen by the project.
- FUNAE will shift more from a utility role to a real fund, with more focus on project identification, preparation and facilitation. It will have to propose projects and potential sites to different actors with different perspectives (Government of Mozambique, international donors, investors...). This reconfirms the strong focus RERD2 has placed since its start on improvement of technical skills and update of FUNAE staff knowledge about project preparation, use of world open datasets and models to support desk studies, site identification and (pre)feasibility studies.
- RERD2 continues assisting FUNAE with data collection and study to prepare an eventual Nintulo hydro plant's executive project. An initial feasibility study commissioned by the project had projected an investment of 23 M€ which was beyond the capacity of the project. However, the study also highlighted the need for validation of the calculations, helped by first collecting more data, followed by a second validation study. The preliminary results of measurements (2019-2020) and follow up study finalized in 2022 point to a capacity of 3.2 MW instead of the originally estimated 11.2 Mw. The investment for realizing this high head SHPP was calculated at 10M€ (which in Nov. 22 was about 43% of the originally estimated amount of 23 M€). A full report has been delivered to FUNAE which is advised to share the results with EDM to jointly analyse its conclusions and recommendations after which it could



be shared with an independent power producer (IPP) that could seek further support from donors such as PROLER or GET.fit to develop the project.

- Out of 22 companies that had submitted expressions of interest four companies were shortlisted for submitting full proposals. Two contracts of a total of 8.768,166 Euro were awarded on 2 Dec. 2021. Official start of works was 10 January 2022. Duration of design and works of four mini-grids was fixed at 365 days. One mini-grid (on Idugo island) was to be built in 425 days. As such commissioning of 5 mini-grids was therewith foreseen for early 2023. Due to delays commissioning is now foreseen in the second half of 2023.
- Important progress has been made by the GIS unit of FUNAE's Research and Planning Department in which work evolved from the "simple" geo-referencing of existing systems to real and meaningful off-grid energy planning and field validation. In 2022 however fewer provincial GIS analysis validation seminars took place than planned (2 against 4 planned). FUNAE however declares to commit to the set target of 11 validation seminars by the end of the project. Intensified contacts with district infrastructure officials led to a change in procedures for field data verification, making the process much more efficient than before.
- The transfer of ownership of small isolated solar systems from FUNAE - many of which were funded by the RERD1 project - to the sectoral ministries and the increased focus of FUNAE, and hence the project, on micro- and mini-grids have meant that project activities have focused much less than envisaged in the TFF on improving the sustainability of the small isolated systems and more on development of solar mini-grids.
- The major risk at this stage of the project is the long-term nature of the infrastructure in the absence of a clear model for operating the mini-grids. This risk is not yet mitigated and depends to a significant extent on factors that are external to the project (application of the regulatory framework, private sector involvement, etc.).
- The year 2022 again registered important investments in the training of FUNAE headquarters and delegation staff. To date a total of 118 FUNAE technicians benefitted of more than 20 different types of training. The project's '*cumulative number of hours of training of FUNAE staff*' reached a value of 8,523 person-hours by the end of 2022 and therewith surpassed the project's end target (7,000) by 1,523 hours. Training by the project as well as contracted parties were accompanied by complete training manuals.
- Similar to 2021 implementation time in the irrigation component was again lost in 2022 due to the unexpected departure of the (second) rural development specialist leading this component and the need for recruitment of his replacement<sup>9</sup>. It also led - again - to the need for additional efforts by the intervention manager to ensure that the momentum of programme implementation was not lost.
- The full take-off of the irrigation component activities has significantly delayed due to failed partnerships with SNV and FNDS (amongst other factors). The situation has prolonged the programme inception period as new partnerships had to be identified and negotiated.

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<sup>9</sup> The first rural development expert to lead the added irrigation component (RERD2+) was employed on 1 May and left the project on 30 September 2021. The second expert was employed from 15 October 2021 - but only arrived in December 2021 - and left on 30 October 2021. The third expert now leading the irrigation component is on board since 16 October 2023.

- The decision to split implementation of the irrigation activities into two vehicles (a) a grant agreement with an NGO partner and (b) through a private sector tender is commendable. The 1.9 M€ grant agreement was signed with iDE, International Development Enterprises in the third week of February and the private sector tender published in the fourth week of February 2023.

Enabel execution official <sup>10</sup>
 Mark Hoekstra

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<sup>10</sup> Name and signature



## 2 Results Monitoring<sup>11</sup>

### 2.1 Evolution of the context

#### 2.1.1 General context

Mozambique is still facing structural challenges characterised by high dependence on extractive industry with limited integration to the rest of the economy, high level of internal and external debt, large trade and current deficits, heavy dependence on resources from foreign direct investment as well as recurrent exposure to climate change related events.

The country shows signs of a gradual but still fragile economic recovery helped by the continued lifting of COVID-19 containment measures that contributed to enhance private consumption and improving the service sector's performance. The economy maintained a recovery trajectory in 2022 with an annual growth of over 4.0% withstanding tropical cyclones impact in the centre and north regions. The IMF decided to support the Country State Budget following the approval of a new extended credit facility. IMF support had been suspended in 2016 following the hidden debt scandal. The business environment is still hard despite the enacting of different regulatory instruments and the country offering business opportunities almost in all sectors.

In August 2022 a series of 20 measures to stimulate the economy, which are part of the PAE - Economic Acceleration Stimulus Package were announced. These measures aim to respond to the country's growth needs, the negative impact of the Russia-Ukraine war, armed violence in Cabo Delgado province, northern Mozambique, and natural disasters. The measures announced lower Corporate Income Tax from 32% to 10%, in agriculture, aquaculture and public transport; VAT, from 17% to 16% in agriculture and renewable energy; the share of revenue from natural resources transferred to the provinces where they are extracted is increased from 2.5% to 10% and a US\$250 million (244.4 million euros) loan guarantee fund is created for banks to provide credit to the economy at more affordable interest rates. The government has 2 years to put the measures in place. Poverty remains high, with 63% of the population living below the poverty line, underscoring the urgency of policies that promote inclusive growth.

The humanitarian situation across the northern province of Cabo Delgado has continued to deteriorate and displacement figures have increased by 20 per cent to 946,508 only in the first half of 2022. The conflict spilled into the neighboring provinces of Niassa and Nampula. Nampula province witnessed four attacks by armed groups in September affecting at least 47,000 people and displacing 12,000. The village of Muite, one of the two villages in northern Nampula where the RERD2 project is building mini-grids, was confronted with a significant influx of refugees following an attack on a close by village (23 km away) in neighboring Cabo Delgado. Since then, the presence of security forces in Muite has been stepped up<sup>12</sup>. If conflict in these areas continue it will embed a negative perception of Northern Mozambique as an unsafe investment destination which might

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<sup>11</sup> Impact refers to global objective, Outcome refers to specific objective, output refers to expected result

<sup>12</sup> In January 2023, the government has stated that the terrorist bases have been dismantled and the situation seems to be improving ; moreover, TOTAL is expected to resume operations in 2023.

limit private sector appetite to invest in the RERD2 program locations. While the country continues to struggle and cope with numerous security-, economic- and social challenges, particularly the security situation will need to be continually monitored throughout 2023.

At the 12th congress of FRELIMO in September 2022, President Nyusi won the seat uncontested to remain president of the party for the next five years. However, this should not affect the presidential candidature as the constitution only allows a maximum of two five-year terms of office, which Nyusi has already completed.

The signature of a Peace and National Reconciliation Agreement in 2019 (between FRELIMO and RENAMO) continues to contribute to stability and more security to the central provinces of Manica and Sofala. Caution however is still needed. Manica is one of the provinces, besides Zambezia, where the new RERD2+ project component is working on renewable energy for productive use i.e. solar powered irrigation.

In the - renewable - energy sector recent regulatory and policy announcements have taken place, with the most relevant being:

- Decree 101/2020 of November 12<sup>th</sup> that adjusts the mandate, management mechanisms, budget arrangements, tutelage, organization and operation of FUNAE, which is the project counterpart (see 2.1.2. below).
- Resolution 35/2021 of December 1<sup>st</sup> that approves the new organizational structure of FUNAE.
- Decree 93/2021 of November 10<sup>th</sup> approves the access to energy regulations for off-grid areas, by establishing the principles and norms for energy services associated to off-grid activities and mini-grids of up to 10 MW.
- Ministerial Diploma 17/2020 of April 14<sup>th</sup>, approves the internal regulations of the Energy Regulator – ARENE
- Enactment of the New electricity law (Law 12/2022) in July 2022. This most recent update of the law came into force in October 2022. It outlines the current state of the legal framework and the roles of participating stakeholders, and it highlights the involvement of the private sector participation and the presence of renewable energies in Mozambique's energy sector.
- In December 2022 the new technical regulations (concessions, standards and norms, grid connection, service level and commercial relationships and tariff) that complement and operationalize the off-grid regulation decreed in 2021 were approved by ARENE and they await publication to become enacted. It must be noted that two additional technical regulations still need to be approved by ARENE and MTA.
- Special mention must also go to the new FUNAE strategic plan 2021-2030 which was recently approved.

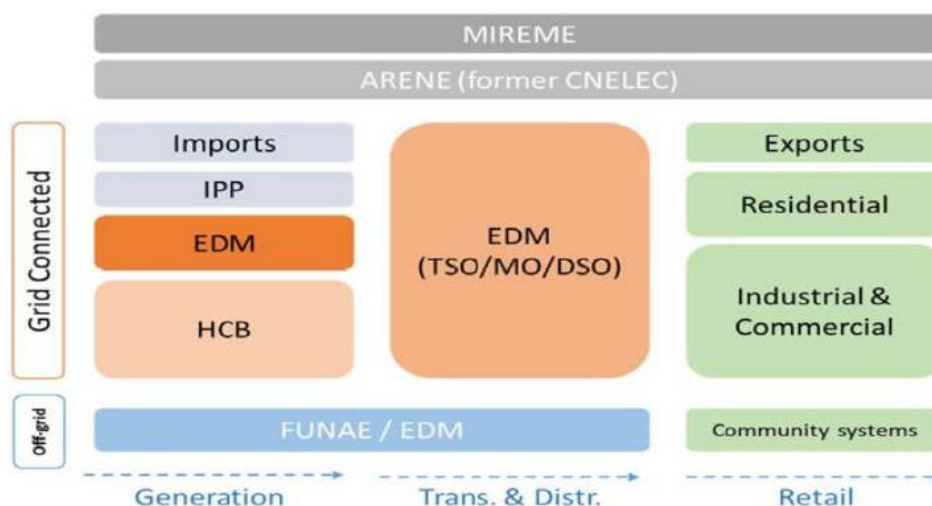
### 2.1.2 General and Institutional context

In terms of the Institutional set up<sup>13</sup> the following diagram summarizes the role and names of the key entities.

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<sup>13</sup> that stems from the current regulation of the sector

### *Institutional set up of the Energy Industry and regulatory bodies*



#### *The Ministry of Mineral Resources and Energy (MIREME)*

The Ministry of Mineral Resources and Energy (MIREME) is responsible for national energy planning, policy formulation and overseeing the operation and development of the energy sector. The ministry remains committed to boost the development of renewable energies and diversification of sources in the national energy matrix, thus contributing to the achievement of the (new) Integrated Master Plan and the National Electrification Strategy objectives. One of the major objectives is to achieve the target of universal access to energy by 2030. New policies and legislation developed in the last two years will further evolve and become reality in the present term of government, thus paving the way for innovative solutions in mini-grids as foreseen by the project.

The lack of coordination in electricity planning to date, especially that of off-grid systems, has been acknowledged and led to the decision to create a dedicated planning unit within the ministry. This unit will play an important role in improving coordination between key stakeholders such as EDM, FUNAE and the private sector in investment planning of off-grid infrastructure. The organisational embedding of this unit is still under discussion.

#### *Establishment of the National Energy Regulatory Authority (ARENE)*

ARENE was created by law in 2017. The appointment of the CEO in November 2019 marked the effective start of ARENE's operability. The new electricity law recognizes ARENE as the energy regulator, with powers of supervision, regulation, representation, control and sanctions, in the 4 main energy areas (electricity, liquid fuels and natural gas downstream) and other forms of energy. Significant progress was made in drafting regulatory measures for off-grid energy. This required coordination by Arene of the various donors and multiple stakeholders involved. In the above-mentioned areas ARENE - as well as MIREME - continue to be supported by the Belgium funded Enabel CB-MIREME project.

ARENE is the entity in charge of, among others;

- approval of legal instruments that are part of the continued development of the legal framework for access to energy in off-grid areas,

- definition of standards of electrical equipment and installations of mini-grids and autonomous systems,
- procurement processes and awarding concessions through public tenders,
- regulations on interconnection,
- protection of the rights and interests of economically vulnerable consumers,
- approval of sales prices and network tariffs. These prices and tariffs are calculated to reflect the capital costs, operation and maintenance costs, and a reasonable return on investment,
- approval of consumption tariffs (also taking into account the costs mentioned in the line above).

#### *Master Plan for Electricity*

In October 2018 government approved the Integrated Master Plan for electricity infrastructure (2018-2043). This plan aims at increasing the country's capacity to generate, consume and export electricity over the next 25 years. The plan (US\$34 million) seeks to ensure diversification of energy sources including hydropower, natural gas and coal. \$18 billion will be invested in energy generation.

#### *Review of Electricity Law*

The new Electricity Law (replacing the 1997 law) was enacted by the president in July 2022. This law aims to promote the efficiency of the electricity sector in accordance with internal, regional and international markets and includes, among others, encouraging participation of the private sector and redefinition of the role of FUNAE. The law also includes a series of specialized regulations, rules and standards on topics such as mini-grids, solar home systems, storage, self-generation and net-metering rules for incorporating isolated grids into the national grid.

#### *The National Energy Fund (FUNAE)*

The Energy Fund (*Fundo de Energia*, FUNAE) – the project's counterpart organization - is a public body subordinated to MIREME with the aim of promoting the development and use of different forms of low-cost energy and the sustainable management of energy resources. Initially setup as a fund, FUNAE today mostly implements off-grid access projects.

Until recently, FUNAE conformed to the rules established in the Basic Law of 2012 (Law No. 7/2012 of February 8) and Decree No. 41/2018 of July 23, which approved the rules for the allocation, autonomy, budget regulation, organization and operation of institutions, foundations and public funds. Decree No. 41/2018 of July 23 however required that the organic structure be adjusted<sup>14</sup> to ensure compliance with the objectives set by the Government for the sector in general and under the National Energy for All Program in particular. As such, a new decree adjusting FUNAE mandate, management mechanisms, budget arrangements, tutelage, organization and operation has been enacted (Decree 101/2020 of 12 November). In addition, FUNAE is undergoing restructuring to adjust to new challenges and opportunities it faces (Resolution 35/2021 of December 1<sup>st</sup>)

FUNAE (public fund) is now a legal entity of public law, category A, with legal personality and administrative, financial and patrimonial autonomy. Under the previous status

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<sup>14</sup> under the provisions of Article 11(d)

patrimonial autonomy was missing. The new decree allows FUNAE to own shares in companies. In the new decree, FUNAE's competences are more broadly defined as: *Implementation and management of electrification projects based on renewable energy solutions, expansion of the rural fuel network, mobilization of funding at the level of internal and external partners (financing) and energy efficiency - and other energy - services*. In the context of its new mission statement FUNAE will shift from a utility role to a real fund, with more focus on project identification, preparation and facilitation. FUNAE will have to propose projects and potential sites to different actors with different perspectives (Government of Mozambique, international donors, investors...).

Under the new decree the Board of Directors is composed of three executive directors (as opposed to one - the CEO - under the previous decree). One of the executive directors is the CEO. The CEO is appointed by the Council of Ministers upon the proposal of the Minister overseeing the energy domain. The implementation of the decree has resulted in a new organizational chart where the maintenance unit has not been made a division (as is foreseen in the RERD2 TFF). The maintenance unit is now expected to become a unit under the "Electrification department". The other - three - departments are the "Fuels Department", the "Financing and Private Sector Service Department" and the "Studies and Mobilization Department". Early August 2022, the CEO of FUNAE was appointed Vice Minister of the Ministry of Mineral Resources of Energy. The open position of CEO was filled by the former Vice Minister of Transport and Communications. The remaining two new board members (two executive directors) were appointed at the end of January 2023. The four new directors are expected to be appointed in Q1 of 2023. It is also expected that during Q1 2023 the new vision of the FUNAE board will be clarified and priorities for the next few years determined. FUNAE finally also adopted its new strategic plan 2021-2030.

#### *Electricidade de Moçambique*

EDM is the government-owned electricity utility established in 1995 as national electrical utility, responsible for the generation, transmission, distribution and sale of electricity throughout the country. But EDM is mostly a transmission and distribution company with few generating assets. EDM has recently created a renewable energy business planning and development portfolio with a Directorate of Renewable Energy and Energy efficiency that is to address renewable energy sources (RES) investments. Doubts have however been expressed as to the feasibility of EDM pursuing such investments when it has to rely on its own corporate funding.

#### *The National Electrification Strategy 2018-2030 (ENE)*

The National Electrification Strategy (NES) represents a key milestone in reaching all Mozambicans with electricity access by 2030. The strategy distinguishes between Expansion Areas (AEPs) and Subsidized Expansion Areas (AES). Its roadmap proposes that EDM takes the lead in identifying and implementing on-grid projects following project prioritization criteria and electrification schemes, while FUNAE focuses on the implementation of off-grid solutions. Once a system is installed, FUNAE will transfer it to EDM for operations<sup>15</sup>. EDM may in turn outsource to private operators or communities. FUNAE projects will, besides other sources, be financed by an Electrification Account without the obligation to reimburse. FUNAE and EDM should coordinate efforts on

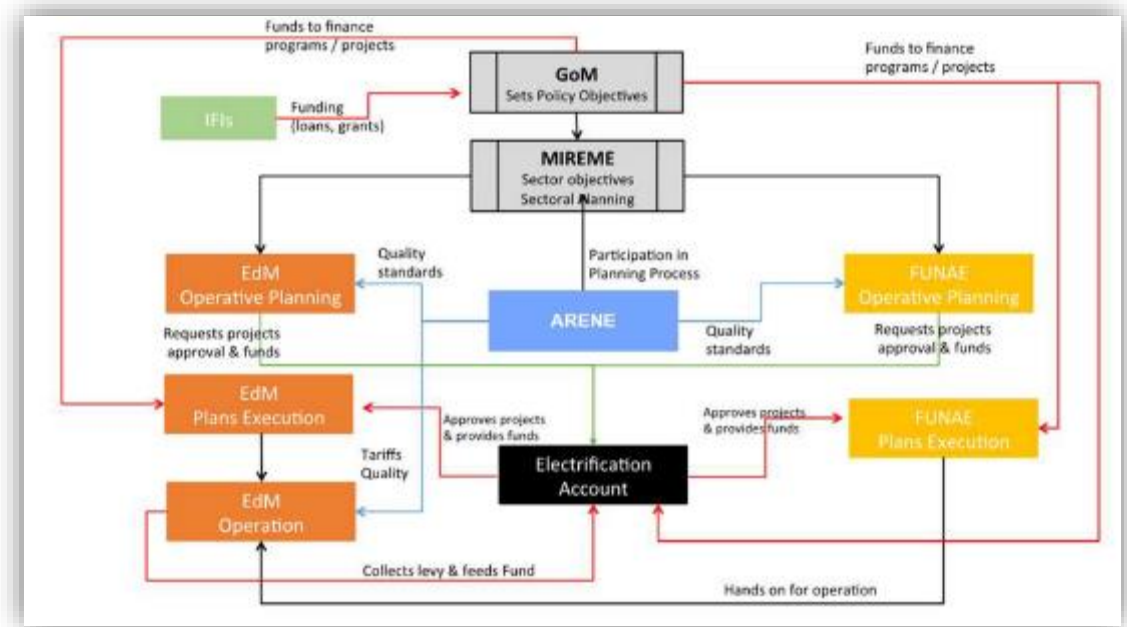
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<sup>15</sup> many stakeholders in the sector cast serious doubts as to whether this will ever happen

specific projects where their areas may overlap. The lack of such coordination affected the project at various times during the past two years and led to it having to change course at various occasions.

A schematic representation of the institutional relationship of the above-mentioned institutions is presented below.

*Energy sector main institutions*



*National Institute of Irrigation (INIR)*

Following the Belgian cooperation ministers' approval of the additional SPIS component (RERD2+) INIR entered as a new project partner.

INIR was created in 2010 to ensure the efficient and sustainable planning, development and management of land and water resources for production. In line with the creation of INIR, a national irrigation strategy was defined in 2012 that plans to double the amount of land under irrigation (with a particular focus on Zambezia and Manica provinces) and a national irrigation plan was formulated in 2015 which sets the short, medium and long-term goals in the irrigation sector. INIR oversees the promotion, the rehabilitation, the construction and the maintenance of irrigation infrastructures, as well as the establishment of water users' associations. INIR is also responsible for implementing and supervising integrated water resources management plans.

A new General Director for INIR<sup>16</sup> was appointed in March 2021.

The Government of Mozambique intends to reposition INIR as a public company with a legal mandate to provide revenue generation services in the irrigation sector. This development is largely viewed by stakeholders as an effort by the Mozambican authorities to reduce INIR dependence on the shrinking national budget. While this development is

<sup>16</sup> Dr. Delfim Vilissa

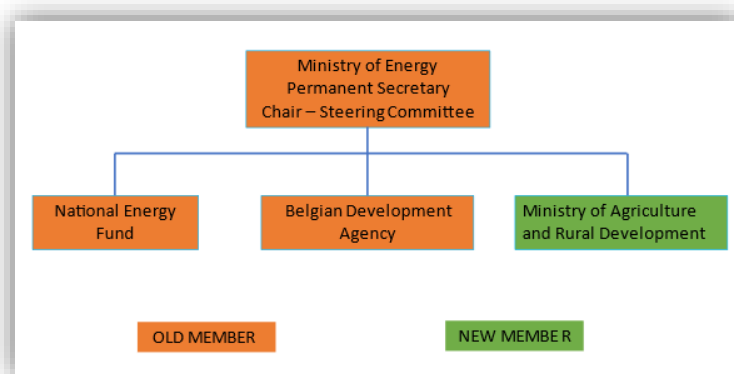


not expected to directly affect the implementation of RERD2+, Enabel needs to monitor the transition process to ensure that planned exit strategies anchored on empowering INIR as a key actor in the irrigation sector are not affected by the changes in mandate/operational which are likely to be affected. A key concern for most stakeholders is the likely conflict of interest that might ensue when INIR, being a regulatory agency, is also allowed to offer commercial services for irrigation development in the country.

### 2.1.3 Management context

Early August 22, the CEO of FUNAE Antonio Saide with whom Enabel has developed a long-lasting positive collaboration, was appointed Vice Minister of the Ministry of Mineral Resources of Energy. The position was filled by the former Vice Minister of Transport and Communications, Manuela Rebelo. A meeting took place in October with the Resident Representative and the team. A consistent effort is ongoing in building social capital with the new responsible of FUNAE, to ensure any major obstacles with the RERD2 intervention may be discussed and overcome. This also means that the RERD's international experts from Enabel are allowed to go back to FUNAE as soon as the green light from FUNAE has been obtained.

The project is supported by a steering committee which acts as the supreme strategic management arm guiding the technical and operational delivery of the programme. The steering committee (SC) is chaired by the permanent secretary of the Ministry of Energy. In the SC the previous CEO of FUNAE (now vice-minister of MIREME) is expected to be replaced by the new CEO of FUNAE. With the addition of the irrigation component a strategic decision has been made to include a representative from the Ministry of Agriculture and Rural Development as a member of the RERD2(+) Steering Committee.



#### 2.1.3.1 Partnership modalities

FUNAE remains the government entity responsible for the intervention. The FUNAE Chief Executive Officer (CEO) is designated as sponsor, responsible for achieving the results and the specific objective of the intervention. The CEO equally acts as Authorizing officer, who is responsible for authorizing and liquidating expenditure following the modalities as laid down in the project document. Co-managed procurement was to be used for all works involving the appropriation of results by FUNAE after the end of the project. For co-managed acquisitions, the Mozambican legislation was to be used, as it is applied to acquisitions financed by the government. These specifically concerned acquisitions

under the following activities; ‘Development of mini-grids’ (6 Mio€), ‘Implementation of Remote Monitoring Systems (360k€) and ‘Implementation of Payment Systems’ (500k€). The December 7, 2020 steering committee approved a project proposed 180-degree turnaround from co-management to regie to circumvent the handicaps of the co-management modality.

INIR / MADER seconded an additional Mozambican counterpart and since May 2021 provides an office with water and electricity services, internet security, etc. in Maputo.

#### 2.1.3.2 Operational modalities

The modalities of operational management of the additional component are aligned to RERD2, including the reporting requirements.

From the point of view of contracting tools, the implementation of the project continues to take the following forms:

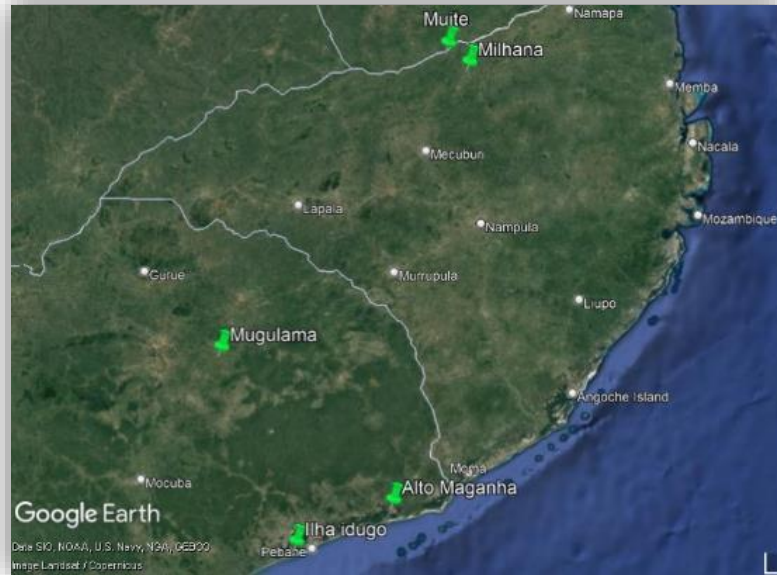
- Direct implementation by Enabel (mainly via technical assistance employment contracts);
- Subcontracting via public (services, works and supplies) contracts where Enabel maintains its contracting authority role;
- Usage of Cooperation Framework Agreements concluded between Enabel and Belgian or European public-law entities; and
- The awarding of Grants to public entities or private not-for-profit organizations in which case Enabel will have the contracting authority role.

#### 2.1.3.3 National and Field Level Anchoring

The three international experts from the electrification component worked in the FUNAE office until the outbreak of the COVID19 pandemic. A return to FUNAE was expected after measures were relaxed in the first half of 2022, but this could not be accommodated by FUNAE. Indeed, FUNAE is jam-packed, given, among other things, the relocation of solar panel factory staff to its headquarters in Maputo. A return to FUNAE is now expected early 2023 after space for FUNAE has been made available in a building previously occupied some departments of MIREME. The International Rural Development Expert and the MEAL (Monitoring, Evaluation and Learning) young professional, who started his contract on the third of May 2022 are embedded within the National Irrigation Institute in Maputo to lead the technical delivery of RERD2+. The two national experts have been integrated within the provincial Ministry of Agriculture and Rural Development offices in Chimoio and Quelimane. By mid-2022 the national expert (agro-ecology) in Chimoio switched to the new provincial delegation of the National Irrigation Institute (INIR). The same is expected to happen with the irrigation expert in Quelimane in the course of 2023.



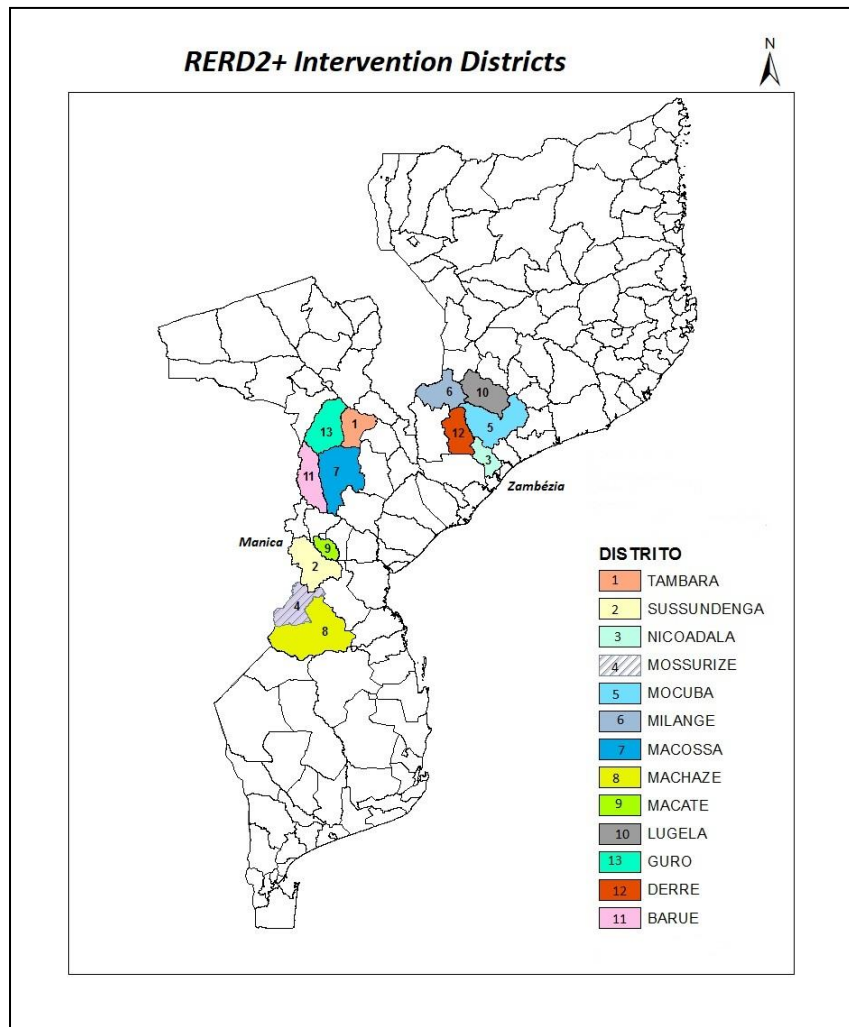
As to the electrification component the green pins on the map below indicate the locations of the five mini-grids being developed.



Five work plates - as the one below – were erected in the 5 communities.



For the irrigation component the map below shows specific districts that were approved by the Government of Mozambique as target locations for the RERD2+ program:



A total of 8 districts were approved in Manica province while 5 districts were also approved in Zambezia province as the formal areas where RERD2+ interventions will be concentrated. The national experts placed focus on the introduction of the program interventions in these districts including relationship building with other actors to promote synergies and collaboration.

## 2.2 Performance outcome



### 2.2.1 Progress of indicators

Outcome: Access to energy in rural areas is increased by investments in renewable energy and in support mechanisms to ensure sustainability.					
Indicators	Baseline value	Value year N-1 2021	Value year N 2022	Target year N 2022	End Target
Access to electricity in rural areas <sup>17</sup>	5,97% of rural population (Global Tracking framework)	na	na	na	7,97% of rural population of Zambezia province
Total - cumulative - number of connections	0	0	0	1,500	3,500 (from 5 mini-grids)
Total installed and operational capacity from renewable energy (kWp)	0	0	0	590	820 kWp
Fee collection rate (payment rate) in mini-grids	0	0	0	80%	80%*
Total installed and operational capacity from renewable energy (kWp) (for irrigation) **)	0	n/a	0	170	750 kWp
Total irrigated area under sustainable practices (ha)	0	n/a	0	200	900
Number of farmers applying best irrigation and agronomical practices	0	n/a	0	100	1,010
Total food production is increased	0	n/a	0	10%	25%
Total food production is diversified	0	n/a	0	25%	50%
Reduction of energy costs for production (medium and big farmers)	0	n/a	0	25%	50%
Percentage of functioning SPIS installations	0	n/a	0	100%	>= 75%
Satisfaction index of beneficiary producers	n/a	n/a	n/a	60%	>= 80%

Note: \*) Installing pre-paid meters means 'no pay no electricity', it is however estimated that 20% of electricity will be lost (non payment). The exact definition and measurement of this indicator will be done end 2022.

\*\*\*) a conservative estimate based on figures from GGGI (2021), "Mobilizing Investments in Solar Powered Irrigation Projects in Zambezia Province, Mozambique" indicates that 1.2 kWp needs to be installed to irrigate 1 (one) hectare of land.

<sup>17</sup> Regarding the measurement of the 'access to electricity' outcome indicator, there were two reasons not to invest in a - costly and time-consuming - data collection system similar to the SE4ALL Global Tracking Framework study from which the above indicator was drawn. The first argument was avoiding overkill of project studies due to the considerable research already - foreseen to be - undertaken (site screening, pre-feasibility and feasibility studies, ...). Secondly the Mozambican Energy Ministry and the National Institute of Statistics are in partnership with the Norwegian Water Resources and Energy Directorate (NVE) working on improving analytical capacity in the energy sector. Measurement of the 'electricity access' indicator is foreseen in this partnership. The project decided not to duplicate efforts and remains in contact with this initiative. Verification of the above indicator will therefore continue to mainly rely on secondary sources.

### 2.2.2 Analysis of progress made

Regarding the electrification component the logic of the project and in particular the (a) stringent selection criteria for mini-grid locations and (b) the importance of proper sizing of these mini-grids forced the project to invest considerably in studies, which logically took the necessary time. After the (pre)feasibility studies were completed and the 5 sites received the final greenlight from the Steering Committee, tenders were published which resulted in the award of two contracts (on 2 December 2021), with a combined total value of €8,768,166.<sup>21</sup> (incl. duties, excl. VAT) for the design, procurement and construction of these 5 mini-grids. The map presented in Ch. 2.1.3.3. above indicates the locations of the five mini-grids. Due to delays in the design and procurement processes most of the construction and assembly of the powerhouses and distribution networks will take place in 2023. As such the project, so far, had no impact on the above-mentioned energy access outcome indicators. The same holds for the indicators of the SPIS components.

### 2.2.3 Potential Impact

The potential impact of the electrification component of the project is significant, not only as a result of the construction of 5 mini-grids with some 3,720 connections serving over 17,000 beneficiaries - including 193 businesses - but also because of the medium-term prospects for the realization of a grid connected hydroelectric power plant of approximately 3.2 MW for which the dossier can continue to be prepared according to the outcome of a study recently Nov. 2022 finalized by the project (see Ch.2.3).

The potential impact of the additional irrigation component is also high due to the installation of solar powered irrigation systems irrigating 900 ha of land under sustainable practices and the consequent impact on farmer incomes, food security and general wellbeing.



## 2.3 Performance output 1 Mini-grids provide reliable and adequate energy service



### 2.3.1 Progress of indicators

Output 1: Mini-grids provide reliable and adequate energy service					
Indicators	Baseline value (from TFF)	Value year N-1 2021	Value year N 2022	Target year N 2022	End Target
Cumulative number of RE productive use locations identified and suitable for the installation of hydro- or solar mini-grids (reinforcing the FUNAE pipeline)	0	15	50*)	22	36
Number of reviewed, revised and updated feasibility and baseline studies	13 existing studies on PV and hydro	0	1 (Marge study Nintulo)	0	1 to 3 studies revised and updated (the total up to Dec. 2022 is 2)
Number of pre-feasibility on-site assessments of FUNAE pipeline locations for mini-grids.	0	0	0	0	20 (# of 19 was reached in 2019)
Number of RERD2 funded and completed comprehensive feasibility studies for solar (hybrid) mini-grids	0	0	0	0	5 (# of 5 has already been reached in 2020)
Number of awareness and stakeholders consultations in targeted mini-grid communities per year	0	5	16	10	25 consultations (total # of awareness campaign by Dec. 2022 was 26)
Cumulative number of hybrid solar mini-grids commissioned, operational and properly maintained	0	0	0	4	5 solar mini-grids
Publication for result dissemination	0	0	0	0	Minimum one publication

\*) This is the number of locations identified by the GIS unit and confirmed by SDPI data as being suitable for mini-grids. (After desk study, FUNAE's GIS unit works with the district authorities to assess the potential for productive use of electricity in the villages concerned.)

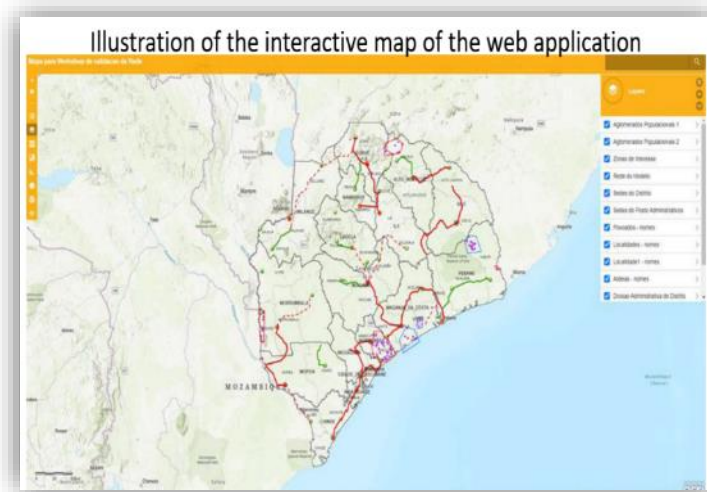
### 2.3.2 Progress of main activities

Progress of <u>main</u> activities <sup>18</sup>	Progress:			
	A	B	C	D
1 Review and update of existing feasibility and baseline studies and site selection in view of productive uses of energy (socio economic surveys)		X		
2 Awareness and stakeholder consultations for each site including the private sector		X		
3 Mini-grid development with productive uses of energy			X	
4 Result dissemination		X		

### 2.3.3 Analysis of progress made

- <sup>18</sup> A: The activities are ahead of schedule  
 B: The activities are on schedule  
 C: The activities are delayed, corrective measures are required.  
 D: The activities are seriously delayed (more than 6 months). Substantial corrective measures are required.





Among the first steps of development of mini-grids is research on their possible locations in function of a number of criteria. Criteria will vary in function of the project promotor that can be public or private. Key however is knowledge on whether and when the location is going to be close to - and thus possibly connected to - the national grid. Such

analysis best takes place with the help of a geographical information system (GIS). The most recent analysis undertaken by the FUNAE GIS unit, assisted by the project, indicates a total of 50-potentially interesting mini-grid locations in Zambezia and Namputa province (i.e. both provinces combined).

The FUNAE GIS unit of the planning division continues to apply the RERD2 promoted methodology for identification of, mainly hybrid-solar, mini-grid sites. As this work evolves the need has arisen to organize missions to the provinces to ground truth the methodology and validate the identified areas for off-grid development with provincial and district entities such as SPI, SDPI, EDM and FUNAE. The quantitative targets of this work were re-confirmed with FUNAE in the M&E update workshop on 14 September 2021. Two such validation seminars took place in 2022. These are also reported in Ch. 2.5.3. Through these project sponsored provincial seminars direct contacts are established between the provincial and district EDM and infrastructure services and the GIS unit. Socio-economic information regarding the villages is now communicated directly from the district services to the FUNAE GIS unit through a common WhatsApp group. The former routine whereby the DEP's "Area Social" conducted telephone interviews with villages has herewith ceased to exist.



As to 'revised and updated studies' indicator, the technical work undertaken - notably the work in Nintulo - was explained in earlier Annual Reports and will not be repeated here.

What remains relevant is that in 2019 the RERD2 project commissioned a feasibility study for a small hydro power plant (SHPP) to electrify the Nintulo area. The result of the

feasibility study, conducted by the external consultant ENCO<sup>19</sup>, showed the possibility of building a SHPP of approximately 11.2 MW that could supply Nintulo and the surrounding settlements with electricity and be connected to the national grid. This probable future Nintulo SHPP would cost about 20 million EUR, for an annual production of 49.7 GWh. It was recommended however that the mentioned hydropower potential of 11.2 MW be confirmed by water flow measurements and later a feasibility study review. A successful waterflow data collection system was set up by the project in collaboration with the Nintulo community that collected data from 2019 to 2022. As such, in 2022, the project disposed of a solid waterflow dataset<sup>20</sup> to serve as input for the review study that was commissioned from the consulting company MARGE.

To attract private investment to this promising project, it was recommended to start with creating the conditions for evacuation of the energy that would be generated by the future hydropower plant. This could be achieved through the construction of a local distribution network that would serve a dual purpose:

- a) Nintulo and the surrounding settlements would be supplied with electricity, as foreseen in the former five-year plan (2014-2019) and the universal 2030 electrification plan, and
- b) Power from the SHPP would be sold to the national grid operated by EDM.

The population of Nintulo, which has been involved since 2011 when FUNAE began the first studies, has been expecting electrification for a long time.

With the above logic in mind, the project decided to carry out feasibility studies into the electrification of Nintulo and its 8 surrounding settlements via the national grid and the injection of SHPP power into the EDM grid. A first phase project was thus to aim for supply of energy to the settlements of Nintulo, even before the construction of the mini-hydro plant and in so doing create the conditions for the evacuation of power of the future SHPP. In addition to the energy needs assessment undertaken in the Nintulo area communities in the context of the ENCO study in 2019, RERD2 undertook a study on the energy needs of Mpissa Village and AGROMOZ (an Agro-business) because Mpissa and AGROMOZ were not covered by the ENCO implemented study.

The first MARGE mission was undertaken between November 24<sup>th</sup> 2021 and December 3<sup>rd</sup> 2021. This mission included theoretical and field training of 4 FUNAE technicians from the Hydro Division<sup>21</sup>.

The MARGE final report<sup>22</sup>, delivered in November 2022, presents the results of:

- 1) the analysis of the river flow data collected during the last two rainy seasons in the selected site and the historical rain and river flow data collected in the area.
- 2) the review of the gauging station rating curve and flow measurements with a propeller (linked with on-site training), and

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<sup>19</sup> Feasibility Study for a small hydro power plant based mini-grid in Nintulo, Gurué district in the Province of Zambezia, Mozambique, ENCO, 2019

<sup>20</sup> Regular project missions to Nintulo still take place to either; a) solve technical issues with the measuring equipment, or b) to coordinate regular road repair works to keep the site to the measuring weir accessible. The tropical storm Ana of the end of January 2022 destroyed parts of the measuring dam and gauges, such that reliable measurements were impossible for months until they could be repaired at the height of the dry season in October/November 2022.

<sup>21</sup> Addition of a training component to the terms of reference of the MARGE assignment had been decided following a successful training of the FUNAE Hydro Division by the junior expert in 2021.

<sup>22</sup> MARGE, Feasibility of hydropower injection into, and extension of the national (EDM) grid in the Nintulo area - Recommendations report, Nov. 2022, 88pp..

- 3) the review of a) the hydrology and the Flow Duration Curve (FDC) of the selected site, b) the projected construction cost, c) the civil, hydro and electromechanical design (intake, channels, penstock, turbines...) and d) the economic and financial study.

Training activities that were linked to the study are presented in Ch. 2.5.3.

The study confirms that the monitoring station installed on the Lotiwa River by Enabel is relevant and overall well designed and recommends that measurements should definitely be continued beyond the duration of the study to enrich the database for any later further update of the rating curve of the water flow.

The Portuguese language version of the report, received in December 2022, was transmitted to FUNAE. FUNAE is advised to share the report with EDM to jointly analyze its conclusions and recommendations.

Two important recommendations of the study are quoted below.

- The low head option of the micro-hydro scheme<sup>23</sup> should not be developed in particular because of the high LCEO, the low possible installed capacity and because an additional alternative source of energy should be installed for the 2 months of the year where the production will be close to zero.
- The attractiveness of the high head option (proposed by ENCO in 2019) is questionable, but with the right level of technical support and subsidies and a commitment from EDM to act as off-taker and to build the MV line from one of the two potential connection points identified, this project could potentially interest an IPP. The MARGE report could therefore be shared with prospective IPPs who could seek the support of programmes such as PROLER or GET.fit to develop the project. The role of Enabel and FUNAE in such a project would be very limited.



It was earlier reported that based on a, project developed, master table of 59 hydro sites holding information on 24 key parameters (geography, hydrology, costs, ...) the FUNAE hydro division had submitted a document to the project that indicates FUNAE's views on the most interesting hydro power locations and suggestions to replicate the positive Nintulo flow measurement experience. Technicians from the Hydro Division and the junior expert, visited the potential hydro site of Mutala (Zambezia) early October 2021. It was concluded that although a measuring dam, as used in Nintulo, was not feasible here due to the width of the river the best opportunity for further work remained this potential hydroelectric power plant site in Mutala. The type of measuring equipment to be acquired was identified. Following exploratory discussions between FUNAE, RERD2 and the

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<sup>23</sup> Estudo de pré-viabilidade, electrificação através de mini-hídrica da localidade de nintulo, AQUALOGUS, 2012



companies 'Central Hydro-Solar de Mutala Lda' and 'Resilience' a proposal for cooperation between these four entities on the collection of river flow data in Mutala was envisaged. However, the continued absence of a formal contract between the two private sector partners led to high risks of inefficient use of RERD2 project human and monetary resources, which eventually led to the decision to cancel this in principle very interesting cooperation.

In 2019 and 2020 the project invested considerably in studies. A total of 19 prefeasibility and 5 comprehensive financial and technical feasibility for mini-grids formed the basis for the EPC tenders published early 2021.

Contracts for a total of 8,768,166 Mio Euro were awarded on 2 December 2021 to two consortia; ESI/EnGreen plus Daker for Lot1 Milhana, Lot2 Muite and Lot5 Mugulama (Total 4,322,407 Euro) and ENERSOL-Azimut plus TECNEL for Lot3 Alto Maganha and Lot4 Idugo (total 4,445,759 Euro). These values are excluding VAT that will be paid by the



national partner FUNAE. Payment of VAT and duties by the partner is an achievement in itself and demonstrates FUNAE's compliance with its agreements with Enabel/Belgium. The official starting date of the work (for both companies) was set at 10 January 2022. The execution period was settled at 425 days for Idugo and 365 days for the other 4 mini-grids.

On 12 April, after 3 rounds of tenders, the USA based company NRECA was awarded a contract of €437,210 for supervision of the design & construction works. The kick-off meeting with NRECA and ENERSOL and ESI respectively took place on 25 and 27 of May 2022.

A total of 16 community meetings were held in the five communities<sup>24</sup> that will receive a mini-grid. A first batch of meetings, known as the "*consulta comunitaria*", relates to the acquisition of land rights (known as DUAT) for the mini-grid infrastructure notably for the exact location of the production unit/'powerhouse'. During this meeting the

<sup>24</sup> 4 in Milhana 4 in Muite, 2 in Nagonha, 3 in Idugo and 3 in Mugulama. Consultations with target communities reported in earlier years concerned the detailed energy needs assessments and the physical inventory phase related to the feasibility studies.

FUNAE/Enabel team officially presents the project and the project team members and answers questions about the timeline of the mini-grid development project, the functioning of the electricity vending system and the use of electrical equipment after the realization of the mini-grid (specifically underlining the importance of productive use of energy). A second batch of community meetings concern what is called the 'consignação'. These meetings: a) mark the official start of works, b) involve presentation of the contractor and works supervisor, c) provide the opportunity to answers any questions regarding issues such as the project timeline, involvement of local workforce during construction, number of beneficiaries that will be connected and d) underline, again, the importance of productive use of energy after the realization of the mini-grid. A third batch of meetings specifically concerns the beneficiary selection process. Each and every community meeting provides opportunities for dialogue and management of expectations.

It is important to note that the project completed the DUAT process for all five sites. It concluded all needed community meetings and FUNAE submitted all the necessary documentation to the Ministry of Land and Environment for obtaining the DUATs. According to FUNAE obtaining the final DUAT certificate can take a couple of months (or even years). Another important document is the environmental license which will be discussed in Ch.2.11.2

As to the engineering, procurement and construction we report as follows.

The design of all 5 mini-grids (powerhouse as well as distribution grids, 3 by ESI and 2 by ENERSOL has been approved. The two companies with their respective partners work in quite different ways. ESI assembles three 40-foot powerhouse containers entirely in Italy as 'plug-and-play' units once they arrive on site. Another three 40-foot containers contain the office (sentry house) complete with kitchen, bathroom and living quarters. These will be located next to the three power houses in the three locations. ENERSOL - like ESI - also orders all mini-grid components from various international suppliers in Europe and Asia, but ships them separately and directly to Maputo, where all components are assembled at the local partner's warehouse in Matola.

ESI 'finished' the assemblage of the 6 containers in November 2022 and invited the FUNAE, Enabel, NRECA team to Rome end November to test the equipment prior to shipment, a so-called Factory Acceptance Test (FAT). The mission checked the installation of the containers, tested the equipment (solar panels, batteries, etc.) and verified the conditions in which the containers stood to be shipped. ESI had to make a number of corrections before the team could give permission for shipping<sup>25</sup>.

The shipment of the six containers is now scheduled for the end of February 2023, while a separate shipment of solar panels will come from China. The shipments will proceed to the port of Nacala where they are expected to arrive early May, to reach their final destination at the end of May.

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<sup>25</sup> During the FAT, the project team noted that ESI planned to ship the solar panels in the six containers mentioned above and had therefore already removed most of the solar panels from their original packaging. This was unacceptable to the project team because in case of any future failures, no warranty claims could be made to the supplier as failures in that case could easily be attributed to improper transportation outside the original packaging. This forced the company to order new solar panels from China to be sent to Mozambique separately.



Civil works in Mugulama (Zambezia) have advanced over the past months (fence, container foundations, water borehole works, ...) but remain to be started in Muite and Milhana (Nampula province). The building of the distribution grids is about to start and expected to be finalized in August. ESI – or better its local partner – has proven to be fast with civil works. The contrary is true for

ENERSOL's local partner. This company, on the other hand, started civil works much earlier i.e. in August 2022 in Nagonha and in November in Idugo island. So in terms of civil works, ENERSOL seems more advanced, but works at a much slower pace. ENERSOL has already completed 11 import processes and most of the equipment is already present in the local partner's warehouse.. A few more shipments need to arrive before all parts can be assembled in the (one) 40-foot container (power house) for Nagonha. The office (sentry house) in Nagonha is being constructed with standard cement blocks. All equipment for Idugo Island will be assembled on the island in a concrete building (powerhouse) built for the purpose<sup>26</sup>. The office in Idugo is also being erected with standard cement blocks.

Progress was slower than planned. Certain events in 2022 could not have been foreseen (see below). On the other hand, the project's, and companies', planning<sup>27</sup> was clearly too ambitious having given insufficient consideration to conditions under which work has to be undertaken.

Two clusters of interrelated factors explain the observed delays. Firstly, unforeseen external events in the international and national context, and secondly, the high interdependence of several key players in the project and the knock-on effect of delays in action or, worse, inaction of some of these actors.

Unforeseen adverse developments in the international context were; a) tightened GHG targets and COVID in China, slowing down production of solar panels, b) the war between Russia and Ukraine that led to an international - energy – crisis, and c) increased security in Northern Mozambique (notably starting in June 2022). The combination of the first two events led to rapidly increased demand and slower delivery of essential mini-grid components such as PV panels, batteries, inverters, etc. In their endeavors to adapt to this situation and comply with the work schedules, the companies were forced to propose

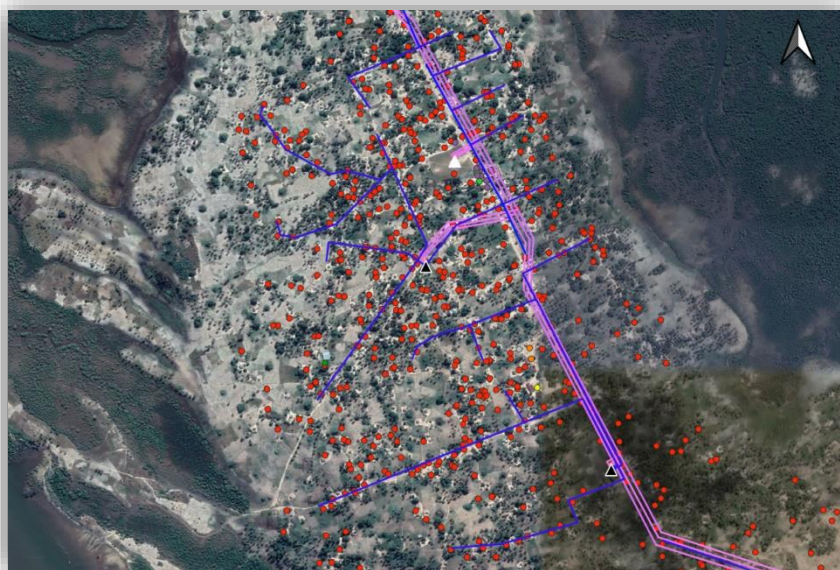
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<sup>26</sup> Idugo being an island a containerized solution was not feasible for this location.

<sup>27</sup> with an anticipated completion of the design and construction of 4 mini-grids in 365 days and 1 mini-grid in 425 days,



variations to their 'Best and Final Offers'(BAFO) dating from 2021. These changes all had to be approved jointly by Enabel, FUNAE and the supervisor NRECA (see below).



Without going into the details of individual responsibilities<sup>28</sup>, it will be clear that in a context of geographically dispersed but highly interdependent actors with different roles and responsibilities<sup>29</sup> regarding the creation of the field conditions for the mini-grids and the approvals at the different stages of the design and construction process of these technically complex mini-grids, the failure or delay of one actor will have important consequences for progress of the next (series of) steps. Failure or delayed action has led to the need for addenda to make some - technical and financial - changes to the EPC contracts that were not initially included in the terms of reference. However, the changes will remain well below the financial limit of 15%.

Lastly in this chapter, publications for results dissemination have not been produced to date. As to communication products please refer to Ch. 3.10.

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<sup>28</sup> A detailed explanatory note was submitted to the Director of Operations in Enabel HQ

<sup>29</sup> FUNAE, communities and their local governments, the implementing companies ESI and ENERSOL and their consortium partners, the supervisor NRECA and the project donor/co-manager Enabel

## 2.4 Performance output 2: Technical and financial sustainability of existing systems is improved

### 2.4.1 Progress of indicators

Output 2: Technical and financial sustainability of existing systems is improved					
Indicators	Baseline value (from TFF)	Value year N-1 2021	Value year N 2022	Target year N 2022	End Target
Nr of RERD1 funded hydro mini-grids investigated (with report) on functioning and operational status	0	0	2	0	3 (Majua, Sembezeia and Muhoa) The total # of studies reached 3 by the end of 2022)
Nr of RERD1 funded solar systems investigated and reported on operational status	0	0	0	0	377 (# target was met in 2019, the systems were then transferred to sectoral ministries (health and education))
GIS implemented beyond a static database and used for asset management purposes	GIS is static database and not used for asset management purposes	Improvements in GIS are being developed	Improvements in GIS carried through according to plan	Improvements in GIS carried through according to plan	GIS fully used for asset management purposes
Degree of connectivity / sharing GIS database with other departments	No sharing with other departments	Execution of improvements	Execution of improvements	Reasonable degree of connectivity	Excellent degree of connectivity
Cumulative number of RERD1 purchased meters and pre-payment systems installed and operational	726*) meters and pre-payment systems purchased but not operational yet \ 0% of systems operational	685	726 (Installed in Majaua, Muhoa and Sembezeia)	690	726
Use of tablets in data collection campaigns and missions of the Operation and Maintenance (O&M) unit	Not yet used	Used in 7 missions	Implementation in all missions at HQ level, pilot use in selected delegations and systematic integration of selected data	Implementation in all missions at HQ level, pilot use in selected delegations and systematic integration of selected data	Systematic use at HQ and delegations' level
Percentage of new (RERD2) mini-grid connections equipped with pre-paid meter	n/a	n/a	n/a	100%	100%
Percentage of FUNAE pre-paid meters served by a remote sales system using mobile money	0%	0%	0%	100%	100%
Cumulative number of FUNAE-managed PV mini-grids - over 20 kWp - that are remotely monitored (facilitating full maintenance)	0	0	0	0	23
*) A total of 726 meters (incl. 3 payment system computers) were purchased in October 2016. All meters were intended for use in 3 hydro mini-grids funded by RERD1. Until February 2021 FUNAE had installed 685 pre-paid meters in Muoha, Sembezeia and Majaua. In 2021 Muoha was connected to EDM's national grid as such 78 pre-paid meters were removed. In 2022 all 726 had finally been installed in the three intended mini-grids of Muoha, Sembezeia and Majaua.					

## 2.4.2 Progress of main activities

Progress of <u>main</u> activities <sup>30</sup>	Progress:			
	A	B	C	D
1 Planning, operation and maintenance processes are strengthened		X		
2 Strengthening of Information systems		X		
3 Remote metering and monitoring systems allow for more efficient maintenance of the systems.		X		
4 Implementation of payment systems (metering, fee collection, pre-payment)			X	

## 2.4.3 Analysis of progress made

Earlier annual reports already described the examination of the operation and functioning of the three RERD1-funded hydro-mini-grids of Majaua, Sembezeia and Muhoa (first indicator in the table above) and the 2019 field study on 377 individual solar energy systems (the second indicator in the table above) also funded by RERD1. Regarding the hydro power plants we can now add observations from a 2022 report prepared by EDM in preparation of the project sponsored training course of FUNAE maintenance staff (see Chapter 2.5.3) and observations from a thematic evaluation also undertaken in 2022 in the context of a thematic review of Enabel energy infrastructure projects in three countries among which Mozambique. A few key observations from the EDM report observation are summarized in this footnote<sup>31</sup>. Please refer to the text box on the right for the Enabel review comments on the Muoha and Sembezeia power plants.

The operational status of the 2 [RERD1] small hydro plants commissioned in 2015 (Muoha 100kW and Sembezeia 62kW) is currently satisfactory; both plants are operational and the quality electromechanical equipment is relatively well maintained by FUNAE. Unfortunately, the initial design did not consider the exceptional floods of March 2019 (cyclone IDAI). The Muoha off-grid plant was completely destroyed and finally repaired. In the meantime, the village of Muoha is connected to the EDM grid. For the Sembezeia plant, the civil engineering was partially damaged; the upstream water reservoir is filled with alluvium and much of the water flows past the plant, which greatly reduces its performance. The distribution network is of good quality and will be extended soon by FUNAE.

The implementation of the project-driven GIS improvement plan is beyond the direct control of the project, but FUNAE suggesting inclusion of concrete progress indicators of off-grid energy planning in the - updated - M&E matrix was significant (see the last indicator of Result 3 in Ch. 2.5.1.).

<sup>30</sup> A: The activities are ahead of schedule  
 B: The activities are on schedule  
 C: The activities are delayed, corrective measures are required.  
 D: The activities are seriously delayed (more than 6 months). Substantial corrective measures are required.

<sup>31</sup> Regarding the hydro power plant of Majaua EDM remarked that the streetlights (always on during the day) are used as a resistive load bank to ensure constant and safe supply of electricity from the generator and prevent equipment from burning out. EDM advises to install a resistance bank in the power station. Another concern relates to the faulty automatic grid cleaning system. A third critical observation concerned the permanently disconnected generator control panel. EDM advises to keep the panel 'always on' to ensure battery charging and pre-heating of the group and thus avoid that one day the battery is discharged or damaged. Regarding the Sembezeia power plant; the plant has been affected by siltation of the dam, which may cause a reduction in the energy potential and erosion of the dam. It is advised to urgently take some initial measures to reduce the silting and thus avoid reducing the useful volume of the reservoir, which could harm power generation. Preventive and corrective monitoring of deposits should be carried out because the loss of storage volume directly affects power generation.

The effectiveness of earlier training of GIS (and DSSE) staff in automatic and manual drone piloting has been confirmed as the GIS unit, as well as other divisions, now autonomously undertake aerial surveys assisted by a RERD2 purchased drone<sup>32</sup>.

FUNAE also continues to actively use the ArcGIS online subscription for the publication of maps and as such making information available to the general public and, importantly, the private sector. The shift of imputation of the license- and subscription costs in 2022 from the project budget to the FUNAE operational budget is an excellent sign of sustained use ArcGIS in planning. Additionally, an energy access monitoring platform is now under development with the Mozambican Space Agency. It is currently in a testing phase. FUNAE is also in the process of developing a project platform. These are significant achievements but the project continues to stress that strict data quality remains necessary before information is made available online. Further implementation of the actions included in the aforementioned GIS improvement plan and further provincial seminars to validate and complement desk analysis (see Ch. 2.5.3.) will significantly contribute to this.

All the above indicates that the analytical capabilities of GIS are being actively and increasingly used. However, the use of GIS for asset management remains absent or very limited. This is linked to FUNAE's policy of transferring decentralized individual solar systems to sector ministries (notably the health and education ministries) and the changing role of FUNAE going forward (as explained Ch. 2.1.2.)

Regarding the degree of connectivity/sharing of the GIS database with other departments we observe what follows. While it would be an exaggeration to say that there is a full interdepartmental data sharing, it must be said that today all FUNAE staff in possession of an ArcGIS account can access information on existing mini-grids, and those under development, via a (shared) link.

On the installation of RERD1 pre-paid meters, we can report that all 726 meters (100%) are now installed in RERD1 funded hydro powered mini-grids, notably those of Majaua, Sembezeia and Muhoa.

The previous annual report described 7 missions undertaken by FUNAE's Maintenance Unit (MU) in which data were collected using tablets introduced by RERD2. The data were shared with the project but, more importantly, included in the maintenance unit's database. All UM missions at HQ level now seem to be using tablets. Mainstreaming of the use of this instrument in FUNAE was greatly facilitated by a DEP "Area Social" staff member who reportedly trained many FUNAE staff in the use of this instrument. According to the head of the maintenance unit, the use of tablets by FUNAE delegation staff lags behind, with about 70 per cent of data collection missions now using these devices. However, a critical observation needs to be made; although collected data are fed

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<sup>32</sup> another encouraging sign is that FUNAE is now in the process of developing a tender for the purchase of drones on its own operational budget

into FUNAE database(s) data analysis and reporting is often still lacking.



Regarding the installation of pre-paid meters and remote sales system services, the project supported FUNAE's maintenance unit in market research on such systems for installation in future RERD2 mini-grids. This also involved the implementation of a centralized sales system that can receive remittances from mobile money accounts. A remote vending system was put in operation with a license and server acquired in August 2022. The server is in FUNAE's UTIC (*Unidade de Tecnologia, Informação, e Comunicação*) but runs a cloud platform with access to all authorized users. Mini-grid meter references from the provinces are progressively stored / uploaded on this system. FUNAE's CEO however has not yet authorized entry into agreements with (the) main mobile money operators (Mpesa, Emola) to integrate these payment systems with the remote sales system. Such integration in the future would allow the automation of the electricity sales and token generation process.

Joint project and UM market research allowed the use of a 'negotiated procedure without prior publication' for a tender for a remote monitoring system for 20+ FUNAE mini-grids. Three offers from international companies were received. Field trips to Kenya and Uganda, planned as part of the evaluation of three bids, were put on hold after the RERD2 project learned that FUNAE was in the process of making a similar purchase funded by the EU delegation and implemented by the French Development Agency (AFD). The project has been waiting 6 months for a decision from FUNAE on the matter. Finally on the 7<sup>th</sup> of February 2023, it emerged that FUNAE wishes to pursue the purchase of a system through the RERD2 project necessitating the bidding companies to update their offers. This activity is taken up again in 2023 and included in the workplan.



## 2.5 Performance output 3: The capacity of FUNAE in planning and project management is improved

### 2.5.1 Progress of indicators

Output 3: The capacity of FUNAE in planning and project management is improved					
Indicators	Baseline value (from TFF)	Value year N-1 2021	Value year N 2022	Target year N 2022	End Target
Capacity building (CB) plan available and executed	No plan for capacity building	ToR under development	ToR under development	Agreed plan for capacity building	Agreed plan for capacity building available and executed according to plan
Cumulative number of different types of training for FUNAE staff administered		23	26	25	30
Cumulative number of trained FUNAE staff	0	104	118	105	125
Cumulative number of hours of training of FUNAE staff (HQ/Delegation, M/F)	0	6,704	8,523	5,300	7,000
Number of - internal - technical support documents drafted and distributed within FUNAE		9	15	12	15
Quality of socio-economic survey methodology	No standard method for socio-economic surveys	Improvements carried through in digital tools	Improved standard template for surveys stored on tablets being used for these surveys	Improved standard template for surveys stored on tablets being used for these surveys	Improved standard template for surveys stored on tablets being used for these surveys
Processes and working procedures for maintenance and mini-grid site-selection (GIS) improved	Working processes and procedures for maintenance and site selection not sufficiently functional	Development of (improved) working procedures ; start implementation	Development of (improved) working procedures start implementation	Implementation of new working procedure and refinement	Clear processes and tools for maintenance and site selection
Cumulative number of provinces with mini-grid sites selected and validated		1 selected 0 validated	3 selected 2 validated	6 selected, 3 validated	11 selected, 11 validated

### 2.5.2 Progress of main activities

Progress of <u>main</u> activities <sup>33</sup>	Progress:			
	A	B	C	D
1 Project management is improved at FUNAE central level		X		
2 Capacity of selected delegations of FUNAE are strengthened in sector planning and coordination			X	
3 Technical assistance		X		
4 Surveys, field trips workshops and seminars, study tours		X		

<sup>33</sup> A: The activities are ahead of schedule  
 B: The activities are on schedule  
 C: The activities are delayed, corrective measures are required.  
 D: The activities are seriously delayed (more than 6 months). Substantial corrective measures are required.

### 2.5.3 Analysis of progress made

FUNAE picked up on a project proposal to contract consultancy services for the preparation of a capacity development plan but after initial cooperation in drafting of the terms of reference this work was suspended pending finalization of FUNAE's new corporate strategy and nomination of 2 (new) executive directors and 4 (new) division heads expected by early 2023.

The project developed a 'training database' where it registers all project in-house and outsourced training activities. From project start to date it registered a total of 8,523 'person training hours'<sup>34</sup> for 118 different technicians. 68 training hours were administered in 2019, 1,312 in 2020, 5,359 in 2021 and 1,784 in 2022. Some 70% of trained technicians was male and 30% female. 72% of trained technicians were from FUNAE headquarters and 28% from delegations. Below is a short overview of training by broad category so far.

*Number of trained technicians per type of training, sex and year.*

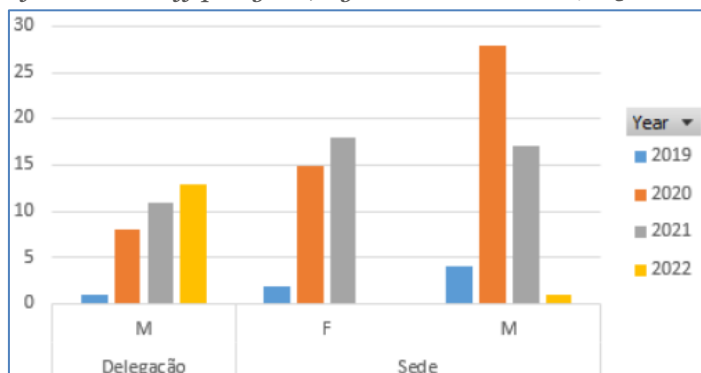
Type of Training	Female				Total Female	Male				Total Male	Grand Total
	2019	2020	2021	2022		2019	2020	2021	2022		
1. Data collection (Kobo toolbox, tablets, gauge metering, ...)		3	1		4	1	16	1		18	22
2. Design of mini-grids								29		29	29
3. Drone and photogrammetry								3		3	3
4. English (5 different levels)			13		13			13		13	26
5. Formação NEBOSH			1		1			1		1	2
6. GIS and hydro design	1		3		4	2	3	4		9	13
7. GIS and planning		3	13		16		1	9		10	26
8. GIS Topography and planning	2	3			5	2	10			12	17
9. Hybrid mini-grid design							4			4	4
10. MS Office Excel (data analysis, ...)		13	12		25		14	13		27	52
11. Project Management			6		6						6
12. PV System design						2				2	2
13. PV System design and planning						1				1	1
14. Generation, Distribution and Management of Renewable Energies		1			1		10			10	11
15. Pre-feasibility study of hydro power plants				1	1				8	8	9
16. Mini-hydro plants Operation & Maintenance									11	11	11
17. Training for trainers - Gender Analysis in the energy sector				1	1						1
18. Factory acceptance mini-grids								2		2	2
19. Project monitoring techniques			3		3			1		1	4
<b>Grand Total</b>	<b>3</b>	<b>23</b>	<b>49</b>	<b>5</b>	<b>80</b>	<b>8</b>	<b>58</b>	<b>73</b>	<b>22</b>	<b>161</b>	<b>241*</b>

\*) Note: Total exceeds 118 (i.e. # of technicians trained) because a good number of technicians benefit from more than one training

Below is a graphical representation of the evolution of FUNAE training supported by the project.

<sup>34</sup> Which is 1,523 hours over the target set for the end of the project

Number of trained staff per year, by sex and location (HQ or Delegation).



All of the above capacity development activities relate to work that needs to be undertaken routinely by FUNAE technicians. As such, they are also linked to indicators under output 2 "Technical and financial sustainability of existing systems is improved".

Most of the courses listed in the table have been commented on in previous reports. Below we mention the five major training activities of 2022.

#### Pre-feasibility studies of small hydro plants

In the context of the work on the Nintulo SHPP described in Ch. 2.3.3. four (4) hydro division and five (5) delegation technicians were trained in producing mini-hydro pre-feasibility studies in their technical, economic-financial and environmental components so that they can play their role of promoting investments in the mini-hydro sector in Mozambique. These pre-feasibility studies have to assess the potential of a site and attract investors. This was a follow up of a 'Training on the use of drones and photogrammetry' that had been administered by MARGE in November 2021. The involved technicians showed a keen interest and have subsequently transmitted their knowledge (as required by FUNAE's principle of cascade training) to other divisions notably the solar division (DSSE) and the research and planning division (DEP). This strengthened earlier training of DEP and DSSE in automatic and manual drone piloting, confirmed by the fact that staff of these division is now autonomously undertaking aerial surveys assisted by the RERD2 purchased drone(s).

#### Mini-hydro plants Operation and Maintenance

The project encourages FUNAE to work with EDM to train their technicians operating (FUNAE) hydro power plants. Two batches of a twenty days training course on the



operation and maintenance of small FUNAE hydropower plants for one HQ hydro division staff and 10 local operators from Manica (4), Zambezia (3) and Niassa (3) was undertaken by EDM engineers at its training institute in Chimoio. Preparation of the course involved the funding of trips of EDM engineers to three FUNAE operated hydropower plants to study the facilities. On the basis of those missions, EDM

prepared their report (see Ch.2.4.3.) on the current status and handling of the SHPPs and proposed the curriculum. A second batch of training sessions (for two groups) was foreseen for Q3 and Q4 but FUNAE did not come forward with a confirmation of their interest. The second batch training is now likely deferred to 2023.

#### Training of trainers in Gender Analysis in the energy sector

The FUNAE gender focal person (as well as the RERD2+ gender focal person of INIR<sup>35</sup>) benefitted from a CBMIREME administered “Training of Trainers” course. This training was accompanied by an elaborate training manual developed for the purpose. M&E by national and international junior experts is taking place to measure the degree of implementation of what was learned by the gender focal points and assess areas for improvement.

#### Factory acceptance of mini-grids

In the last week of November 2022, the RERD2 energy engineer accompanied by two of his FUNAE counterpart technicians and the NRECA contract supervisor of the 5 mini-grids travelled to Rome. The prime purpose of the mission was to check six pre-assembled containers before shipment and to test the equipment for compliance with the contract's terms of reference.

In addition to the mission's primary objective; a) the two FUNAE engineers learned how the containers are assembled, b) had the opportunity to test innovative materials such as HV batteries and their inverters, and c) through dedicated meetings, were able to understand how the EPC contractor designs the mini-grids and what the contractors' priorities are in terms of design and logistics.

#### Project monitoring techniques

Also funded was a full online course for four technicians from DEP on “Project Monitoring techniques”.

#### Project Management Reporting

A "Project Management Reporting" course was funded under the project in 2021, but for various reasons, the course could not be attended in 2021 nor in 2022. Five FUNAE provincial delegates participated in this course in Portugal in January 2023, travel costs were financed by FUNAE.

The project continues to encourage the GIS unit to apply the project developed manual on site identification of mini-grids and to produce a database and pipeline for the development of mini-grids projects in the provinces where this analysis has not yet taken place i.e., all except Zambezia, Nampula and Tete.<sup>36</sup> The techniques now used in the GIS unit seem to be successful. Progress by the GIS unit however is slower than planned. To date only three provinces were fully analyzed (with validated shapefile maps) and only two validation seminars were held against a project target of 3 for the end of 2022 (and 11 by the end of the project). With the analysis of all remaining provinces attributed to specific technicians and analysis of Sofala being in an advanced stage the GIS Unit's self-evaluation of this indicator rates it as ‘on target’ i.e., ‘Implementation of new working procedure and refinement’. It should be remarked however that, whilst the GIS unit is

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<sup>35</sup> Not included in the table above as the table only concerns the electrification component

<sup>36</sup> This methodology was earlier described in an article entitled ‘Rural electrification in Mozambique: how to find the right villages?’.

indeed making significant steps, no more can be said on the performance of the maintenance unit regarding the ‘maintenance part’ of this indicator (see also explanation on this subject in Ch. 2.4.3 and Ch. 2.1.2).

Learning about remote monitoring systems from mini-grids via field trips to Kenya and Uganda did not take place as the acquisition of a remote monitoring system was put on hold by FUNAE. Depending on FUNAE's choice for a particular system to be installed (see Ch. 2.4.3) organization of this trip may resume.

In 2022, two new comprehensive technical documents were prepared. One (Nº. 14 below) was part of intensive workshop and in field training activities of FUNAE Hydro division staff referred to in Ch.2.3.3. The second concerns the project’s gender strategy, the dissemination workshop of which took place early November 2022. This gender strategy contains two action plans, one for the RERD2 electrification component with FUNAE and one for the irrigation component with INIR.

Below is a list of all technical documents / manuals - all in Portuguese – developed by the project so far.

#### **RERD2 Technical training documents**

1. *Uso produtivo de energia, 2019, 7 pag.*
2. *Avaliação e monitorização dos sistemas RERD1 na Zambézia, 2019, 31 pag.*
3. *Análise de consumo das mini-redes geridas pelo FUNAE, 2020, 56 pag.*
4. *Manual para coleta de dados do caudal e precipitação em Nintulo, 2020, 43 pag.*
5. *Plano GIS, Recomendações para a estratégia GIS no âmbito da FUNAE e feedback sobre o plano GIS da FUNAE, 2020, 9 pag.*
6. *Manual do Drone. Documento com a informação necessária para a utilização de drone para a produção de mapas. 2020, 12 páginas.*
7. *Manual Kobotoolbox. Utilização básica de kobotoolbox para recolha de dados de campo. Adaptado da documentação oficial. 72 slides, 2020.*
8. *Fluxo de trabalho da Kobotoolbox. Documento que descreve o fluxo de trabalho recomendado para a utilização da kobotoolbox dentro da Dep. de Estudos e Planeamento (DEP/FUNAE), 4 pag.*
9. *Metodologia de pré-selecção de locais com teledeteção, 2020.*
10. *Templates inquéritos socio-economicos readaptadas em colaboração com DEP, 2020*
11. *Manual de uso do software “Weatherlink 6.0.5”, 2020, 9 pag.*
12. *Metodologia para a identificação de locais adaptados para a construção de mini-redes Dezembro 2020, 28 pag.*
13. *Análise em remoto o potencial de locais hídricos - manual, August 2021, 133 pag*
14. *Training on hydropower pre-feasibility studies for FUNAE technicians Final report, June 2022, 72 pag. (attached documentation and slides are in the Portuguese language)*
15. *Estratégia de género para RERD2, 2022, 29 pag.*

Apart from the above reporting on ‘formal’ capacity building activities it remains interesting to note that the ‘simple’ fact of day-to-day collaboration between Enabel and FUNAE staff also contributes to individual and organizational learning of which we mention two examples.

The transition to the "Regie" modality, with the active involvement of FUNAE technicians in the new (Enabel regie) tenders, has allowed FUNAE technicians to understand laws and procedures different from those of Mozambique. They acknowledge that these procedures are an interesting reference for an institution such as FUNAE, which is regularly invited to contribute to the evaluation of Mozambican procurement procedures and invited to suggest improvements. In doing so, the project plays a role in informing the

FUNAE procurement unit (UGEA) by proposing procedures that guarantee more flexibility, price control and bid quality.

On the more technical side, FUNAE benefits from the project team approach and is motivated to introduce innovative technological solutions, such as containerized solutions, reduced IP protection<sup>37</sup> of some components - if there is no real need - and different inverter configurations. This has contributed to FUNAE's technical diversification also in other projects paving the way to reduce construction costs, improve the quality of mini-grids and open up the market to brands that were not yet present in Mozambique. Indeed, FUNAE recently launched a tender for the purchase of fifteen pre-assembled mini-grid containers destined for as many rural communities.

The FUNAE engineers are also benefiting from the approach that Enabel and NRECA (project supervisor) engineers have chosen in analyzing certain aspects related to the introduction of new technologies, such as the analysis of air conditioning systems proposed for cooling the battery room and the subsequent identification of critical points to be studied. In addition, FUNAE technicians are exposed to innovative design solutions that the contractor is proposing, showing them how the same problem can have different solutions

## 2.6 Performance output 4: pro memoria, technical budget line for IVA (VAT)

This additional technical budget line was created to keep track of VAT movements in the former Enabel accounting system. Enabel projects, like many other cooperation projects, are since many years in principle exempt from payment of Value Added Taxes. In practice however VAT was – and often still is –paid, only to be claimed back later by the end of the project.

Following the introduction of a new VAT mechanism in Mozambique in November 2017, on 19 June 2018, the Enabel representation alerted FUNAE about the need to register the RERD2 project for this new special VAT regularization mechanism. The request was in effect introduced by FUNAE at the Ministry of Economy and Finance. In 2020 this was followed up by an Exchange of letters between the Mozambican and Belgian governments resulting in an addendum adding the Ministry of Economy and Finance (MEF) as signatory to the Specific Agreement between the two countries<sup>38</sup>. On 28 May 2021 FUNAE officially informed Enabel that VAT and customs duties linked to the development of the project's mini-grids would be fully charged to the FUNAE / state budget in accordance with the terms set out in the special agreement and its addendum. A formal letter dated 27 February 2022 from the Ministry of Finance to FUNAE confirmed that RERD2 was indeed eligible for the VAT mechanism under Decree No 66/2017.

From all correspondence so far between FUNAE and the Directorate of Public Accounts and Customs regarding 11 import processes (all by the ENERSOL consortium), it is clear that the duties are indeed fully borne by the state budget, so the project does not have to

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<sup>37</sup> IP = Ingress Protection, an international protection standard of effectiveness of the sealing of electrical enclosures against intrusion from foreign bodies such dirt, dust, moisture ..

<sup>38</sup> The original agreement had been signed only with, Ministry of Foreign Affairs and Cooperation (MINEC° which, according to MEF, was not sufficient for the project to qualify for the mechanism.



pay these costs. The total value of these 11 imports is about €300,000. This confirms the project's approach of committing to building five rather than four mini-grids.

## 2.7 Performance output 5: The new legal framework is influenced by FUNAE

### 2.7.1 Progress of indicators

Output 5: The new legal framework is influenced by FUNAE					
Indicators	Baseline value (from TFF)	Value year N-1 2021	Value year N 2022	Target year N 2022	End Target
Number of discussion / position papers on legal frameworks for renewable energy developed by FUNAE, and shared with decision-makers.	0	0	0	1	4
Number of meetings organised by decision-makers (MIREME, ARENE) attended by FUNAE in which legal frameworks are discussed.	0	0	0	1	4

Earlier reports (including the baseline report) explained the addition of result 5 “*The new legal framework is influenced by FUNAE*” to the original project logical framework. FUNAE and the project have been working with different donor initiatives trying to overcome the in 2019 identified difficulties. The project, as well as other stakeholders, contributed to drafting the new regulatory framework developed by MIREME and ARENE in cooperation with a group of national and international experts. The new decree regulating the off-grid energy sector (Regulation for Energy Access in Off-Grid areas in Mozambique) was approved (see Ch.2.1.1) laying an important foundation for future private sector investments in off-grid energy installations. These recent and very important steps in the legal framework reduced the need for the project to maintain resources for the foreseen activities (position papers, meetings, ...). Recent developments in the legal framework now actually urge FUNAE to evolve into an institution that functions as a genuine fund and less as a utility (as has been the case up to now). As such it was essential for the project to reorient its activities under this result area and honor FUNAE’s request for the recruitment of a national expert who can support the organization in its transition into an agile and innovative fund with knowledge of blended finance models and climate finance. The national climate finance expert is on board since 22 October 2021 and 100% based in FUNAE. The national expert's areas of intervention include developing a climate finance proposal for FUNAE, identifying financial instruments, assisting FUNAE in its accreditation with the Green Climate Fund and assisting the government of Mozambique in preparing COP meetings. Results we can highlight so far are listed below.

#### *Climate Finance proposals*

The initial idea was for FUNAE to piggyback on the experience of the Ministry of Land and Environment (MTA) and the National Sustainable Development Fund (FNDS) with the NAMA Facility<sup>39</sup>, however, this was not possible because the NAMA Facility informed

<sup>39</sup> Nationally Appropriate Mitigation Actions

MTA that FNDS had failed the enhanced due diligence process and unless a new NAMA Support Organization (NSO) was identified the presented idea of a Solid Waste project<sup>40</sup> would be rejected. Enabel was indicated as the new NSO. The proposal was reformulated to focus first on a material recovery facility and second on a sanitary landfill, for the Nampula, Nacala and Pemba Municipalities. In December 2022, the board of the NAMA Facility approved the NAMA Support Program submitted by MTA and a kick-off meeting between Enabel and the NAMA Facility took place. On the back of this meeting Enabel, MTA, FNDS and ANAMM<sup>41</sup> have started the preparatory activities to conclude all the technical studies to ensure that construction can start in 2024.

In the specific case of a climate proposal to be prepared by FUNAE, an initial discussion was held with the Head of the Technical Support Unit (TSU) of the NAMA Facility. Possible priority projects focusing on mini-hydropower and clean cooking solutions were identified as areas with potential for success from the point of view of the future focus of the NAMA facility.

#### *Identification, Development and Deployment of Financial Instruments*

Financial instruments to be deployed under the new private sector department of FUNAE have been finalized by Deloitte and the final report is waiting for approval from the board. However, it is not clear yet what the approach will be, what financial instruments will be chosen and where the resources to supplement the financial instruments will come from.

#### *Direct Accreditation to the Green Climate Fund (GCF)*

During the year under review, FUNAE started its accreditation process with the GCF. As part of this, an initial self-assessment was carried out, identifying the organization's strengths and weaknesses. A nomination letter from the Ministry of Economy and Finance (NDA, the national designated authority) was also obtained.

At COP -27 FUNAE managed to establish a direct communication line with the GCF and quarterly meetings have been scheduled with the accreditation department of the GCF (the second meeting is scheduled to take place in February 2023). The GCF also encouraged FUNAE to submit a proposal to its new funding facility (Project Specific Assessment Approach – PSAA) that will most likely be announced in April. Under the accreditation process of FUNAE, MEF facilitated FUNAEs' engagement with FONERWA (Ruanda Green Fund).

In the meantime, the RERD2 national expert assisted Enabel in submitting a readiness proposal to the GCF. The proposal is expected to be approved by late Q1 or early Q2 of 2023. Under this proposal, FUNAE and FNDS will share some Technical Assistance resources to support the accreditation process of both institutions.

#### *COP 27 preparations and participation*

Lastly under this result chapter, three staff of FUNAE (two of which supported by the project and accompanied by the RERD2 National Expert) participated in COP-27 in Sharm el-Skeikh. As preparation for their participation several capacity-building sessions were held and themes, around the main COP topics, were dealt with, in addition, specific and realistic objectives for FUNAE's participation were identified to ensure that the Funds' participation was considered successful. As a result, FUNAE participated in

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<sup>40</sup> "Mozambique – Sustainable Waste Management: Laying the Foundations for a Circular Economy",

<sup>41</sup> National Association of Municipalities of Mozambique

discussion panels related to clean cooking organized by HEPA (Health and Energy Platform of Action) and by SE4All and Modern Energy Cooking Service (MECS). In addition, at COP – 27 FUNAE held meetings with the Green Environmental Facility, Green Climate Fund, the NAMA Facility and the Beyond the Grid Fund to mobilize finance from these institutions in the next few years.

Other activities included supporting FNDS in the due diligence process, facilitating meetings with the African Development Bank to determine whether technical assistance could be provided, and discussions with the EU to obtain support for setting up an MRV system for the off-grid sector and others.

The intervention manager in turn continues to contribute to events that promote private sector interest in the off-grid energy sector (see Ch. 3.10 on communication).

## 2.8 Performance output 6: Sustainable solar powered irrigation systems are taken up by selected farmers in 2 provinces



Implementation of the RERD2+ component commenced mid-2021. Therefore, the indicator “Values year N-1 2021” still correspond to the “Baseline values”. In this same year the RERD2+ baseline report was produced and integrated into the updated RERD2 baseline report that was approved by the steering committee early 2022.

### 2.8.1 Progress of indicators

Output 6: Sustainable solar powered irrigation systems are taken up by selected farmers in 2 provinces					
Indicators	Baseline value	Value year N-1 2021	Value year N 2022	Target year N 2022	End Target
Cumulative number of farmers informed and sensitized in the provinces about SPIS	0	0	2,107 63% men, 37% women)	>=1,000 (minimum 50% women)	>= 2.000 (minimum 50% of women)
Total irrigated area (ha) under SPIS installations by the project	0	n/a	0	200	900
Number of reports on lessons learned disseminated and published	n/a	n/a	0	1	3

## 2.8.2 State of progress of the main activities

Progress of <u>main</u> activities <sup>42</sup>	Progress:			
	A	B	C	D
1 Sites selection and preparatory actions		X		
2 IEC of beneficiaries and partners on SPIS	X			
3 Technical participatory analysis and identification of most promising SPIS options		X		
4 Support acquisition and implementation of SPIS through existing financing mechanisms and actors			X	
5 Continuous learning and adjustment & dissemination of results		X		

### 2.8.1 Analysis of progress made

A call for proposals to facilitate contracting of required Information, Education and Communication NGO partner(s) was launched in April 2022. A total of 8 concept notes were received. Full proposals (narrative and financial) from 4 NGO applicants were reviewed. In November 2 NGOs were selected for contract award for an 18 months period to champion implementation of SPIS Information, Education and Communication Activities in the two provinces (Manica and Zambezia).

Whilst the above process was ongoing in parallel with attempts to contract partners to support acquisition and implementation of SPIS (see below) project staff conducted sensitization / SPIS demand activation activities<sup>43</sup> in 11 districts in the two provinces Manica (Guro, Macossa, Machaze, Bárúé, Macate, Tambara and Mussorize) and Zambezia (Nicoadala, Derre, Quelimane and Milange). A total of 2,107 farmers (1,324 men and 783 women) participated in these project facilitated SPIS demand activation sessions. The current achievement of sensitized farmers surpasses the target for 2022 and was actually doubled in number<sup>44</sup>.

Given the extent of IEC activities in 2022 under the project and the fact that IEC is also part of another NGO partnership (with iDE, see below), the need to still contract the two selected NGOs was being re-considered at the time of writing this report. A decision to cancel the process was practically taken.

With the intensification of demand activation activities, the number of stakeholders interested in acquiring SPIS still grows every day. About 70% of the 2,107 actors sensitised during 2022 are interested in acquiring a SPIS. However, a number of producers do not meet the requirements for the operationalization of these systems, a situation that calls for careful analysis during the project's beneficiary selection process going forward.

Visits by the national experts to potential sites that had started in September 2021 continued throughout 2022. A digital form (ODK solution based on the Kobo Toolbox platform) was used by the team for collecting onsite data necessary to assess the feasibility and viability of SPIS in line with the eligibility criteria referred to in the previous annual report. During these field visits, irrigation systems were c.q. are mapped using handheld

<sup>42</sup> A: The activities are ahead of schedule  
 B: The activities are on schedule  
 C: The activities are delayed, corrective measures are required.  
 D: The activities are seriously delayed (more than 6 months). Substantial corrective measures are required.

<sup>43</sup> Thirteen (13) missions

<sup>44</sup> Logframe target for 2022 = 1,000 farmers.

devices such as GPS and tablets to show current and potential irrigation areas. The project database currently contains information from all the 13 program districts. A total of 1,475 farmers have been identified as possible RERD2+ beneficiaries in the two provinces collectively with a total of over 800 ha of potentially irrigable land.

The TFF stipulated that the large majority of SPIS systems was to be installed through a grant agreement with the Sustainable National Development Fund (FNDS) in the Ministry of Agriculture and Rural Development. The grant agreement was to be signed with FNDS with a view to operationalise a matching investment facility which would include:

1. provision of a grant subsidy to selected farmers (between 60 – 80%) of the investment required to purchase and install SPIS, and
2. farmer's payment of a matching investment contribution (between 20 – 40%) of the investment required to purchase and install SPIS. This contribution was to be paid either in the form of cash or through a credit facility which the beneficiary had to secure.

The partnership formation process with FNDS began in early 2022. Due to several reasons, including the partner's prolonged failure to respond to proceed with due diligence, it was agreed that an alternative partner would be sought. After a scoping exercise, iDE (International Development Enterprises) emerged as a potentially strong partner. A concrete project proposal was developed. The formalities to award a direct grant finished in January 2023 and the grant agreement of 1.9M€ was signed mid-February 2023. As such iDE is now the main partner to facilitate uptake of SPIS installation under RERD2+.

The 2021 annual report explained the role of two GGGI studies and listed 18 eligibility criteria applied in the selection of SPIS project sites. Mid 2022 it was decided that a selected number of farms that were shortlisted in these two GGGI studies could be reached through a private sector tender. Validation of 21 GGGI recommended beneficiaries was conducted by a multistakeholder committee in both Manica and Zambezia provinces and 14 irrigation schemes were finally approved by the RERD2+ committee. A private sector tender defining three lots was developed and published in February 2023. Systems are foreseen to be installed during 2023. It is envisaged that the farms where the systems will be installed will serve as SPIS learning centres in the future.



## 2.9 Performance 7: The technical and financial capacities of farmers, institutional partners and market actors for a sustainable use of solar powered irrigation systems are enhanced



### 2.9.1 Progress of indicators

Output 7: The technical and financial capacities of farmers, institutional partners and market actors for a sustainable use of solar powered irrigation systems are enhanced					
Indicators	Baseline value	Value year N-1 2021	Value year N 2022	Target year N 2022	End Target
Number of people trained in new practices for sustainable irrigation and sustainable agriculture	0	0	41 people trained in SPIS installation, operationalization and maintenance. (93% men, 7% women)	50% of extensionists, 25% of members of associations, 50% of the medium and big individual farmers (incl.50% of women)	100% of extensionists, >= 50% of members of associations, 100% of the medium and big individual farmers (including 50% of women)
Satisfaction of end-users regarding the quality of available services on solar pumping irrigation (%)	n/a	n/a	n/a	60%	>= 80%
Number of appropriate solar powered irrigation technology and practices identified and disseminated	0	0	2 (Future pumps SF2 and Grundfus)	0	8 (minimum 2 irrigation practices for each category of crop = 2X4)
Level of knowledge and quality of the maintenance of SPIS by users	n/a	n/a	n/a	N/A	>= 80% with score "A"



### 2.9.1 State of progress of the main activities

Progress of <u>main</u> activities <sup>45</sup>	Progress:			
	A	B	C	D
1 Support for implementation and use of SPIS and strengthening maintenance		X		
2 Improving sustainable irrigation and agronomic practices linked with SPIS's use			X	
3 Strengthening suppliers, distributors and service suppliers of SPIS		X		
4 Build local expertise on SPIS through collaboration with Research centers and learning centers		X		
5 Capacity building of institutional partners with a focus on the provincial and local level		X		

### 2.9.1 Analysis of progress made

Early 2022 preliminary visits to research and learning institutions were made with a view of establishing potential collaborations in the demonstration / extension, of irrigation techniques, learning pathways for sustainable irrigation techniques and improving knowledge on SPIS. A total of 5 education institutions were engaged as indicated below:

Manica Province	Zambezia Province
Instituto Superior Politécnico de Manica (ISPM)	Instituto Agrária de Milange (IAMI)
Instituto Instituto Agrário de Chimoio (IAC)	University Licungo in Mocuba
Instituto de Investigação Agrária de Moçambique (IIAM)	

In the course of the year partnerships were signed with two institutions; the *Instituto Superior Politécnico de Manica* (ISPM) and the *Instituto de Agrária de Milange* (IAMI) to facilitate establishment of demonstration plots for SPIS technologies<sup>46</sup>. These partnerships were formalized through Memoranda of Understandings. Under these partnerships 4 irrigation pumps (2 Grundfos and 2 Future Pumps) have been purchased and installed in the two institutions to facilitate SPIS demonstration in the two provinces. Agricultural inputs (seed and fertilizer) have also been provided to these institutions to complement demonstration of SPIS solutions.

A Dutch Consulting Organization (Resilience) working in partnership with the NGO PRACTICA Foundation was contracted to conduct a skills and knowledge audit of the SPIS sector in Mozambique. The work included realization of two provincial level validation / capacity building events for sector stakeholders. The full report was submitted in August 2022, shared with relevant stakeholders and validated in a workshop in Maputo on 22

<sup>45</sup> A The activities are ahead of schedule  
 B The activities are on schedule  
 C The activities are delayed, corrective measures are required.  
 D The activities are seriously delayed (more than 6 months). Substantial corrective measures are required.

<sup>46</sup> The project also established contacts with the Instituto de *Investigação Agrária de Moçambique* (IIAM) and the *Instituto Agrário de Chimoio* (IAC) in Manica and the *Universidade Licongo* in Mocuba in Zambezia but these contacts did not (yet) result in formalized partnerships.

November 2022.<sup>47</sup> The results will support development of a call for proposals from training institutions interested in course design and implementation of the capacity building activities that address identified capacity gaps.

A call for proposals to facilitate contracting of a capacity building expert was launched in April 2022. The consultant conducted an institutional capacity assessment of INIR based on the organization legal mandate, current structure and operational strategies. The draft institutional assessment report was submitted to INIR/Enabel in September 2022. A



validation workshop including discussion on the development of a capacity building plan to address identified gaps was realized in October 2022. The capacity enhancing plan is being developed through participatory processes. The consultant is also charged with supporting INIR to develop viable resource mobilization strategies to reduce its dependency on central funding.

Two exchange events were organized to promote skills development and peer to peer learning. Firstly, a total of 36 market actors<sup>48</sup> from Manica and Zambezia participated in a learning event conducted in Manica, Macate district. The exchange event showcased how a solar powered irrigation system should be designed and installed. Challenges and opportunities related to the management of SPIS systems were discussed and participants shared information based on their learning experiences. Secondly, a total of 8 irrigation technicians (INIR, DPAP and Enabel) participated in a week-long training event in Chokwe in June 2022 administered by the (SPIS specialized) Dutch NGO PRACTICA Foundation. The training exposed the technicians to all SPIS design, installation, operation and maintenance modalities. This resource pool of 8 will be used as Trainers for other technicians in their respective organizations / provinces.

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<sup>47</sup> The Workshop actually concerned **two** RERD2+ studies developed during 2022. The workshop: (i) collected contributions and final recommendations regarding (a) the capacity audit and proposal of training requirements in the SPIS value chain **and** (b) the a gender strategy for the RERD2+, and (ii) validated the results of both studies with a view to their dissemination and implementation.

<sup>48</sup> 12 farmers, 16 extensionists, 1 researcher from Polytechnic Institute Manica, 1 student, 2 FUNAE staff Manica delegation and 4 Enabel technicians

Local expertise on SPIS was also built through collaboration with the private sector. A total of 26 actors (24 men and 2 women) from Zambezia and Manica, the majority being from the private sector, participated in a 3 days training event in Quelimane organized by the company Soelec with Enabel support. The training exposed these actors to all SPIS design, installation, operation and maintenance modalities.

## 2.10 Performance 8: Initiatives to foster an enabling environment for private and public investments in the irrigation sector are supported



### 2.10.1 Progress of indicators

Output 8: Initiatives to foster an enabling environment for private and public investments in the irrigation sector are supported					
Indicators	Baseline value	Value year N-1 2021	Value year N 2022	Target year N 2022	End Target
Financial mechanism that stimulates investment in SPIS in place	n/a	n/a	MoU for partnership between Enabel and BCI under development	Financial Mechanism Developed and Piloted	Financial Mechanism Promoted to be replicated by other market actors
Number of coordination meetings at provincial level with public and private stakeholders from the water, energy and agriculture sector	0	0	2	6	12

### 2.10.2 State of progress of the main activities

Progress of <u>main</u> activities <sup>49</sup>	Progress:			
	A	B	C	D
1 Supporting platforms to exchange and coordinate the actions of different actors		X		
2 Support institutional actors in creating an enabling environment for SPIS uptake and dissemination		X		

### 2.10.3 Analysis of progress made

This result focuses on creating an enabling environment for SPIS's uptake. Main overall challenges that hamper the wider dissemination of SPIS are: (i) lack of coordination between actors and information sharing, (ii) lack of structural finance solutions for end users and (iii) lack of business development services for further growth.

<sup>49</sup> A: The activities are ahead of schedule

B: The activities are on schedule

C: The activities are delayed, corrective measures are required.

D: The activities are seriously delayed (more than 6 months). Substantial corrective measures are required.

Contacts were made at provincial level for the revitalisation of platforms to exchange and coordinate the interventions of the different actors.

Terms of reference for the development of a financial strategy were drafted and a tender launched. Three bids were received, but no contract was signed with the winner due ongoing uncertainty and lingering questions about the viability of a partnership with the National Fund for Sustainable Development (FNDS).

A tender for the development of an enabling environment strategy and workplan for RERD2+ was launched three times but no bids were received.

A stakeholder dialogue workshop themed ‘Innovative financing solutions for the SPIS sector’ was held in 15th of June 2022 in Quelimane. A total 80 participants<sup>50</sup> participated in the event. The event provided a platform for stakeholders to discuss public and private sector driven financing solutions, their relevance and potential for sustainability. The private sector driven pay as you go (PAYG) scheme was the key focus for discussion during the meeting.

A MoU for partnership between Enabel and BCI is under development. This agreement will allow RERD2+ beneficiaries to benefit from the subsidized credit line designed to promote the productive use of renewable energy solutions (including solar irrigation) at an interest rate of 7.5% per year.

Two provincial level workshops involving public and private stakeholders from different sectors were conducted in Manica and Zambezia (March 2022) to celebrate International Women’s Day under the theme ‘Promoting women participation and leadership in irrigated agriculture’. These two events involving the participation of 80 leaders, 51 women (64%) and 29 men (36%), at various levels provided a viable platform to showcase / lobby for more interventions that are gender inclusive as a strategy for promoting a sustainable SPIS sector in Mozambique.

A workshop was held on 5 October 2022 in Maputo with the participation of the INIR Directorate and nine (9) private sector key actors from the SPIS sector. The meeting discussed key challenges for the SPIS sector development and shared the information about the current opportunities in SPIS value chain. A clear road map based on recommendations was developed and approved by the participants.

## 2.11 Transversal Themes

The narrative below provides a summary of work performed to facilitate the embedding of transversal themes in the implementation of the RERD2/RERD2+ program.

### 2.11.1 Gender

For previous gender-related actions, please refer to earlier annual reports.

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<sup>50</sup> 17% farmers, 7% financial institutions, 13% private sector, 5% NGOs, 5% research institutes, 51% government officers , 2% others

In 2022 81 actors (49% women, 51% men) were trained by Steglarp Services (Consulting company) contracted to develop the RERD2/RERD2+ gender strategy. The trained actors are expected to support widening of the network of gender champions available in the project provinces, notably Manica and Zambezia. The Steglarp training included the FUNAE and INIR gender focal points who work closely with the project to ensure that gender considerations are embedded in all programme interventions. These focal points also participated in a week “Training of trainers” workshop administered by the project CB-MIREME and that included sessions on gender analysis” (see also Ch. 2.5.3.)

The RERD2 Gender strategy (*Estrategia de género para RERD2, 2022, 29.pag*) was validated in a November 2022 workshop attended by 18 participants from eight different entities<sup>51</sup> and includes action plans for the electrification as well as the irrigation component of the project. Actions include exploring the possibility of granting preferential conditions to women and women's groups for accessing funding for the acquisition of SPIS equipment.

Lastly, as described in Ch. 2.10.3, two provincial-level workshops were held on the occasion of International Women's Day with the theme *"Promoting women's participation and leadership in irrigated agriculture"*, in



which 80 leaders participated: 51 women (64%) and 29 men (36%).

As to inclusiveness, among which gender; the infrastructure for access to electricity proposed by RERD2 targets all beneficiaries without distinction and conform the ‘energy for all’ policy of the Mozambican government. Prepaid meters are included to

facilitate access to service.

For the RERD2+ irrigation component the criterion is more difficult to apply since the infrastructure is intended for farmers who will have the financial capacity to co-invest. Nevertheless, the action plan of the gender strategy includes exploring the possibility of granting preferential conditions to women and women's groups for accessing funding for the acquisition of SPIS equipment.

### 2.11.2 Environment

Environmental impact studies for hydro- and solar on- and off-grid projects are mandatory by law.

Regarding the hydropower component of the project, it was reported earlier that the feasibility study on the Nintulo hydropower plant collected and systematized all necessary information for the preparation of the hydropower project's environmental impact

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<sup>51</sup> MIREME, FUNAE, INIR, MADER/GSSA, MGCAS, Resilience, Steglarp consultants and Enabel.



study<sup>52</sup>. It also conducted a preliminary environmental impact assessment. The final report listed the positive and negative environmental impacts and mitigation measures of the project.

Similar to the hydro feasibility study, the 5 solar mini-grid feasibility studies included a preliminary environmental & social impact assessment to assess risks arising during plant construction and operations. According to the World Bank and FUNAE guidelines, solar mini-grids fall under category “B”, meaning only local impacts are expected, with minor negative effects on the surrounding areas and easy to prevent. Indeed, according to the Decree 45/2004, regulating the Environmental Impact Assessment procedures in Mozambique, all solar/hybrid mini-grids projects fall under category “B”, requiring only a Simplified Impact Assessment outlining main project features, to be submitted to the DPCA (*Direcção Provincial para a Coordenação da Acção Ambiental*) for authorization. Whereas all the technical features to be highlighted (according to article N° 13 of the Decree 45/2004) are dealt with in the technical chapters of the feasibility reports the



section on preliminary environmental impact assessment highlights the mitigation measures for the environmental (and social) aspects. The documents also include a section on environmental monitoring that guides work during the construction of the mini-grids that started in 2022.

The FUNAE Zambezia delegation reports that the environmental license processes for the three mini-grids in this province is almost complete with only some small payments pending. As to the 2 mini-grids in Nampula the Provincial Environment Service (SPA) surprisingly classified in category “A” which means that extra consultancies are needed. This classification however is not consistent with FUNAE mini-grids in other provinces. Solar mini-grids are usually classified in category “C”. FUNAE is currently in negotiation with SPA Nampula to change the classification from “A” to “C”. The project monitors this issue going forward.

Given their limited resilience, most farmers in the Manica and Zambezia provinces have an economic and social vulnerability to climate change. The additional component focuses on environmental sustainability and climate change resilience which will be enhanced by

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<sup>52</sup> In accordance with Decree 45/2004 of 29 September.

testing and adapting options for solar powered irrigation and sustainable agricultural practices improving soil health, water use efficiency, biodiversity, microclimate, and reduced consumption of fuel.

Although the project's approach of developing infrastructure has little environmental impact there will at some stage be the problem of collecting and recycling of certain components at their end of life (solar modules, inverters, and other electronic components, Lithium battery cells, submersible pumps etc.). Remains the issue of overhead distribution lines, especially MV lines which require trees to be cleared to create open strips of land. However, the latter problem is minor in the RERD2 sites, except perhaps for Idugo Island, where some trees may have to give way.

### 2.11.3 Digitalization

The work on digitalization is partly described in chapter 2.4.3. concerning project work on improvement of FUNAE technical systems. In order to be complete, we indicate in the box below the applications, instruments, tools and resources applied in the implementation of the project with FUNAE:

- *QGIS* and *drones for river basin analysis* for hydropower generation
- *Tablets*, combined with *Kobo Toolbox*, for 5 mini-grid beneficiary data collection surveys (and database feed-in) for Monitoring, Evaluation and Learning in both the electrification as well as irrigation component
- *WhatsApp* groups to \* pass on data collected in the field on a weekly basis (this also allows for timely verification that data collection is taking place and continuous), \* to exchange images of progress of the mini-grid construction work and \* images of works log-book pages (notes).
- *Open-source datasets* on; - population distribution such as *Wordpop* (population and settlements), - *Gridfinder* (grid infrastructure estimation), - *Openbuildings* (building footprints by Google), - *Villageinfrastructure* and - *remote sensing* for site identification for off-grid energy project planning
- *Drones for topographic surveys* and village mapping (for RE locations, hydro and solar) *ArcGIS* online for dissemination of information to the public and private sector

Forthcoming may be the installation of a mini-grid remote monitoring system by the RERD2 project depending on the decision of FUNAE to opt for either the Enabel or EU promoted system<sup>53</sup>.

From March 2019 to the end of February 2021, the project benefitted from the services of a Junior Expert in digital data management. His skills have been highly relevant for the project notably in 'Strengthening of information systems', 'Implementation of remote monitoring systems', 'Implementation of [mobile] payment systems' and 'capacity building' in these areas. The Junior Expert not only contributed to innovative digital data collection in the field, but was also a driving force in improving the functioning of FUNAE's GIS unit and the implementation of measures to pave the way for a future link between the current stand-alone databases in the organisation such as those of the GIS - and the Operations and Maintenance Unit.

His last document '*Metodologia para a identificação de locais adaptados para a construção de mini-redes*'<sup>54</sup> is worth mentioning again in this context because it laid the foundation for FUNAE's capacities in what is undoubtedly one of the most important

<sup>53</sup> or both according to recent indications by FUNAE engineers

<sup>54</sup> methodology for the identification of suitable sites for the construction of mini-grids

future tasks of FUNAE's new “Studies and Mobilization Division” i.e. the identification of locations for off-grid electrification projects.

The project Energy Engineer continues to be active and appreciated members of Enabel's 'Digital Believers' group. The objective of this group is to be a community of practice of colleagues interested in digitalization / digital for development and to co-create the operational approach of Enabel in Digital Development.



In the irrigation component the registration and data collection for the identification of priority intervention sites uses digital questionnaires developed in Kobo Collect for real-time processing and immediate compilation of data at national level. During field visits, plots are mapped using GPS and tablets, for both the current and potential irrigation areas, by tracking the extent of the system and fields, and later extracting the areas with simple GIS software.

Additionally, 4 WhatsApp groups (learning hubs) were created and are at different stages of operation. These groups share SPIS operational challenges, solutions and lessons learned in 4 different fields of knowledge: I) SPIS Skills Audit Group, II. SPIS Extension Learning group, III. INIR + SPIS Private Sector Companies and IV. Gender and SPIS learning group.

The project also envisages the implementation of an interactive web application for the cartographic presentation of infrastructure and equipment installed in the field and the rapid visualization of program indicators.

RERD2+ is also in consultation with INIR to explore the possibility of using drones to monitor irrigated areas in the target communities.

Finally, in this section on digitisation, it is worth mentioning that the final report of a "Multi-country strategic learning and evaluation exercise" on large infrastructure projects launched by Enabel headquarters specifically complimented RERD2 on its work on integrating digital solutions and highlighted its importance for other actors, donors and the private sector in Mozambique.

## 2.12 Risk management RERD2 and RERD2 Plus

Risk Identification			Risk analysis			Risk Treatment			Follow-up of risk	
Description of Risk	Period of identification	Risk category	Probability	Potential Impact	Total	Action(s)	Resp.	Deadline	Progress	Status
Instability due to presidential elections in 2019 leads to insecurity in the provinces, which would hamper the implementation of activities and project quality	TFF	OPS	Medium	Medium	Medium	The geographical concentration will be adapted to the security situation. The focus will be on two provinces.	FUNAE	Nov19	Four provinces were initially chosen: Zambezia, Niassa, Nampula and Manica. The Steering committee of May 2018 assigned Zambezia as the project only target province.	<u>Closed</u>
						Close monitoring of events in provinces in the run-up to the elections	RR, PMT	Throughout the project period	-	<u>Closed</u>
Difficult access to sites due to natural occurrences (heavy rains) which block roads	TFF	OPS	Medium	Medium	Medium	In the planning of activities, consider the period from December – February as months not suitable for works/rehabilitations but for other activities (procurement/acquisition of goods, trainings, etc.)	PMT	Throughout the project period	For successful actions in 2019 to 2021 see earlier PILOT reports. The current EPC for 5 mini-grids was planned such that the design will take the design will take place during the rainy season and the procurement, transport and construction during the dry season of 2022. Delays described in the Narrative are likely to push companies to store arriving containers up to the moment roads are in appropriate conditions. This potential problems concerns 4 out of 5 mini-grids, one being well located on the N1 tarmac road.	In progress

Risk Identification			Risk analysis			Risk Treatment			Follow-up of risk	
Description of Risk	Period of identification	Risk category	Probability	Potential Impact	Total	Action(s)	Resp.	Deadline	Progress	Status
Slow pace of intervention due to procurement procedures	TFF	OPS	Medium	Medium	Medium	Optimized implementation modalities based on lessons learned from RERD1	Enabel / FUNAE	Throughout the project period	The steering committee of December 2019 adopted a RERD2 proposal to transfer funds to a co-management budget line to a regie line to speed up (hydro and solar) feasibility studies	<u>Closed</u>
Idem as above	Idem	Idem	Idem	Idem	Idem	Projects will build on existing studies developed by RERD1	Enabel /FUNAE	Throughout project period	(done but because of choices made by FUNAE the number of locations so far was limited to only one location studied by RERD1.	<u>Closed</u>
Idem as above	Idem	Idem	Idem	Idem	Idem	All travel, study tours and surveys in Enabel management mode.	Enabel	Throughout project period	Done so far and will continue.	<u>Closed</u>
Idem as above	Idem	Idem	Idem	Idem	Idem	Vehicles purchased on RERD1 must be made available to the project staff when needed	Enabel	Throughout project period	Available / in progress	<u>Closed</u>
Idem as above	Idem	Idem	Idem	Idem	Idem	Within the IMU: Procurement expert for the program	Enabel	Throughout project period	Procurement expert available	<u>Closed</u> (is on board)
Idem as above	idem	idem	idem	idem	idem	Within the IMU: Support from international RAFi	Enabel	Throughout project period	RAFI available	<u>Closed</u> (is on board)
Resistance to change in FUNAE	TFF	OPS	Medium	Medium	Medium	Full-time long term technical assistance with adequate profile regarding capacity reinforcement and change management (see budget line A03 05)	Enabel	Throughout project period	Project recruited 2 ITAs in October 2018 in addition to the one already based in Zambezia province since July 2018. Contract of the Quelimane (province) based capacity building expert, ended on 30 May 2020, was not renewed.	In progress (the baseline workshop suggested to delete this statement on resistance from this risk)

Risk Identification			Risk analysis			Risk Treatment			Follow-up of risk	
Description of Risk	Period of identification	Risk category	Probability	Potential Impact	Total	Action(s)	Resp.	Deadline	Progress	Status
									The RERD2+ ITA Rural Dvt. started his assignment on 1 May 2021, left 30 September and was replaced by a new ITA on 15 Oct.. This ITA in turn tendered his resignation on 29 September 2022 necessitating a third recruitment of an ITA to lead the RERD2+ irrigation component who came on board on 16 January 2023.	management table
Idem as above	idem	idem	idem	idem	idem	Budget for activities and support devoted to sustain change processes (see Z03 04 Missions cost)	Enable	Through-out project period	Available	
Idem as above	idem	idem	idem	idem	idem	Involve FUNAE staff on change processes and build on the high degree of openness showed by the management of FUNAE.	Enabel	Through-out project period	In progress	
Low private sector interest for operating mini-grids	TFF	DEV	High	High	Very High	The intervention works on several axes, including with other actors than the private sector.	Enabel / FUNAE	Through-out project period	Being undertaken.	In progress
Idem as above	idem	idem	idem	idem	idem	Create enabling conditions for private sector interest in mini-grids, including receptiveness of FUNAE (activity R1.A2 , R3.A4)	Enabel / FUNAE	Through-out project period	On 14 September 2021 the GoM approved a Decree on the Regulation for Off-Grid Energy Access. It is a major milestone, providing clarity to all stakeholders and ensures the necessary conditions for the private sector to develop its activities and protect its	In progress



Risk Identification			Risk analysis			Risk Treatment			Follow-up of risk	
Description of Risk	Period of identification	Risk category	Probability	Potential Impact	Total	Action(s)	Resp.	Deadline	Progress	Status
Idem as above	idem	idem	idem	idem	idem				investments. Detailed rules remain to be drafted.	
Idem as above	idem	idem	idem	idem	idem	Start with outsourcing only operation and maintenance (O&M)	Enabel /FUNAE	Through-out project period	To date there is no outsourcing of O&M -	In progress
Idem as above	idem	idem	idem	idem	idem	Make a thorough economic feasibility study and attract private sector with interesting business models	Enabel / FUNAE	Through-out project period	Study of appropriate business models is included in all project launched feasibility studies, be they for hydro or hybrid/solar based mini-grids.	In progress
Idem as above	idem	idem	idem	idem	idem	Involve private sector from the start and build a sustainable model for public-private partnership for the operation of grids.	Enabel / FUNAE	Through-out project period	A new legal framework (and notably adoption of the new electricity law) are approved paving the way for entry of the private sector. Pending are still the drafting of a series of instruments and the approval of ones already submitted.	In progress
Idem as above	idem	idem	idem	idem	<u>idem</u>	Envisage other management modes than the private sector	Enabel / FUNAE	Through-out project period	The project placed a national expert in FUNAE in October 2022 with a contract of two years to, among others, assist FUNAE moving forward in thinking about alternative business models. However more traditional management models are for the time being likely to be applied in the RERD2-funded mini-grids	In progress
Idem as above	idem	idem	idem	idem	idem	Small mini-grids can be clustered for operation & maintenance to form an attractive package	Enabel / FUNAE	Through-out project period	Clustering of mini-grids has effectively been proposed to FUNAE (to date one inland / agriculture area cluster and	<u>Closed</u>

Risk Identification			Risk analysis			Risk Treatment			Follow-up of risk	
Description of Risk	Period of identification	Risk category	Probability	Potential Impact	Total	Action(s)	Resp.	Deadline	Progress	Status
					idem				one coastal / fishing area cluster).	
Idem as above	idem	idem	idem	idem		idem	Make a careful selection of sites and target large sites with economic potential	Enabel / FUNAE	Through-out project period	Sites have been rigorously screened in 2019 resulting in selection of 25% of the FUNAE proposed Zambezia project pipeline. Exhaustion of the Zambezia project pipeline & requests from FUNAE have led to inclusion of 2 sites in the neighbouring Nampula province finalized in Nov. 2020. A new GIS/satellite imagery assisted method and a concrete identification of 27 areas for further study were proposed in Sept. 2020. FUNAE now uses the method for off-grid energy planning.
Financial sustainability of the systems is problematic	TFF	DEV	High	High	Very High	Better estimation and budgeting of OM costs   Feasibility studies	Enabel / FUNAE	Through-out project period	Estimation of OM costs are included in all ToR for mini-grid feasibility studies and will be included for SPIS studies.	<u>Closed</u>
Idem as above	idem	idem	idem	idem	idem	Continue implementation of preventive maintenance (reducing OM Costs)	Enabel / FUNAE	Through-out project period	This action is handicapped by limited operational budget of FUNAE imposing travel restrictions of OM staff	<u>Closed</u>
Idem as above	idem	idem	idem	idem	idem	Make a strong users awareness campaign on correct use of systems (PV) to lower OM costs (reducing OM Costs)	Enabel / FUNAE	Through-out project period	A Junior expert supposed to work on this took up his duties in mid-April 2021. His contract ends on 10 January 2023 after which this engineer continues to work for the project for another (at least) 6 month as	In progress

Risk Identification			Risk analysis			Risk Treatment			Follow-up of risk	
Description of Risk	Period of identification	Risk category	Probability	Potential Impact	Total	Action(s)	Resp.	Deadline	Progress	Status
									full international technical assistant.	
Idem as above	idem	idem	idem	idem	idem	Inform the authorities on real OM costs of mini grids and advocate for government subsidies (increasing OM resources)	Enabel / FUNAE	Through-out project period	Indicative (high) OM cost have been demonstrated through some field missions to selected mini-grids in the provinces of Manica and Niassa. Reports were distributed among division heads in FUNAE.	In progress
Idem as above	idem	idem	idem	idem	idem	Propose a well-studied adapted tariff structure (increasing OM resources)	Enabel / FUNAE	Through-out project period	This subject was included in the ToR of all mini-grid feasibility studies so far and remains key object of collaboration between different donor projects in the RE domain.	In progress
Idem as above	idem	idem	idem	idem	idem	Increase revenue collection by generalizing use of pre-payment systems (R2 A3) (increasing OM resources)	Enabel / FUNAE	Through-out project period	Different prepayment systems are being studied by the project in collaboration with FUNAE's operations and maintenance unit.	In progress
Idem as above	idem	idem	idem	idem	idem	Involve local authorities at the planning stage and define their role in the project to increase willingness to pay (increasing OM resources)	Enabel / FUNAE	Through-out project period	Local authorities of 5 communities were consulted in August / Sept 2020 in the context of feasibility studies.	In progress
Idem as above	idem	idem	idem	idem	idem	Design the project in a rural development perspective that promotes economic uses of energy to increase ability to pay (thus increasing OM resources)	Enabel / FUNAE	Through-out project period	Economic use is at the core of all discussions on site selection and decision and the reason why 80% of the pipeline sites were rejected	In progress

Risk Identification			Risk analysis			Risk Treatment			Follow-up of risk	
Description of Risk	Period of identification	Risk category	Probability	Potential Impact	Total	Action(s)	Resp.	Deadline	Progress	Status
Lack of policy and regulation for mini-grids hampers private sector interest. No operational independent regulator.	TFF	DEV	Medium	Medium	Medium	Planned establishment of ARENE as independent regulator	ARENE	Throughout project period	Establishment of a functional ARENE is extremely slow but progress is being registered while different donor initiatives such as CBMIREME are providing solid support.	Closed
Idem as above	idem	idem	idem	idem	idem	Support from CBMIREME to ARENE on regulatory functions	Enabel	Throughout project period	Significant progress has been made in a joint effort between MIREME, ARENE and specialists from different donors (including RERD2) to propose a new regulatory framework for minigrids that was adopted by the end of Dec. 2021. The new regulatory framework in Mozambique paves the way for increased private sector activity in the RE sector.	In progress
Idem as above	idem	idem	idem	idem	idem	Undertake seminars targeted at the private sector on regulatory issues	Enabel / FUNAE / ARENE	throughout project period	See earlier PILOT for past actions. Again on 24 February 2022 the Intervention Manager acted as speaker at the webinar "Briefing and Debate on the new off-grid energy new off-grid energy regulation", organized by ALER and AMER in cooperation with ARENE and FUNAE. He also updated the meeting on the progress of the 5 mini-grids of	In progress

Risk Identification			Risk analysis			Risk Treatment			Follow-up of risk	
Description of Risk	Period of identification	Risk category	Probability	Potential Impact	Total	Action(s)	Resp.	Deadline	Progress	Status
									the RERD2 project. This is a regular / ongoing activity.	
High numbers of non-functioning RERD1 installations	TFF	REP	High	High	Very High	Capacity building, monitoring systems and reinforcement of FUNAE Delegations (R2; R3)	Enabel / FUNAE	Through-out project period	A project report on a Sept. 2019 sample survey of 377 RERD1 systems indicates 61.7% as functional - against 50% as indicated in the project document, 22.6% out of service and 15.7% as problematic. Approximately 70 % of the breakdowns are due to problems with the batteries (38%) and/or the inverter (32%). In the meantime, FUNAE is phasing out maintenance of small systems after transfer of systems to sectoral ministries (education and health)	<u>Closed</u>
Technical failure or low quality of mini-grid construction	TFF	REP	Medium	High	High	Strong ITA; review of feasibility studies (R1 A1)	Enabel	Through-out project period.	The feasibility study on 5 solar mini-grids was carried out by a reputable company with a wealth of international experience. The EPC tender will also have to result in the selection of (a) renowned Engineering, Procurement and Construction company (companies).	<u>Closed</u>
Import taxes exemption not granted	TFF	FIN	High	Low	Medium	Request (import and VAT) tax exemption for the importation of quality PV systems	Enabel	Through-out project period	FUNAE commitments to pay VAT & duties allowed the project to foresee 5 minigrids. VAT payments by FUNAE is a new practice for Enabel and FUNAE. FUNAE struggled a long time to obtain clarity from the Ministry of Economy	In progress

Risk Identification			Risk analysis			Risk Treatment			Follow-up of risk	
Description of Risk	Period of identification	Risk category	Probability	Potential Impact	Total	Action(s)	Resp.	Deadline	Progress	Status
									and Finance on exact procedures. The procedure is very bureaucratic & does not seem to be easy. Indications from the 11 importation processes to date (20/02/2023) is however that the system works i.e. the state is assuming payment of VAT and import duties.	
Idem as above	idem	idem	idem	idem	idem	Cooperation with other donors to put reduction of fiscal barriers as a priority	Enabel	throughout project period	Actions are coordinated within the Energy Sector Wide Group (ESWG) of donors.	In progress
Idem as above	idem	idem	idem	idem	idem	Use locally produced TUV certified PV panels	Enabel / FUNAE	Through-out project period	-	<u>Closed</u>
Low value for money of bids for construction contracts	TFF	FIN	High	High	Very High	Publish tenders in English; publish internationally	Enabel / FUNAE	Through-out project period	Tenders for 'Engineering, Construction and Design' (EPC) published in July 2020 and in March 2021 were published in Portuguese and English and nationally and internationally.	<u>Closed</u>
Idem as above	idem	idem	idem	idem	Very High	Make feasibility studies of high quality (R1.A1)	Enabel	Through-out project period	The project's first feasibility study on a hydro installation in Nintulo, Zambezia province is of high quality while representing very good value for money. The first PV hybrid feasibility study tender resulted in 18 offers of which 8 passed the selection stage resulting in the evaluation of 8 quality offers of which the best (value for money)	<u>Closed</u>



Risk Identification			Risk analysis			Risk Treatment			Follow-up of risk	
Description of Risk	Period of identification	Risk category	Probability	Potential Impact	Total	Action(s)	Resp.	Deadline	Progress	Status
Idem as above	idem	idem	idem	idem	idem	Tender in euros	Enabel	Through-out project period	proposal was selected. The resulting study of 5 sites was of high quality.	
Idem as above	idem	idem	idem	idem	idem	Split tenders for power plant and for distribution network	Enabel / FUNAE	Through-out project period	Tender documents state that all prices must be given in EUR (euros) or MZN (Mozambican Meticaís) while 'similar services' are to be given in EUR equivalent(s). Splitting tenders for power plant and for distribution network makes sense in the case of hydro plants but not in the case of solar/hybrid mini-grids under 400-500 kW. Splitting the tenders increases costs and management problems (delays) because the project would need to coordinate 2 companies on the field, manage 2 contracts, etc. Since the project will only invest in hybrid solar mini-grids and not anymore in hydro plants splitting tenders has become irrelevant	<u>Closed</u>
Establishment of capital controls on foreign currency accounts in Mozambique	TFF	FIN	Low	High	Medium	Derogation to have a DB EURO account in co-management	Enabel	Through-out project period	See status	<u>Closed</u>

Risk Identification			Risk analysis			Risk Treatment			Follow-up of risk	
Description of Risk	Period of identification	Risk category	Probability	Potential Impact	Total	Action(s)	Resp.	Deadline	Progress	Status
Forced conversion of foreign currency accounts into local currency	TFF	FIN	Low	High	Medium	Derogation to have a DB EURO account in co-management	Enabel	Through-out project period	See status	<u>Closed</u>
Devaluation of the local currency	TFF	FIN	Medium	High	High	Derogation to have a DB EURO account in co-management	Enabel	Through-out project period		<u>Closed</u>
Delayed refund of VAT	TFF	FIN	High	High	Very	Continue with the existing set up for VAT compensation as in RERD1	Enabel / FUNAE	Through-out project period	Is on the agenda of each Steering Committee to date. Awaiting conclusive action from government.  See above for VAT and import duties for the 5 mini-grids. The first 11 import processes show that these costs are borne entirely by the state.	In progress
Idem as above	idem	idem	idem	idem	Idem	After the first two years of project execution, make an assessment of VAT refund.	Enabel	Through-out project period	The first 11 import processes show that at least these costs are borne entirely by the state.	In progress
Idem as above	idem	idem	idem	idem	idem	Exchange of letters ongoing with the support of the diplomatic office so that the MEF is involved as a signatory to the Specific Convention (not the case only MAE which gave the mandate to the technical Ministry to sign the Specific agreement. The MEF is responsible	Enabel	Through-out project period	MEF signed amended SC and FUNAE committed to paying VAT and duties directly causing the project to award contracts for five mini-grids instead of 4.	<u>Closed</u>

Risk Identification			Risk analysis			Risk Treatment			Follow-up of risk	
Description of Risk	Period of identification	Risk category	Probability	Potential Impact	Total	Action(s)	Resp.	Deadline	Progress	Status
						for the reimbursement of VAT since 2015.				
Poor public contract and action plan execution performance owing to the COVID Pandemic	Q1 2020	OPS	High	Medium	High	Extend deadline of submission of tender offers.	Enabel	Through-out project period	Deadline of submission of offers on the “Feasibility study for hybrid mini-grids in Zambézia and Nampula, Mozambique” was extended with 1 week. The deadline for submission of expressions of interest for the EPC tender of March 2021 was extended with 1 week.	<u>Closed</u>
Idem as above	idem	idem	idem	idem	idem	Extension of the period the tender is open.	Enabel	Through-out project period	Tender period was extended with two weeks because of the COVID19 outbreak.	<u>Closed</u>
Idem as above	idem	idem	idem	idem	idem	Foresee addenda of the contract if COVID19 (travel) restrictions hamper implementation of the feasibility study.	Enabel	Through-out project period	Addenda was not necessary. Study was completed within deadline.	<u>Closed</u>
Idem as above	idem	idem	idem	idem	idem	Postpone (training) activities	Enabel	Through-out project period	- 6th ARE, Energy Access Investment Forum (18-19 March) postponed - MGA (Micro Grid Academy) training (16-20 March) 11 FUNAE staff completed - Excel Training of 27 FUNAE staff completed	<u>Closed</u>
Idem as above	idem	idem	idem	idem	idem	Organise trainings online	Enabel	As long as needed	Since mid-2020 a maximum possible of number of courses / training sessions (either internal or with external service providers) take place online. This appears quite successful as it results in high(er)	Closed

Risk Identification			Risk analysis			Risk Treatment			Follow-up of risk	
Description of Risk	Period of identification	Risk category	Probability	Potential Impact	Total	Action(s)	Resp.	Deadline	Progress	Status
									participation rates. In this context it has been important to provide necessary means to the partner that was only using desktops. Laptops provide for more flexibility / mobility.	
10002/10003 Late award of contract for the EPC (co-management) of the mini-grids of Alto Benfica and Mungalama due to a slow negotiation process with FUNAE on selection and exclusion criteria.	Q2 2020	OPS	Medium	Medium	Medium	Contact FUNAE CEO as soon as advice is obtained from the Deloitte auditors.	CEO FUNAE	Q2/3 2020	Deloitte has been approached to provide advice on legality of FUNAE selection and exclusion criteria. Deloitte's advice was extremely useful and project 'won' on all fronts in negotiations with the partner on potentially problematic issues in tender text. In the meantime, the SC of 7 Dec 2020 decided to implement all EPCs under regie. This risk is closed and not anymore classified as PRIORITY.	<u>Closed</u>
10002/10003 Late start of contract execution of the EPC (co-management) of the minigrids of Alto Benfica and Mungalama due to delays in the advice from the	Q1	OPS	Medium	Medium	Medium Risk	If after 54 days the administrative court has not answered FUNAE concerning the submitted contract the RERD2 intervention manager will ask the FUNAE project co-Director and UGEA/FUNAE to send a letter to the administrative court stating that the legal period of 54 days has passed and that FUNAE	FUNAE Change Manager	Q2/3 2020	In the meantime, the SC of 7 Dec 2020 decided to implement all EPCs under regie	<u>Closed</u>

Risk Identification			Risk analysis			Risk Treatment			Follow-up of risk	
Description of Risk	Period of identification	Risk category	Probability	Potential Impact	Total	Action(s)	Resp.	Deadline	Progress	Status
public prosecutor office and/or the administrative court's position.						will proceed with the execution of the contract.				
Limited access to the field and/or limited availability of national and international expertise due to Covid19 restriction	Q1	OPS	Medium	Medium	Medium	<ul style="list-style-type: none"> <li>• Boost use of digital communication means</li> <li>• Pay special attention to Terms of reference for assignments</li> <li>• Foresee additional NTA at provincial levels additionally to ITA</li> </ul>	Enabel	Through-out project period		In progress
Irrigation component: Limited interest and/or resistance to change	Q1/'21	OPS	Medium	High	High	Full-time long term technical assistance with adequate profile regarding capacity reinforcement and change management	Enabel			<u>Closed</u>
Idem	Idem	Idem	Idem	Idem	idem	Budget for activities and support devoted to sustain change processes	Enabel	01/01/22	The project reached twice as much beneficiaries in 2022 then set by the 2022 set target indicator. 70% is interested in acquiring SPIS.	In progress
Idem	Idem	Idem	Idem	Idem	Idem	Involve partners in change processes	Enabel	01/09/21	Two partner level workshops were conducted to consult provincial partners on SPIS skills requirements and strategies for women's participation.	In progress

Risk Identification			Risk analysis			Risk Treatment			Follow-up of risk	
Description of Risk	Period of identification	Risk category	Probability	Potential Impact	Total	Action(s)	Resp.	Deadline	Progress	Status
Idem	Idem	Idem	Idem	Idem	Idem	Reinforced presence of technical assistance at provincial level	Enabel	01/08/21	2 ATN in place in provinces	<u>Closed</u>
Irrigation component: Depletion of water resources	Q1/21	OPS	Low	High	Medium	Choice of provinces with abundant water resources	Enabel			<u>Closed</u>
Idem	Idem	Idem	Idem	Idem	Idem	Inclusion of a specific criteria related to surface water availability for sites/landscape selection	Enabel		Water availability is one of the criteria for selection of beneficiaries	<u>Closed</u>
Idem	Idem	Idem	Idem	Idem	Idem	Research action to strengthen water resource monitoring at landscape level	Enabel		An international junior will work with the project starting March 2023 to work in this subject.	Planned
Idem	Idem	Idem	Idem	Idem	Idem	Diffusion of best irrigation and agricultural practices	Enabel		An international junior will work with the project starting March 2023 to work in this subject.	Planned
Irrigation component: Land tenure insecurity	Q1/21	OPS	High	Low	Medium	Consider land registrations before installing irrigation schemes	Enabel	01/09/21	Status of the beneficiary / association is one of the criteria for selection of beneficiaries	<u>Closed</u>
Idem	Idem	Idem	Idem	Idem	Idem	Introduce a criterion related to land and conflict (no implementation of activities in conflict prone areas)	Enabel	01/09/21	Risk of conflicts is one of the criteria for selection of beneficiaries	<u>Closed</u>
Irrigation component: Low private sector interest for investing in solar	Q1/21	DEV	Medium	High	High	Create enabling conditions for private sector interest in solar irrigation, including receptiveness of FUNAE	N/A	N/A	A private sector workshop conducted with INIR to provide a platform for review of bottlenecks limiting competitiveness and private sector participation in SPIS.	In progress



Risk Identification			Risk analysis			Risk Treatment			Follow-up of risk	
Description of Risk	Period of identification	Risk category	Probability	Potential Impact	Total	Action(s)	Resp.	Deadline	Progress	Status
powered irrigation										
Idem	Idem	Idem	Idem	Idem	Idem	Start with outsourcing only operation and maintenance	N/A	N/A		Planned
Idem	Idem	Idem	Idem	Idem	Idem	Undertake a thorough economic feasibility study and attract private sector with interesting business models	N/A	N/A		Planned
Idem	Idem	Idem	Idem	Idem	Idem	Make a careful selection of sites and target sites with economic potential	N/A	N/A		In progress
Irrigation component: Low sustainability of capacity building activities of state partners (high staff turnover...)	Q3/21	DEV	Medium	Medium	Medium	Mobilize national and/or international NGOs through grants	N/A	01/01/22	Grant agreement signed in February 2023.	Planned
Idem	Idem	Idem	Idem	Idem	Idem	Promoting PPP	N/A	N/A		Planned
Irrigation component: Complexity of implementing micro-projects scattered over a very large area	Q3/21	DEV	High	Medium	High	Start with a small number of priority districts and gradually expand the intervention	Enabel	01/10/21	Prioritization of districts underway with the support of provincial partners	<u>Closed</u>
Irrigation component:	Q1/21	REP	High	High	Very High	Capacity building, monitoring systems and	N/A	N/A		Planned

Risk Identification			Risk analysis			Risk Treatment			Follow-up of risk	
Description of Risk	Period of identification	Risk category	Probability	Potential Impact	Total	Action(s)	Resp.	Deadline	Progress	Status
High numbers of non-functioning SPIS installations						reinforcement of provincial actors and Delegations				
Idem	Idem	Idem	Idem	Idem	Idem	Reinforced technical assistance in the field	N/A	N/A	An application for a junior expert in has been honoured by headquarters in Brussels. The junior expert starting in March 2023 will also assist in integrated technical and commercial backstopping to beneficiary farmers.	Planned
Idem	Idem	Idem	Idem	Idem	Idem	Ensure a sustainable access to SPIS material, spare parts and advice by strengthening local suppliers and distributors of SPIS	N/A	N/A		Planned
Idem	Idem	Idem	Idem	Idem	Idem	Close monitoring by project staff	N/A	N/A		Planned
Irrigation component: Technical failure or low quality of SPIS construction	Q1/21	REP	Medium	High	High	Strong technical assistance	N/A	N/A	Excellent international and national staff on board in project.	In progress
Idem	Idem	Idem	Idem	Idem	Idem	Review of feasibility studies	N/A	N/A	GGGI studies went through comprehensive validation phase.	In progress
Idem	Idem	Idem	Idem	Idem	Idem	Appropriate technical specifications	N/A	N/A	Appropriate specifications were applied in tender document(s) published in 2023.	In progress

Risk Identification			Risk analysis			Risk Treatment			Follow-up of risk	
Description of Risk	Period of identification	Risk category	Probability	Potential Impact	Total	Action(s)	Resp.	Deadline	Progress	Status
Idem	Idem	Idem	Idem	Idem	Idem	Requirements for the acquisition of quality equipment and materials	N/A	N/A	Appropriate specifications were applied in tender document(s) published in 2023.	In progress
Irrigation component: large number of thefts / vandalisms	Q2/21	REP	High	High	Very High	Community outreach work	N/A	N/A		Planned
Idem	Idem	Idem	Idem	Idem	Idem	Anti-burglary infrastructure	N/A	N/A		Planned
The energy crisis in the EU and the tightened GHG targets and COVID in China lead to increased demand for, and slower delivery, of essential PV components for mini-grids shifting the end dates for the completion of mini-grids.	Q1/21	OPS	High	High	Very High	Allow the companies to vary their BAFO's i.e., accept alternative brands more available on the market	Enabel	N/A	Variations were systematically analysed with the help of the supervisor NRECA and whenever (actually quite often) accepted. All designs and components have been approved. The project is now awaiting delivery in the field and finalization of construction.	In progress
Failure of direct payment of VAT and duties by the Mozambican counterpart	Q1/22	FIN	Medium	High	High		FUNAE	N/A	For all 2022 mini-grid contractor importation processes FUNAE / the Mozambican state is assuming its responsibility and assuming payment of VAT and import duties	In progress

Risk Identification			Risk analysis			Risk Treatment			Follow-up of risk	
Description of Risk	Period of identification	Risk category	Probability	Potential Impact	Total	Action(s)	Resp.	Deadline	Progress	Status
(FUNAE) delay the design and construction of mini-grids										
Delayed installation of SPIS due to partnership formation challenges with FNDS (the National Sustainable Development Fund)	Q2/22	OPS	High	High	Very High	Identify alternative actors to implement interventions previously proposed for FNDS (SNV and / or tendering to private sector).	Enabel	N/A	A new partner iDE was identified and a grant agreement signed in February 2023.	<u>Closed</u>
Delayed implementation of private sector driven interventions due to challenges related to partnership formation with SNV	Q2/22	OPS	High	Medium	High	Integrate private sector interventions in NGO partner to be identified for IEC activities	Enabel	Q3/22	A new partner iDE was identified and a grant agreement signed in February 2023. Activities to integrate private sector driven interventions are part of the signed project grant agreement.	<u>Closed</u>
idem	idem	idem	idem	idem	idem	Enabel field team directly engages private sector partners to implement planned interventions	Enabel	Q3/22	A total of 5 private sector companies have been engaged (SolarWorks, AgroHorizonte, SOELEC, Epsilon and BlueZone) and are collaborating actively with RERD2 Plus for SPIS demand activation and commercial distribution of Solar Pumping equipment. A	In progress

Risk Identification			Risk analysis			Risk Treatment			Follow-up of risk	
Description of Risk	Period of identification	Risk category	Probability	Potential Impact	Total	Action(s)	Resp.	Deadline	Progress	Status
									workshop was also conducted to facilitate dialogue and increased collaboration between INIR and private sector companies.	
Reputational damage to Enabel due to failure to support GGGI identified beneficiaries	Q2/22	REP	Medium	Medium	Medium	Conduct direct meetings with GGGI beneficiaries to explain delays and to manage expectations	Enabel	Q3/22	Meetings with GGGI beneficiaries have been conducted in partnership with INIR and DPAP. Beneficiaries have been advised of ongoing procurement systems for SPIS. Conduct details of provincial representatives have been provided to the GGGI beneficiaries to facilitate continued communication and risk management	In progress
idem	idem	idem	idem	idem	idem	Handover GGGI beneficiaries for support by partner replacing FNDS	Enabel	Q1/23	In order to reach the GGGI beneficiaries a tender with 3 lots (2 Manica, 1 Zambezia) to install 14 SPIS was published in February 2023. The works are supposed to finish in 2023.	In progress
Intensifying terrorist attacks lead to insecurity in North Nampula / Mecuburi District which would hamper the implementatio	Q3	OPS	Medium	High	High	Close monitoring of events in the province / district and adjust mission and works planning if needed	Enabel	Through-out project period	Briefing have been conducted with RERD2 and RERD2+ teams to raise increased awareness and agree on communication procedures in case of identified security concerns. Government has increased presence of security forces in the 2 target communities in	In progress

Risk Identification			Risk analysis			Risk Treatment			Follow-up of risk	
Description of Risk	Period of identification	Risk category	Probability	Potential Impact	Total	Action(s)	Resp.	Deadline	Progress	Status
n on of activities and project quality.									North Nampula (Muite and Milhana)	
The forecast of the National Institute of Meteorology (emitted in January 2023) in which it predicts an extremely harsh rainy season where Mozambique could be hit by 10 cyclones or tropical storms in the first four months of 2023 causes access routes to become impassable and interrupt works for considerable time.	Q1/2023	OPS	Medium	Medium		Close monitoring of events and adjust works planning if needed	Enabel	Through-out Q1 and Q2 of 2023		Planned



## 3 Steering and Learning

### 3.1 Strategic re-orientations

#### 3.1.1 Mini-grid electrification component

##### Hydro based mini-grids

FUNAE's initial strategy to use the RERD2 available funds for the development of one particular hydro based mini-grid in Nintulo and the outcome of a feasibility study in this location (referred to in Ch. 2.3.3.) led on the one hand to the identification of an attractive hydro project but at the same time excluded realization of this, or any other hydro mini-grid project, within the timeframe of the project. The November 2022 MARGE report with recommendations on this particular Nintulo hydro project was forwarded to FUNAE with the advice to share it with EDM and possibly a private sector partner. RERD2 will now, going forward, only limit itself to support data collection to further strengthen the waterflow database for any possible future update study.

##### Solar mini-grids

Regarding solar mini-grids, the project was initially guided by FUNAE's renewable energy atlas and the organization's project pipeline. This pipeline indicated the sites to be further explored through pre-feasibility and feasibility studies. More than twenty locations were investigated on site. On the basis of the criteria listed in the TFF the project selected the most interesting locations for further investigation. Some locations were removed from the list, sometimes at quite an advanced stage (even after approval of the steering committee), because it became clear at some point that EDM was going to electrify the sites. Other sites were dropped because after the feasibility study it was clear that the location no longer met the selection criteria. The process led to the project exhausting all potential locations in Zambezia, reason why it opened up for another province<sup>55</sup>. This additional province became Nampula, where today, amid increased security concerns, 2 (out of 5) mini-grids are now under development.

##### Small solar systems and maintenance

The transfer of small solar energy systems, 698 of which were financed by RERD1, to sector ministries (notably those of education and health) means that FUNAE can no longer claim income from these systems and refrains – at least partly – from maintaining them. This led to a reorientation of FUNAE's maintenance - and GIS unit's work, and consequently to their needs for RERD2 support on maintenance systems for these decentralized systems. Both units are now more focused on micro- and mini-grid operations and off-grid energy planning than on asset management of small systems. With the above in mind, and since the adoption of the new regulations on energy access in off-grid areas, which pave the way for more private sector investment in mini-grids, and the significant institutional changes that FUNAE is

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<sup>55</sup> It is worth recalling that the project document (TFF) proposes to focus geographically on a maximum of two provinces, to be chosen from Zambezia, Nampula, Niassa and Manica. The first steering committee of May 2018 however had chosen only one province, namely Zambezia.

currently undergoing, the question is to what extent capacity building in the maintenance unit for systems other than micro- and mini-grids is still relevant.

#### New legal and institutional context and changing roles

Chapter 2.1.2. of this report describes the general and institutional context in which the project operates. In particular, it highlights the changes in FUNAE, which is now led by a CEO (appointed in August 2022), two executive directors (who took office on 27 January 2023) and four - new – department directors expected to be appointed in April 2023. These significant changes to the organisational chart and the government's call for FUNAE to move from a role as a utility to a true fund supporting private sector investment raise questions about how Enabel / RERD2 should adapt its support to FUNAE, particularly regarding the management models of the five mini-grids to be completed in the second half of 2023.

#### Mid-Term Review

Considering the above a Mid-Term Review (MTR) foreseen for the months of March / April 2023 is particularly timely<sup>56</sup>. The project looks forward to exchanging views with the team, its recommendations and respective discussions.

Meanwhile the RERD2+ irrigation component (see below) will not yet have reached full cruising speed by the time of the MTR. A challenge will thus be to also propose strategic (re)orientations for the SPI component.

#### 3.1.2 Solar powered irrigation component (SPIS)

Due to the delayed partnership formation with FNDS for the implementation of the SPI component of RERD2+, the intervention sought alternative partners. Identification of suitable partners included a scoping exercise with SNV (previously identified in the TFF) and also iDE, an international NGO specialising in irrigation schemes in Mozambique. After assessing the continuous non-response of FNDS a management decision was taken to invest in alternative partnerships so that the component on SPI can progress.

iDE passed all the eligibility criteria and disposes of the necessary technical and financial capacity to carry out the assignment. Since FNDS was identified as the direct beneficiary of the grant in the TFF, it was necessary to formalise the change in implementing partner for the grant component. This led to several conversations with INIR (Director) and MADER (Vice Minister) to secure their consensus in proceeding with the change of partner. No objection was made. However, there has been a delay in obtaining written confirmation from INIR/MADER of their non-objection and in lieu of this, the silence will be considered as a go-ahead.

In response to Enabel's invitation the NGO 'International Development Enterprises' (iDE) submitted a proposal for a grant of 1,9 Mio€. The proposal has received the green light from HQ in February 2023. Under this partnership iDE will facilitate procurement, installation and sustainable operation of solar powered irrigation systems on small, medium and (a few) larger farms. Furthermore, iDE will facilitate

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<sup>56</sup> It's worth mentioning that the project did not benefit from an HQ backstopping mission. It is also noted that the MTR was adjourned from 2022 due to the fact that the HQ framework contract for reviews had expired and a new tender needed to be finalized.

private sector engagement for SPIS investment promotion, demand activation, product distribution and retail in the districts covered by the programme in Zambezia and Manica provinces.

Besides the above grant the project decided to use a second vehicle in the implementation of irrigation activities i.e., through a private sector tender for 14 beneficiaries identified in 2 GGGI studies (See Ch. 2.8.1). This helps the RERD2+ programme team to accelerate programme implementation and to spread out risk.

#### Acceleration of programme implementation

Implementation time was lost particularly in 2021 due to COVID-19 induced constraints which limited activity in the target locations.

Delays related to the recruitment of key personnel in 2021 due to early departure (after 4 months) of the irrigation component leader and in 2022, again, after departure of the second component leader (after 12 months) also compromised the speed of programme delivery. The 2023 workplan therefore has been structured to ensure that RERD2+ secures increased presence in the programme locations. The effort to ensure speedy implementation of scheduled work in the programme locations is also intended to protect stakeholder confidence and commitment to the programme. The increased effort to accelerate implementation of the programme activities will however be balanced with the critical need to ensure the technical integrity of all interventions in terms of technical best practice. A RERD2+ request to Enabel's junior programme was accepted by headquarters in Brussels. The international junior expert is expected to arrive in Mozambique in March 2023 and will be based in Chimoio. Focus of work will be on climate-smart agriculture, water management and agro-ecology.

#### Strengthening programme transparency and accountability

RERD2+ has prioritised the need to enhance accountability systems during programme delivery. This includes, in collaboration with iDE, operationalisation of an auditable beneficiary selection and contracting process, refining the programme Monitoring, Evaluation and Learning (MEAL) systems. This will also include programme reporting to stakeholders at defined intervals to ensure programme performance management and positioning on the market. RERD2+ has recruited a junior expert (expected to arrive in March) who will focus on climate smart agriculture, water management and agro-ecology.

#### Coordination of RERD2+ SPIS component activities with Partners

RERD2+ acknowledges that sustainable rural development in the target programme locations will require coordinated, complementary efforts with other actors/programmes such as a PRACTICA<sup>57</sup> funded by GIZ, the United Kingdom Foreign Commonwealth Office (FCDO) funded BRIHLO initiative, World Bank supported IRRIGA and SUSTENTA programmes. In this respect, the 2023 workplan and implementation approach is engineered to ensure that platforms for cross fertilisation of efforts and learning are promoted to ensure increased complementarity with other programmes.

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<sup>57</sup> Dutch NGO implementing the project "Developing the Solar Irrigation Business Case in Gaza province' Mozambique".

### Embedding cross cutting themes

RERD2+ acknowledges the crucial importance of cross cutting themes such as gender, youth and sustainable protection of the environment. Gender specific training for RERD2+ team members and partners was undertaken in 2022. The 2023 workplan includes application of the in 2022 developed gender strategy and action plan to guide programme implementation.

### Public Private Partnerships

RERD2+ acknowledges the importance of public-private partnerships in the promotion of SPIS in Mozambique. To ensure the sustainability of these partnerships, the 2023 workplan has prioritised creation of platforms for stakeholder dialogue on SPIS sector constraints and opportunities. This will include engagement on policy bottlenecks and promoting solutions that promote achievement of win – win scenarios for the stakeholders involved in the sector. Working closely with iDE RERD2+ will seek to promote private sector investments in SPIS for demand activation, product retailing and technical backstopping

## 3.2 Recommendations

Recommendations	Actor	Deadline
Continue with the collection of waterflow data at the potential Nintulo SHPP site to enrich the database on which to base further update studies leading to the formulation of an EPC tender	IM/RERD2/FUNAE	2024
Accelerate building of the 2 mini-grids in Nampula (Muite and Milhana) and 3 mini-grids in Zambezia (Mugulama, Alto Maganha and Idugo island)	IM/RERD2/FUNAE	Q4 2023
For the years 2023 and 2024 include in the FUNAE budget the equivalent total VAT and duties amount for the construction / completion of mini-grids and the purchase of associated equipment (meters, prepaid system, remote monitoring system);	FUNAE	2023, 2024
Continue to support the O&M and the GIS units in their work on micro- and mini-grids and off-grid energy planning	IM/RERD2	2023, 2024
Develop a capacity building plan for FUNAE including tailored trainings to staff adapted to new FUNAE needs.	IM/RERD2	2023, 2024
Continue to support FUNAE in its process to evolve into a genuine fund.	IM/RERD2/FUNAE	22023, 2024
Address the capacity building needs of market actors, as outlined in the validated skills audit report of the SPIS sector, through the development of curricula and implementation of targeted training activities / programmes.	IM/RERD2+	2023
Develop implementation strategy for the promotion of an enabling environment for the SPIS sector including mapping of potential	IM/RERD2+	2023

partners and identification of policy bottlenecks that require attention		
Follow up on the capacity building plan developed for INIR including tailored trainings to staff to enhance partner operational capacity in preparation of RERD2+ exit.	IM/RERD2+	2023, 2024
Integrate recommendations from the Mid-Term Review of March / April 2023 in the workplan of the remaining period of the project.	PM/RERD2	2023, 2024

### 3.3 Lessons Learned

Hereunder we list the lessons learned to date.

Lessons Learned	Target group
Involving communities in - data collection for - project preparation (such as in Nintulo) results in excellent community buy-in but increases the need for managing the community's 'revolution of rising expectations'	Enabel, FUNAE, beneficiary communities
The development of rural off-grid electrification projects requires continuous contact with the national on-grid utility, especially before launching a tender for mini-grids. Coordination between EDM (on-grid) and FUNAE (off-grid) should be ensured at ministerial level.	MIREME, FUNAE, EDM, projects in the off-grid energy domain
Before investment decisions are taken, mini-grid projects require pre-feasibility studies, followed by comprehensive socio-economic and technical feasibility studies and, due to their complexity, carefully considered tendering procedures, especially in a context like Mozambique where there is little or no experience with mini-grids to date.	Enabel & mini-grid projects developed under public funding
The co-management modality in Mozambique discourages international companies from bidding on public tenders for relatively important infrastructural works as all documentation must be submitted in Portuguese, stamped by a sworn translator, while, in addition, some of the documentation to be submitted is of a distinctly Mozambican administrative nature and not necessarily in possession of the tenderer.	Enabel, FUNAE, public sector
Enabel lacks instruments that provides scope for project assistance to private actors willing to take risks in investing in mini-grids. If Enabel wants to work on innovative ways for private sector development in the energy domain, or another field, it must equip itself with tools such as for example catalytic grants and/or results-based financing. In line with the above it is important that Enabel develops capacity in supporting partners for blended finance for large infrastructural works financed through a combination of grants, loans and private capital.	Enabel, private sector
In a country the size of Mozambique, geographical concentration and clustering of project activities and investments is necessary to increase the effectiveness of project operations and thus have a tangible impact on socio-economic development.	Enabel

The recruitment of an effective, responsive and uncompromising EPC supervisor is key in assuring delivery of quality infrastructure <sup>58</sup> .	Enabel, FUNAE
In formulating - renewable – energy projects the collection and recycling of components (solar panels, inverters, batteries, submersible pumps, etc.) at their end-of-life needs to be specifically addressed in the TFF / Project document.	Enabel
“Continuous training” with trainers/TAs who are embedded in the beneficiaries’ teams contributes significantly to the assimilation and application of what is learned. Using existing training centres in the country (especially in a Portuguese-speaking country like Mozambique where proficiency in English is a regular problem) such as EDM’s hydropower training centre is highly recommendable.	Enabel, FUNAE, public sector
Private sector companies such as SolarWorks have started operationalising Pay As You Go (PAYG) schemes designed to improve farmer’s financial capacity to purchase SPIS equipment in Mozambique. The effectiveness of these PAYG facilities as an alternative method of SPIS equipment financing seems to be encouraging but there is need to further review results from the model.	SPIS public and private sector stakeholders in Mozambique.
Private sector agribusiness companies in Mozambique are the main users of irrigation solutions in the country. The linkage however between these agribusiness companies and INIR remains very weak. The RERD2+ project started strengthening these linkages but a need remains to further explore mechanisms to strengthen collaboration between the agribusiness firms and INIR to promote more inclusive cooperation for sector growth.	INIR, private agribusiness companies
Only 40% of private sector companies are providing after sales services to farmers who would have purchased SPIS solutions to support correct installation and use of the technologies. There is need to explore how more companies can be incentivised to provide full package of services (including after sales support) to SPIS users.	SPIS public and private sector stakeholders in Mozambique.
Integrating an additional project component, doubling the budget, halfway through a project instead of designing a new intervention, may be justified because of the ease and speed of integrating a new component instead of designing a new intervention, but it generates a non-negligible amount of extra work for the intervention manager. Formulating it/a new project, conducting preparatory research, contracting consultants for scoping studies, integrating two logical frameworks and later two baselines, establishing new partnerships and managing them , building up new social capital, replacing new component leaders who decide to leave the project, managing and reporting on two projects that are out of sync, etc. etc., represents a significant increase in effort that inevitably comes at the expense of focussing on the original project for which the manager was hired while increasing risks of associated delays.	Enabel

<sup>58</sup> The supervision of the EPC of the 5 RERD2 mini-grids was outsourced to an international supervisor NRECA.



# Annexes

## 3.4 Quality criteria

1. RELEVANCE: The degree to which the intervention is in line with local and national policies and priorities as well as with the expectations of the beneficiaries				
<i>In order to calculate the total score for this quality criterion, proceed as follows: 'At least one 'A', no 'C' or 'D' = A; Two times 'B' = B; At least one 'C', no 'D' = C; at least one 'D' = D</i>				
Assessment RELEVANCE: total score	A	B	C	D
	X			
1.1 What is the present level of relevance of the intervention?				
X	A	Clearly still embedded in national policies and Belgian strategy, responds to aid effectiveness commitments, highly relevant to needs of target group.		
	B	Still fits well in national policies and Belgian strategy (without always being explicit), reasonably compatible with aid effectiveness commitments, relevant to target group's needs.		
	C	Some issues regarding consistency with national policies and Belgian strategy, aid effectiveness or relevance.		
	D	Contradictions with national policies and Belgian strategy, aid efficiency commitments; relevance to needs is questionable. Major adaptations needed.		
1.2 As presently designed, is the intervention logic still holding true?				
	A	Clear and well-structured intervention logic; feasible and consistent vertical logic of objectives; adequate indicators; Risks and Assumptions clearly identified and managed; exit strategy in place (if applicable).		
X	B	Adequate intervention logic although it might need some improvements regarding hierarchy of objectives, indicators, Risk and Assumptions.		
	C	Problems with intervention logic may affect performance of intervention and capacity to monitor and evaluate progress; improvements necessary.		
	D	Intervention logic is faulty and requires major revision for the intervention to have a chance of success.		

2. EFFICIENCY OF IMPLEMENTATION TO DATE: Degree to which the resources of the intervention (funds, expertise, time, etc.) have been converted into results in an economical way				
<i>In order to calculate the total score for this quality criterion, proceed as follows: 'At least two 'A', no 'C' or 'D' = A; Two times 'B', no 'C' or 'D' = B; at least one 'C', no 'D' = C; at least one 'D' = D</i>				
Assessment EFFICIENCY : total score	A	B	C	D
		X		
2.1 How well are inputs (financial, HR, goods & equipment) managed?				
X	A	All inputs are available on time and within budget.		
	B	Most inputs are available in reasonable time and do not require substantial budget adjustments. However, there is room for improvement.		
	C	Availability and usage of inputs face problems, which need to be addressed; otherwise results may be at risk.		
	D	Availability and management of inputs have serious deficiencies, which threaten the achievement of results. Substantial change is needed.		

2.2 How well is the implementation of activities managed?	
	A Activities implemented on schedule
X	B Most activities are on schedule. Delays exist, but do not harm the delivery of outputs
	C Activities are delayed. Corrections are necessary to deliver without too much delay.
	D Serious delay. Outputs will not be delivered unless major changes in planning.
2.3 How well are outputs achieved?	
	A All outputs have been and most likely will be delivered as scheduled with good quality contributing to outcomes as planned.
X	B Output delivery is and will most likely be according to plan, but there is room for improvement in terms of quality, coverage and timing.
	C Some output are/will be not delivered on time or with good quality. Adjustments are necessary.
	D Quality and delivery of outputs has and most likely will have serious deficiencies. Major adjustments are needed to ensure that at least the key outputs are delivered on time.

3. EFFECTIVENESS TO DATE: Degree to which the outcome (Specific Objective) is achieved as planned at the end of year N				
<i>In order to calculate the total score for this quality criterion, proceed as follows: 'At least one 'A', no 'C' or 'D' = A; Two times 'B' = B; At least one 'C', no 'D' = C; at least one 'D' = D</i>				
Assessment EFFECTIVENESS: total score	A	B	C	D
		X		
3.1 As presently implemented what is the likelihood of the outcome to be achieved?				
	A Full achievement of the outcome is likely in terms of quality and coverage. Negative effects (if any) have been mitigated.			
X	B Outcome will be achieved with minor limitations; negative effects (if any) have not caused much harm.			
	C Outcome will be achieved only partially among others because of negative effects to which management was not able to fully adapt. Corrective measures have to be taken to improve ability to achieve outcome.			
	D The intervention will not achieve its outcome unless major, fundamental measures are taken.			
3.2 Are activities and outputs adapted (when needed), in order to achieve the outcome?				
	A The intervention is successful in adapting its strategies / activities and outputs to changing external conditions in order to achieve the outcome. Risks and assumptions are managed in a proactive manner.			
X	B The intervention is relatively successful in adapting its strategies to changing external conditions in order to achieve its outcome. Risks management is rather passive.			
	C The intervention has not entirely succeeded in adapting its strategies to changing external conditions in a timely or adequate manner. Risk management has been rather static. An important change in strategies is necessary in order to ensure the intervention can achieve its outcome.			
	D The intervention has failed to respond to changing external conditions, risks were insufficiently managed. Major changes are needed to attain the outcome.			

4. POTENTIAL SUSTAINABILITY: The degree of likelihood to maintain and reproduce the benefits of an intervention in the long run (beyond the implementation period of the intervention).				
<i>In order to calculate the total score for this quality criterion, proceed as follows: At least 3 'A's, no 'C' or 'D' = A ; Maximum two 'C's, no 'D' = B; At least three 'C's, no 'D' = C ; At least one 'D' = D</i>				
Assessment POTENTIAL SUSTAINABILITY : total score	A	B	C	D
		X		
4.1 Financial/economic viability?				
	A	Financial/economic sustainability is potentially very good: costs for services and maintenance are covered or affordable; external factors will not change that.		
	B	Financial/economic sustainability is likely to be good, but problems might arise namely from changing external economic factors.		
X	C	Problems need to be addressed regarding financial sustainability either in terms of institutional or target groups costs or changing economic context.		
	D	Financial/economic sustainability is very questionable unless major changes are made.		
4.2 What is the level of ownership of the intervention by target groups and will it continue after the end of external support?				
	A	The steering committee and other relevant local structures are strongly involved in all stages of implementation and are committed to continue producing and using results.		
X	B	Implementation is based in a good part on the steering committee and other relevant local structures, which are also somewhat involved in decision-making. Likelihood of sustainability is good, but there is room for improvement.		
	C	The intervention uses mainly ad-hoc arrangements and the steering committee and other relevant local structures to ensure sustainability. Continued results are not guaranteed. Corrective measures are needed.		
	D	The intervention depends completely on ad-hoc structures with no prospect of sustainability. Fundamental changes are needed to enable sustainability.		
4.3 What is the level of policy support provided and the degree of interaction between intervention and policy level?				
	A	Policy and institutions have been highly supportive of intervention and will continue to be so.		
X	B	Policy and policy enforcing institutions have been generally supportive, or at least have not hindered the intervention, and are likely to continue to be so.		
	C	Intervention sustainability is limited due to lack of policy support. Corrective measures are needed.		
	D	Policies have been and likely will be in contradiction with the intervention. Fundamental changes needed to make intervention sustainable.		
4.4 How well is the intervention contributing to institutional and management capacity?				
	A	Intervention is embedded in institutional structures and has contributed to improve the institutional and management capacity (even if this is not an explicit goal).		
X	B	Intervention management is well embedded in institutional structures and has somewhat contributed to capacity building. Additional expertise might be required. Improvements in order to guarantee sustainability are possible.		
	C	Intervention relies too much on ad-hoc structures instead of institutions; capacity building has not been sufficient to fully ensure sustainability. Corrective measures are needed.		
	D	Intervention is relying on ad hoc and capacity transfer to existing institutions, which could guarantee sustainability, is unlikely unless fundamental changes are undertaken.		

### 3.5 Decisions taken by the steering committee and follow-up

Decision					Action			Follow-up	
Decision	Period of identification	Timing	Source	Actor	Action(s)	Resp.	Deadline	Progress	Status
Composition and management of Joint Steering Committee	Q2 2018	Immediate	JLCB		Directors of <i>Direcção de Planificação e Cooperação</i> and of <i>Direcção Nacional de Energias Novas e Renováveis</i> will be invited members of the Steering Committee on a permanent basis	JLCB	Next steering committee	Noted	<u>CLOSED</u>
					Joint Steering Committees of CB MIREME and RERD2 will be held jointly; additional Steering Committees may be held for each project individually if need be	JLCB	Next steering committee	Noted	<u>CLOSED</u>
TFF's reference to CNELEC applies to ARENE	Q2 2018	Immediate	JLCB		-	-	-	Noted	<u>CLOSED</u>
CB MIREME and FUNAE to provide more detailed activity planning until end of 2018	Q2 2018	Immediate	JLCB		After planning sessions formulate more detailed planning	PM	-	FUNAE provided a plan for 2018 which was integrated in the 2019 operational plan.	<u>CLOSED</u>
RERD2 result report 2018 and operational plan and budget 2019 are approved.	Q1 2019	Immediate	JLCB		N.A.	N.A.	N.A.	Noted	<u>CLOSED</u>

Decision					Action			Follow-up	
Decision	Period of identification	Timing	Source	Actor	Action(s)	Resp.	Deadline	Progress	Status
On the basis of a list of RERD2 pre-selected sites decide on those that merit further studies in view of project investment.	Q1 2019		JLBC		Proposed by the project in the JLCB of 4 December 2019	PM / JLBC	Dec. 2019	Sites to advance with EPCs and in-depth feasibility studies.	<u>CLOSED</u>
Approval of the following sites for building solar mini-grids: 1. Naburi, 2. Alto Maganha and 3. Namanla in Pebane district; 4. Mungulama in Ile district and 5. Alto Benfica in Mocuba	Q4 2019	Immediate	PM/JLBC		Organize complete technical and economic feasibility studies of selected / approved locations	OM	Q2-Q4	Full mini-grid feasibility studies of 5 locations completed by Q4 2020	<u>CLOSED</u>
Financial reinforcement of the direct management budget line R1A1 "Review and update of existing studies", to speed up the process of contracting solar feasibility studies.	Q4 2019	Immediate	PM/JLBC		Proposed by the project in the JLCB of 4 December 2019	PM	Q1 2020	JLCB approved. Budget line increased by the additional RERD2+ budget.	<u>CLOSED</u>
Include a 4th result in the project logical framework denominated "The new legal framework is influenced by FUNAE" with a budget line "R4A1 Carrying out specialized studies to strengthen the legal framework".	Q4 2019	Immediate	PM/JLBC		Proposed by the project in the JLCB of 4 December 2019	PM	Q1 2020	4 <sup>th</sup> result added to logical framework. Budget line funded from the extra RERD2+.	<u>CLOSED</u>
The 2020 Results Report is adopted	Q4 2020	Immediate	JLCB		Submit to Enabel	PM	Q1	Report submitted	<u>CLOSED</u>

Decision					Action			Follow-up	
Decision	Period of identification	Timing	Source	Actor	Action(s)	Resp.	Deadline	Progress	Status
Nampula and Manica are included as beneficiary provinces of the RERD2(+) project.	Q4 2020	Immediate	JLCB		Recruit ATI and national staff and start up project activities	Intervention Manager	Q1/Q2	ATI identified and selected. INIR briefed and mobilized to prepare for ATI arrival	<u>CLOSED</u>
Continue with the construction of solar-hybrid mini-grids in the Administrative Posts of Muite and Milhana in the province of Nampula and in the Island of Idugo, Alto Maganha and Mugalama in Zambezia province	Q4 2020	Immediate	JLCB		Prepare EOI, EPC and supervision tenders for construction of 4 to 5 mini-grids	Intervention Manager	Q1	Contracts for 5 mini-grids awarded to 2 companies for a total value of 8,768,166 Euro	<u>ONGOING</u>
For the coming years y+1 (2021, 2022...) the inclusion in the FUNAE budget of the equivalent total VAT amount for the construction of mini-grids and the purchase of associated equipment (meters, prepaid system, remote monitoring system)	Q4 2020	Immediate	JLCB		FUNAE	CEO	Q2-Q3 / 2021, 2022, 2023, 2023	Register mini-grid works at the Procuradoria da República and insert VAT values in yearly FUNAE budget	ONGOING
5. Approval of budget transfers from the following Co-management lines: A0103 (Mini-Grid Development) of EUR 6,000,000.00 (actually EUR 5,999,950.00), line A0203 (Implementation of Remote Monitoring Systems) EUR 360,000.00 and line A0204 (Implementation Of Payment Systems) of EUR 500,000.00 to Regie in order to	Q4 2020	Immediate	JLCB		Request approval budget revision at Enabel HQ in Brussels	RAFI / Enabel	Q1	Budget revision approved by JCLB of 15 November 2021	<u>CLOSED</u>



Decision					Action			Follow-up	
Decision	Period of identification	Timing	Source	Actor	Action(s)	Resp.	Deadline	Progress	Status
accelerate the construction of mini-grids and the acquisition of associated equipment.									
The agreement between the Ministry of Foreign Affairs (MINEC) and MIREME on VAT to be sent to the Diplomatic Bureau of Belgium so that the Ministry of Finance can acknowledge VAT refunds, under its responsibility since 2015.	Q4 2020	ASAP	JLCB		Send agreement between the Ministry of Foreign Affairs (MINEC) and MIREME on VAT to Diplomatic Bureau of Belgium	MIREME	Q1	Addenda to the SC was signed	<u>CLOSED</u>
Formal invitation of a representative of the Ministry of Agriculture and Rural Development (MADER) to the RERD2(+) steering committee after having shared the RERD2+ document with all institutions involved and after having obtained all necessary Mozambican and Belgian approvals. (MADER) in the Steering Committee RERD2 (+).	Q4 2020	Timely before next JLCB meeting	JLCB		Send invitation	Permanent Secretary MIREME	Q1 and / or Q4	Pending	ONGOING
Approval of budget transfers from the following budget lines: A0101 Review and updating of existing feasibility and baseline studies A0201 Planning, operation and maintenance A0202 Strengthening of	Q4 2021	Immediate	JLCB		Integrate new budget in Enabel financial management system	Intervention Manager / RAFI	Q1/2022	Done	CLOSED

Decision					Action			Follow-up	
Decision	Period of identification	Timing	Source	Actor	Action(s)	Resp.	Deadline	Progress	Status
information systems A0205 Implementation of payment systems A0302 Provincial Delegations capacity building X0101 Contingencies (COGEST) to budget line A0103 Development of mini-grids - incl. monitoring - (€950,000) and budget line A0501 "Studies to strengthen the legal framework" (€60,000) as indicated in Annex 1. This allows to proceed with the construction of the 5 mini-grids, the acquisition of equipment associated with the mini-grids and to strengthen FUNAE's capacity to raise funds for off-grid projects.									
Annex 1 of the minutes of meeting of the 15 Nov 2021 Steering Committee detailing budget changes allowing to build 5 (instead of 4) mini-grids was approved and is declared integral part of the minutes.	Q4 2021	Immediate	JLCB			Intervention Manager	Nov. 2021	Noted	CLOSED
Decided to award the contracts for the construction of solar hybrid mini-grids in the Administrative Posts of Muite and Milhana in Nampula province and the Island of Idugo, Alto	Q4 2021	immediate	JLCB		Award contract for EPC of 5 mini-grids to 2 companies	Intervention Manager	Dec. 2021	Done	CLOSED

Decision					Action			Follow-up	
Decision	Period of identification	Timing	Source	Actor	Action(s)	Resp.	Deadline	Progress	Status
Maganha and Mugulama in Zambézia province.									
RERD2 / RERD2+ Updated Baseline Report of September 2021 with inclusion of RERD2+ / SPIS indicators approved	Q1 2022	Immediate	JCLB		Apply in project monitoring	Intervention manager	Throughout the project period	Ongoing	Ongoing
Annual Results Report 2021 RERD2 / RERD2 approved	Q1 2022	Immediate	JCLB		Submit(ted) report to HQ	Intervention manager	Q1 2022	Done	CLOSED
RERD2/RERD2+ Project activity plan and budget 2022 approved	Q1 2022	Immediate	JCLB		Implement plan	Intervention manager	Q4 2022	Done	CLOSED

### 3.6 Updated Logical framework

General Objective	Indicators	Means of verification	Base values	Target	Assumptions
Rural Economic and Social Development is promoted by increased sustainable access to energy	<ul style="list-style-type: none"> <li>Poverty indicators of target area</li> </ul>	<ul style="list-style-type: none"> <li>Government statistics (INE - Instituto Nacional de Estatística)</li> <li>UNDP</li> </ul>	<ul style="list-style-type: none"> <li>Zambezia: 70.5%</li> <li>Nampula 54.7%</li> <li>Niassa 31.9%</li> <li>Manica 55.1%</li> <li>Nat. average 54.7%</li> </ul> (UNDP 2019 Report on MDGs)	<ul style="list-style-type: none"> <li>Zambezia: 69.5%</li> <li>Nampula 53.7%</li> <li>Niassa 30.9%</li> </ul>	<ul style="list-style-type: none"> <li>Successful integration of the RERD2 intervention with other interventions promoting productive uses of energy</li> </ul>
	<ul style="list-style-type: none"> <li>Cumulative number of productive businesses electrified by RERD2 mini-grids</li> </ul>	<ul style="list-style-type: none"> <li>Feasibility Survey Report &amp; Energy needs Assessment &amp; Post-electrification study</li> </ul>	0	154	
	<ul style="list-style-type: none"> <li>Cumulative number of NEW businesses established after the electrification of the village</li> </ul>	<ul style="list-style-type: none"> <li>Feasibility Survey Report &amp; Energy needs Assessment &amp; Post-electrification study</li> </ul>	0	30	
Outcome	Indicators	Means of verification	Base values	Target	Assumptions
Access to energy in rural areas is increased by investments in renewable energy and in support mechanisms to ensure sustainability	<ul style="list-style-type: none"> <li>Access to electricity in rural areas</li> </ul>	<ul style="list-style-type: none"> <li>Existing multi-tier framework surveys (SE4All)</li> <li>Household surveys</li> </ul>	5,97% of rural populations (Global Tracking framework)	7,97% of rural population of one province	<ul style="list-style-type: none"> <li>No extreme climatic event</li> <li>No major insecurity in the targeted provinces</li> <li>No major impact of Covid 19 restrictions</li> </ul>
	<ul style="list-style-type: none"> <li>Total – cumulative – number of connections</li> </ul>	<ul style="list-style-type: none"> <li>Feasibility Survey Report &amp; Energy needs assessments &amp; RERD2 report</li> </ul>	0	3500	

	• Total installed and operational capacity from renewable energy (kWp)	• Feasibility Survey Report & Energy needs assessments & RERD2 report	Electrification: 0 Irrigation: 0	Electrification: 820 Irrigation: 750	
	• Fee collection rate (payment rate) in mini-grids	• FUNAE payment records	0	80%	
	• Total irrigated area under sustainable practices (ha)	• Project + SDAE	0	900	
	• Number of farmers applying best irrigation and agronomical practices	• Field assessment and survey (biophysical as well as socio-economic) reports	0	1.000	
	• Total food production is increased	• Project + SDAE	0	25%	
	• Total food production is diversified	• Project + SDAE	0	50%	
	• Reduction of energy costs for production (medium and big farmers)	• Project + SDAE	0	50%	
	• Percentage of functioning SPIS installations	• Project + SDAE	n/a	>= 75%	
	• Satisfaction index of beneficiary producers	• Household survey	n/a	>= 80%	

Result 1	Indicators	Means of verification	Base values	Target	Assumptions
Mini-grids developed for households, productive users and public infrastructure	<ul style="list-style-type: none"> <li>Cumulative number of RE productive use locations and identified and suitable for the installation of hydro- or solar mini-grids (reinforcing the FUNAE pipeline)</li> </ul>	<ul style="list-style-type: none"> <li>RERD2-report</li> </ul>	0	36	<ul style="list-style-type: none"> <li>At least 2 Quality EPC companies manage to submit technically and financially acceptable offers</li> <li>No major security disruptions during construction of mini-grids in Zambezia and</li> </ul>

	<ul style="list-style-type: none"> <li>Number of reviewed, revised and updated feasibility and baseline studies</li> </ul>	<ul style="list-style-type: none"> <li>RERD2-report</li> </ul>	13 existing studies on PV and hydro	1 to 3	<p>Nampula</p> <ul style="list-style-type: none"> <li>The FUNAE GIS unit stays motivated and carries through project promoted improvement plans and validates in office identified locations in the provinces</li> </ul>
	<ul style="list-style-type: none"> <li>Number of pre-feasibility on-site assessments of FUNAE pipeline locations for mini-grids</li> </ul>	<ul style="list-style-type: none"> <li>RERD2-report</li> </ul>	0	20	
	<ul style="list-style-type: none"> <li>Number of RERD2 funded and completed comprehensive feasibility studies for solar (hybrid) mini-grids</li> </ul>	<ul style="list-style-type: none"> <li>RERD2-report</li> </ul>	0	5	
	<ul style="list-style-type: none"> <li>Number of awareness and stakeholder consultations in targeted mini-grid communities per year</li> </ul>	<ul style="list-style-type: none"> <li>RERD2-report</li> </ul>	0	25	
	<ul style="list-style-type: none"> <li>Cumulative number of hybrid solar mini-grids commissioned, operational and properly maintained</li> </ul>	<ul style="list-style-type: none"> <li>RERD2-report</li> </ul>	0	5	
	<ul style="list-style-type: none"> <li>Publication for result dissemination</li> </ul>	<ul style="list-style-type: none"> <li>RERD2-report</li> </ul>	0	1	
<b>Activities for R1</b>	<b>Actors involved</b>	<b>Estimated Budget</b>			<b>assumptions</b>
R1.A1: Review and update of existing feasibility and baseline studies and site selection in view of productive uses of energy (socio economic surveys)	Consultancy, NGOs, FUNAE, business associations, businesses, other donors, local authorities	€200.000	13 existing studies on PV and hydro	1 to 3 studies revised and updated	<ul style="list-style-type: none"> <li>Quality consultants are found</li> <li>The existing FUNAE pipeline for mini-grids is relevant to the objective</li> <li>Existing studies are of good quality</li> </ul>
R1.A2 : Awareness and stakeholder consultations for each site including the private sector	NGOs, FUNAE, business associations, businesses, local authorities	€50.000	0 campaigns	1 a 3 awareness campaigns performed on future sites	NGOs and actors with sufficient knowledge of local conditions can be found



R1.A3: Mini-grid development with productive uses of energy	Private sector, FUNAE, consultants, NGOs, communities, local authorities	€ 6.120.000	3 large existing hydro mini grids (Sembezia, Murora, Majaua) and 3 large solar mini grids	1 to 3 additional large hydro mini-grids	<ul style="list-style-type: none"> <li>• A financially sustainable management system for mini grid is agreed upon</li> <li>• Enforcement of payment for services</li> <li>• Sufficient ability to pay</li> </ul>
R1.A4 Result dissemination	FUNAE	€ 50.000	0 publications	Minimum one publication	

Result 2	Indicators	Means of verification	Base values	Target	Assumptions
Technical and financial sustainability of existing systems is improved	<ul style="list-style-type: none"> <li>• Nr of RERD1 funded hydro-mini-grids investigated (with report) on functioning and operational status</li> </ul>	<ul style="list-style-type: none"> <li>• RERD2-report</li> </ul>	0	3	<ul style="list-style-type: none"> <li>• Continuity in management and continued openness to other stakeholders</li> <li>• Users are willing and able to pay for the energy services</li> <li>• FUNAE is open to a level of decentralization process giving more autonomy to the Delegations, including financial.</li> <li>• Agreement can be found on tariffs and subsidies</li> </ul>
	<ul style="list-style-type: none"> <li>• Nr of RERD1 funded solar systems investigated and reported on operational status</li> </ul>	<ul style="list-style-type: none"> <li>• RERD2-report</li> </ul>	0	377	
	<ul style="list-style-type: none"> <li>• GIS implemented beyond a static database and used for asset management purposes</li> </ul>	<ul style="list-style-type: none"> <li>• RERD2-report (according to joint self-assessment by the DEP and O&amp;M-unit)</li> </ul>	GIS is a static baseline and not used for asset management purposes	GIS is fully used for asset management purposes	
	<ul style="list-style-type: none"> <li>• Degree of connectivity/sharing GIS database with other departments</li> </ul>	<ul style="list-style-type: none"> <li>• RERD2-report (self-assessment by DEP)</li> </ul>	No sharing with other departments	Excellent degree of connectivity	
	<ul style="list-style-type: none"> <li>• Cumulative number of RERD1 purchased meters and pre-payment systems installed and operational</li> </ul>	<ul style="list-style-type: none"> <li>• RERD2-report</li> </ul>	726 meters and pre-payment meters purchased, but not yet operational – 0% of systems operational	726 – 100% of systems operational	

	<ul style="list-style-type: none"> <li>Use of tablets in data collection campaigns and missions of the Operation and Maintenance (O&amp;M) unit</li> </ul>	<ul style="list-style-type: none"> <li>RERd2-report (self-assessment by the O&amp;M-unit)</li> </ul>	Not yet used	Systematic use at HQ and delegations level
	<ul style="list-style-type: none"> <li>Percentage of new (RERD2) mini-grid connections equipped with pre-paid meters</li> </ul>	<ul style="list-style-type: none"> <li>RERD2-report</li> </ul>	n/a	100%
	<ul style="list-style-type: none"> <li>Percentage of FUNAE pre-paid meters served by a remote sales system using mobile money</li> </ul>	<ul style="list-style-type: none"> <li>FUNAE records &amp; RERD2-reports</li> </ul>	0%	100%
	<ul style="list-style-type: none"> <li>Cumulative number of FUNAE-managed PV-mini-grids – over 20 kWp – that are remotely monitored (facilitating full maintenance)</li> </ul>	<ul style="list-style-type: none"> <li>FUNAE records &amp; RERD2-reports</li> </ul>	0	23

	Activities for R2	Actors involved	Estimated Budget			assumptions
	R2.A1 Planning, Operation and maintenance	FUNAE with focus on maintenance unit, and other relevant divisions (solar, mini-hydro)	€ 200.000	Maintenance unit half functional 50%	Maintenance unit strengthened 90%	Integration with other departments is simulated Qualified human resources are kept in FUNAE
	R2. A2 Strengthening of Information systems	FUNAE maintenance unit and delegations	€ 200.000	Data base and GIS not connected Information not shared between departments 0%	GIS and data base connected and used for asset management, site identification and planning 100%	Integration with other departments is simulated Qualified human resources are kept in FUNAE
	R2 A3 Implementation of monitoring remote monitoring	FUNAE delegations in the provinces and relevant divisions	€ 360.000	8 systems installed; 3 different technologies	One technology chosen. Number of systems installed according to	Monitoring systems are adequate for the targeted systems.

systems				budget	
R2 A4 Implementation of payment systems (metering, fee collection, pre-payment)	FUNAE maintenance unit and Delegations in the provinces	€500.000	1000 Meters and pre-payment systems purchased but not operational yet 0 % of systems operational 1000	Pre- payment (for domestic users) and meters systematic on the mini-grids financed by RERD2 100% of mini-grids equipped with pre-payment systems	Users are willing and able to pay for services

Result 3	Indicators	Means of verification	Base values	Target	Assumptions
The capacity of FUNAE in planning and project management is improved	• Capacity building 'CB' plan available and executed	• RERD2-report	No capacity building plan	Agreed capacity building plan available and executed according to plan	<ul style="list-style-type: none"> <li>Continuity in management</li> <li>Cooperation between divisions</li> <li>FUNAE retains qualified human resources</li> </ul>
	• Cumulative number of different types of training for FUNAE staff administered	• RERD2-report	0	30	
	• Cumulative number of trained FUNAE staff	• RERD2-report	0	125	
	• Cumulative number of hours of training of FUNAE staff (HQ/Delegation M/F)	• RERD2-report	0	7000	
	• Number of internal technical support documents drafted and distributed within FUNAE	• RERD2-report	0	15	
	• Quality of socio-economic survey methodology	• FUNAE records & RERD2-reports	No standard method for socio-economic survey	Improved standard template for surveys stored on tablets being used for these surveys	
	• Processes and working procedures for maintenance and mini-grid selection (GIS) improved	• FUNAE records and RERD2-reports	Working processes and procedures for maintenance and site selection not sufficiently functional	Clear processes and tools for maintenance and site-selection	

	<ul style="list-style-type: none"> <li>Cumulative number of provinces with mini-grid sites selected and validated</li> </ul>	<ul style="list-style-type: none"> <li>FUNAE records &amp; RERD2-reports</li> </ul>	0	11 selected, 11 validated	
Activities for R3	Actors involved	Estimated budget			Assumptions
R3.A1 Project management is improved at HQ level	<ul style="list-style-type: none"> <li>FUNAE relevant divisions in HQ</li> </ul>	€ 100.000	Processes and working procedures not updated	Clear processes and tools for project management	<ul style="list-style-type: none"> <li>Integration with other departments is simulated</li> <li>Qualified human resources are kept in FUNAE</li> </ul>
R3.A2. Capacity building of Delegations in sector planning and coordination	FUNAE maintenance unit and delegations	€ 200.000	Planning process with DIPREME unclear	Clear working processes and structure; Technicians better trained	<ul style="list-style-type: none"> <li>Qualified human resources are kept in FUNAE</li> <li>More autonomy for FUNAE Delegation</li> </ul>
R3 A3 Technical assistance	Enabel	€2.250.000			<ul style="list-style-type: none"> <li>Experts with adequate profiles are found</li> </ul>
R3 A4 Surveys, field trips workshops and seminars, study tours	FUNAE and Enabel staff	€200.000			

Result 4	Indicators	Means of verification	Base values	Target	Assumptions
Pro memoria, technical budget line for VAT (IVA)	N/A	N/A	N/A	N/A	N/A

Result 5	Indicators	Means of verification	Base values	Target	Assumptions
New legal Framework influenced by FUNAE	<ul style="list-style-type: none"> <li>Number of discussions/position papers on legal frameworks for renewable energy developed by FUNAE and shared with decision-makers</li> </ul>	<ul style="list-style-type: none"> <li>FUNAE records &amp; RERD2-report</li> </ul>	0	4	<ul style="list-style-type: none"> <li>Policy decision makers are receptive to suggestions from FUNAE and the project</li> </ul>
	<ul style="list-style-type: none"> <li>Number of meetings organized by decision-makers (MIREMR, ARENE) attended by FUNAE in which legal</li> </ul>	<ul style="list-style-type: none"> <li>FUNAE records &amp; RERD2-report</li> </ul>	0	4	

	frameworks are discussed				
Activities for R5	Actors involved	Estimated budget			Assumptions
R3.A1 Project management is improved at HQ level	<ul style="list-style-type: none"> <li>FUNAE relevant divisions in HQ</li> </ul>	€ 100.000	Processes and working procedures not updated	Clear processes and tools for project management	<ul style="list-style-type: none"> <li>Integration with other departments is simulated</li> <li>Qualified human resources are kept in FUNAE</li> </ul>
R3.A2. Capacity building of Delegations in sector planning and coordination	FUNAE maintenance unit and delegations	€ 200.000	Planning process with DIPREME unclear	Clear working processes and structure; Technicians better trained	<ul style="list-style-type: none"> <li>Qualified human resources are kept in FUNAE</li> <li>More autonomy for FUNAE Delegation</li> </ul>
R3 A3 Technical assistance	Enabel	€2.250.000			<ul style="list-style-type: none"> <li>Experts with adequate profiles are found</li> </ul>
R3 A4 Surveys, field trips workshops and seminars, study tours	FUNAE and Enabel staff	€200.000			

Result 6	Indicators	Means of verification	Base values	Target	Assumptions
Sustainable solar powered irrigation systems are taken up by selected farmers in 2 provinces	<ul style="list-style-type: none"> <li>Cumulative number of farmers informed and sensitized in the provinces about SPIS</li> </ul>	<ul style="list-style-type: none"> <li>Project and partners reports</li> </ul>	0	>= 2.000 (minimum 50% of women)	<ul style="list-style-type: none"> <li>Different wealth categories of households are well represented and willing to invest in SPIS</li> <li>Sustainability of the set-up</li> </ul>
	<ul style="list-style-type: none"> <li>Total irrigated area (ha) under SPIS installations by the project</li> </ul>	<ul style="list-style-type: none"> <li>Field visits / survey reports</li> <li>Project and partners database</li> </ul>	0	900	
	<ul style="list-style-type: none"> <li>Number of reports on lessons learned disseminated and published</li> </ul>	<ul style="list-style-type: none"> <li>Project and partners database</li> </ul>	n/a	3	
Activities for R6	Actors involved	Estimated budget			Assumptions
R6.A1 Sites selection and preparatory actions	INIR at national and provincial level, DPAPZ, SDAE, SDPI	€ 220.000		Potential sites identified within Zambezia and Manica provinces for 900 ha	<ul style="list-style-type: none"> <li>Involvement of local technicians for the objective identification of sites</li> </ul>
R6.A2 IEC of beneficiaries and partners on SPIS	Local partners (NGO)	€ 60.000		Awareness among farmers about SPIS and	<ul style="list-style-type: none"> <li>NGOs and actors with sufficient knowledge of local conditions can be found</li> </ul>

				renewable energies	
R6.A3 Technical participatory analysis and identification of most promising SPIS options	INIR at national and provincial level, DPAPZ, SDAE, SDPI	€ 200.000		List of most promising SPIS options and systems	<ul style="list-style-type: none"> <li>• Availability of technical solutions accessible to small producers</li> </ul>
R6.A4 Support acquisition and implementation of SPIS through existing financing mechanisms and actors	FNDS, existing mechanism, private sector	€2.220.000		<p>900 small-scale farmers supported (kits of 0,5 to 2 ha)</p> <p>100 medium-scale farmers supported (average of 5 ha / farmer)</p> <p>10 large-scale entrepreneurial farmers supported (average of 20 ha / farmer)</p>	<ul style="list-style-type: none"> <li>• Opportunities for collaboration with FNDS or other existing mechanisms</li> </ul>
R6.A5 Continuous learning and adjustment & dissemination of results	INIR	€ 20.000			<ul style="list-style-type: none"> <li>•</li> </ul>
R6.A6 Technical Assistance (ITA and NTA)		€ 1.008.000			<ul style="list-style-type: none"> <li>• Experts with adequate profiles are found</li> </ul>
R6.A7 Training costs and short term expertise envelope		€ 74.000			<ul style="list-style-type: none"> <li>•</li> </ul>



Result 7	Indicators	Means of verification	Base values	Target	Assumptions
The technical and financial capacities of farmers, institutional partners and market actors for a sustainable use of solar powered irrigation systems are enhanced	<ul style="list-style-type: none"> <li>Number of people trained in new practices for sustainable irrigation and sustainable agriculture</li> </ul>	<ul style="list-style-type: none"> <li>Field visits / survey reports</li> </ul>	0	100% of extensionists, >= 50% of members of associations, 100% of the medium and big individual farmers (including 50% of women)	<ul style="list-style-type: none"> <li>Extension services relevant for irrigation and agriculture are willing to collaborate</li> <li>Private sector interest for investing in solar powered irrigation materials and techniques is confirmed</li> <li>International and national Research and knowledge centers timely available for fields research</li> </ul>
	<ul style="list-style-type: none"> <li>Satisfaction of end-users regarding the quality of available services on solar pumping irrigation (%)</li> </ul>	<ul style="list-style-type: none"> <li>Beneficiary survey</li> </ul>	n/a	>= 80%	
	<ul style="list-style-type: none"> <li>Number of appropriate solar powered irrigation technology and practices identified and disseminated</li> </ul>	<ul style="list-style-type: none"> <li>Research reports and studies</li> </ul>	0	8 (minimum 2 irrigation practices for each category of crop = 2X4)	
	<ul style="list-style-type: none"> <li>Level of knowledge and quality of the maintenance of SPIS by users</li> </ul>	<ul style="list-style-type: none"> <li>Beneficiary survey</li> </ul>	n/a	>= 80% with score "A"	
Activities for R7	Actors involved	Estimated budget			Assumptions
R7.A1 Support for implementation and use of SPIS and strengthening maintenance	Local partners (NGO), INIR, DPAPZ, SDAE, SDPI	€ 200.000			<ul style="list-style-type: none"> <li>NGOs and actors with sufficient knowledge of local conditions can be found</li> <li>Presence of local suppliers</li> </ul>
R7.A2. Improving sustainable irrigation and agronomic practices linked with SPIS's use	Local partners (NGO), Agricultural extension, DPAPZ, SDAE, SDPI	€ 420.000			<ul style="list-style-type: none"> <li>NGOs and actors with sufficient knowledge of local conditions can be found</li> </ul>
R7.A3 Strengthening suppliers distributors and service suppliers of SPIS	Private operators	€ 70.000			<ul style="list-style-type: none"> <li>NGOs and actors with sufficient knowledge of local conditions can be found</li> <li>Presence of local suppliers</li> <li>Involvement of the private sector</li> </ul>
R7.A4 Build local expertise on	Research centres, Universities,	€ 667.500			<ul style="list-style-type: none"> <li>Opportunities for collaboration with institutes at</li> </ul>

	SPIS through collaboration with Research centres and learning centres	Agrarian institutes				provincial level
	R7.A5 Capacity building of institutional partners with a focus on the provincial and local level	Institutional partners, private operators, NGO	€ 60.000			•
	R7.A6 National Technical Assistance		€ 240.000			• Experts with adequate profiles are found
	R7.A7 Training costs and short term expertise envelope		€ 75.000			•

Result 8	Indicators	Means of verification	Base values	Target	Assumptions
Initiatives to foster an enabling environment for private and public investments in the irrigation sector are supported	<ul style="list-style-type: none"> <li>Financial mechanism that stimulate investment in SPIS in place</li> </ul>	<ul style="list-style-type: none"> <li>Project report</li> </ul>	n/a	Financial Mechanism Promoted to be replicated by other market actors	<ul style="list-style-type: none"> <li>Efficient collaboration with FUNAE, MADER, INIR, FNDS etc.</li> <li>No restrictions of the government for setting-up financial mechanisms</li> </ul>
	<ul style="list-style-type: none"> <li>Number of coordination meetings at provincial level with public and private stakeholders from the water, energy and agriculture sector</li> </ul>	<ul style="list-style-type: none"> <li>Project report</li> </ul>	0	12	
Activities for R8	Actors involved	Estimated budget			Assumptions
R8.A1 Supporting platforms to exchange and coordinate the actions of different actors	Main institutional actors, private sector organizations, NGO, local authorities	€ 32.000			<ul style="list-style-type: none"> <li>Collaboration and involvement of institutional partners</li> </ul>
R8.A2 Support institutional actors in creating an enabling environment for SPIS uptake and dissemination	National funds/subsidies, FNDS	€ 130.000			<ul style="list-style-type: none"> <li>Efficient collaboration with FNDS or existing mechanisms</li> </ul>
R8.A3 Short term expertise envelope		€ 100.000			<ul style="list-style-type: none"> <li></li> </ul>

### 3.7 MoRe Results at a glance

Logical framework's results or indicators modified?	<p>- The December 2019 steering committee (SC) agreed with a change in the Logical Framework adding a fourth result.</p> <p>- the December 2020 SC agreed with an extra component on Solar Powered Irrigation studies adding three results with the associated addition of a full set of indicators.</p> <p>- In 2021 the RERD2 and RERD2+ logical frameworks were merged. It is attached to this report. The baseline report (in English and Portuguese) explains all additions and - some - changes in progress indicators. The updated baseline report was approved by the March 2022 steering committee.</p>
Baseline Report registered on PIT?	Yes
Planning MTR (registration of report)	<p>The MTR of RERD2 was scheduled for 2022. As such the ToR was sent to headquarters early in the year. Because of problems with the use of the Framework Work Contract (FWC) for evaluations and the fact that a new tender was issued to secure this service for Mozambique, a delay in the evaluation was already anticipated. It was then estimated that the new service provider would be available by September 2022, but no bids were received for the tender. It was then proposed to wait until the headquarters had finalized the award of the new FWC for evaluations, expected in December 2022. As such, the service was scheduled for March 2023, since in January most government staff are on leave and the intervention in February is normally fully occupied with planning, the steering committee meeting and preparation of the results report).</p> <p>(registration of report in Q2, 2023)</p>
Planning ETR (registration of report)	Not yet determined
Backstopping missions since 01/01/2018	0

### 3.8 Evolution of the budget

Below are the budget modifications as approved by the Steering Committee of 15 November 2021.

Enabel							
		MOZ1503411 RERD 2	Budget evolution				
		Budget Execution/Activities	Modality	Budget	Budget (+)	Budget (-)	New Budget total
<b>A</b>		<b>Increase access to energy</b>		<b>19,106,500</b>	<b>1,010,000</b>	<b>- 910,000</b>	<b>19,206,500</b>
A	01	Mini-grids provide reliable and adequate energy services		8,770,000	950,000	- 100,000	9,620,000
A	01	01 Review and update of existing studies	REGIE	710,000		- 100,000	610,000
A	01	02 Awareness and stakeholder consultations	REGIE	150,000			150,000
A	01	03 Mini grid development	COGEST	-			-
A	01	04 Result dissemination	REGIE	60,000			60,000
A	01	05 Mini grid development	REGIE	7,800,000	950,000		8,750,000
A	01	06 Short term expertise envelope	REGIE	50,000			50,000
A	02	Technical and financial sustainability of existing systems is improved		1,260,000	-	- 760,000	500,000
A	02	01 Planning, operation and maintenance	REGIE	200,000		- 80,000	120,000
A	02	02 Strengthening of information systems	REGIE	200,000		- 80,000	120,000
A	02	03 Implementation of remote monitoring systems	COGEST	-			-
A	02	04 Implementation of payment systems	COGEST	-			-
A	02	05 Implementation of remote monitoring systems	REGIE	360,000		- 100,000	260,000
A	02	06 Implementation of payment systems	REGIE	500,000		- 500,000	-
A	03	Capacity building of FUNAE in planning and project management		3,220,000	-	- 50,000	3,170,000
A	03	01 Project management at HQ level	REGIE	100,000			100,000
A	03	02 Capacity building of Delegations	REGIE	200,000		- 50,000	150,000
A	03	03 Technical assistance	REGIE	2,520,000			2,520,000
A	03	04 Surveys, field trips, workshops and seminars, study tours	REGIE	400,000			400,000
A	04	IVA		-	-	-	-
A	04	01 IVA	REGIE	-	-	-	-
A	04	02 IVA	COGEST	-	-	-	-
A	05	New legal framework influenced by FUNAE		60,000	60,000	-	120,000
A	05	01 Carrying out specialised studies to strengthen the legal framework".	REGIE	60,000	60,000		120,000
A	06	R6 Sustainable solar powered irrigation systems are taken up by selected farmers in 2 provinces		3,802,000	-	-	3,802,000
A	06	01 Sites selection and preparatory actions	REGIE	220,000			220,000
A	06	02 IEC of beneficiaries and partners on SPIS	REGIE	60,000			60,000
A	06	03 Technical participatory analysis and identification of most promising SPIS options	REGIE	200,000			200,000
A	06	04 Support acquisition and implementation of SPIS through existing financing mechanisms and actors	REGIE	2,220,000			2,220,000
A	06	05 Continuous learning and adjustment & dissemination of results	REGIE	20,000			20,000

Enabel			MOZ1503411 RERD 2					
			Budget evolution					
Budget Execution/Activities			Modality	Budget	Budget (+)	Budget (-)	New Budget total	
A	06	06	Technical Assistance (ITA and NTA)	REGIE	1,008,000		1,008,000	
A	06	07	Training costs and short term expertise envelope	REGIE	74,000		74,000	
A	07		R7 The technical and financial capacities of farmers, institutional partners and market actors for a sustainable use of solar powered irrigation systems are enhanced		1,732,500	-	1,732,500	
A	07	01	Support for implementation and use of SPIS and strengthening maintenance	REGIE	200,000		200,000	
A	07	02	Improving sustainable irrigation and agronomic practices linked with SPIS's use	REGIE	420,000		420,000	
A	07	03	Strengthening suppliers distributors and service suppliers of SPIS	REGIE	70,000		70,000	
A	07	04	Build local expertise on SPIS through collaboration with Research centres and learning centres	REGIE	667,500		667,500	
A	07	05	Capacity building of institutional partners with a focus on the provincial and local level	REGIE	60,000		60,000	
A	07	06	National Technical Assistance	REGIE	240,000		240,000	
A	07	07	Training costs and short term expertise envelope	REGIE	75,000		75,000	
A	08		R8 Initiatives to support an enabling environment for private and public investments in the irrigation sector are supported		262,000	-	262,000	
A	08	01	Supporting platforms to exchange and coordinate the actions of different actors	REGIE	32,000		32,000	
A	08	02	Support institutional actors in creating an enabling environment for SPIS uptake and dissemination	REGIE	130,000		130,000	
A	08	03	Short term expertise envelope	REGIE	100,000		100,000	
X			<b>Contingencies</b>		<b>374,520</b>	-	<b>100,000</b>	<b>274,520</b>
X	01		Contingencies		374,520	-	100,000	274,520
X	01	01	Contingencies	COGEST	163,000		100,000	63,000
X	01	02	Contingencies	REGIE	211,520			211,520
Z			<b>General Means</b>		<b>2,518,980</b>	-	-	<b>2,518,980</b>
Z	01		Personnel Costs		1,284,600	-	-	1,284,600
Z	01	01	Regional Administration & Finance	REGIE	326,540			326,540
Z	01	02	Finance/admin/procurement staff	REGIE	958,060			958,060
Z	01	03	Driver	REGIE	-			-
Z	02		Investment costs		195,000	-	-	195,000
Z	02	01	IT equipment	REGIE	60,000			60,000
Z	02	02	Office refurbishing	REGIE	15,000			15,000
Z	02	03	Furniture and equipment	REGIE	15,000			15,000
Z	02	04	Vehicles	REGIE	105,000			105,000

Enabel							
		MOZ1503411 RERD 2	Budget evolution				
		Budget Execution/Activities	Modality	Budget	Budget (+)	Budget (-)	New Budget total
Z	03	Operating Costs		726,380	-	-	726,380
Z	03	01 Office consumable	REGIE	50,400			50,400
Z	03	02 Communication costs	REGIE	54,000			54,000
Z	03	03 Fuel and maintenance	REGIE	132,000			132,000
Z	03	04 Mission costs	REGIE	126,000			126,000
Z	03	05 Other operation costs	REGIE	5,000			5,000
Z	03	06 Office rental	REGIE	270,000			270,000
Z	03	07 Office renovation and maintenance	REGIE	22,000			22,000
Z	03	08 Marketing and representation costs	REGIE	32,000			32,000
Z	03	09 Training administrative staff	REGIE	20,000			20,000
Z	03	10 ICT Maintenance and UBW Costs	REGIE	10,980			10,980
Z	03	11 Financial transaction costs	REGIE	4,000			4,000
Z	04	Audit, Follow-up and Evaluations		313,000	-	-	313,000
Z	04	01 Audit	REGIE	95,000			95,000
Z	04	02 Mid-term and final evaluation	REGIE	140,000			140,000
Z	04	03 Follow-up and backstopping	REGIE	68,000			68,000
Z	04	04 Monitoring	REGIE	10,000			10,000
Z	99	98 Conversion rate adjustment	REGIE	-			-
		<b>Total:</b>		22,000,000	1,010,000	- 1,010,000	22,000,000
		COGEST		163,000	0	-100,000	63,000
		REGIE		21,837,000	1,010,000	-910,000	21,937,000
		<b>Total:</b>		<b>22,000,000.00</b>	<b>1,010,000.00</b>	<b>- 1,010,000.00</b>	<b>22,000,000.00</b>



### 3.9 “Budget versus current (y – m)” Report

Budget Execution/Activities		Budget RERD2	Expenses start to end 2021	Expenses 2022	Total Expenses end 2022	Budget remaining 01/01/23	% executed
MOZ1503411 RERD 2							
<b>A Increase access to energy</b>		<b>19,206,500.00</b>	<b>2,139,015.03</b>	<b>1,312,347.84</b>	<b>3,451,362.87</b>	<b>17,099,024.58</b>	<b>17.97%</b>
A 01	Mini-grids provide reliable and adequate energy services	9,620,000.00	452,560.97	311,679.54	764,240.51	8,855,759.49	7.94%
A 01 01	Review and update of existing studies	REGIE 610,000.00	439,523.82	22,370.61	461,894.43	148,105.57	75.72%
A 01 02	Awareness and stakeholder consultations	REGIE 150,000.00	-	-	-	150,000.00	0.00%
A 01 03	Mini-grid development	COGEST 14.71	-	-	14.71	-	100.00%
A 01 04	Result dissemination	REGIE 60,000.00	5,843.07	174.85	6,017.92	53,982.08	10.03%
A 01 05	Mini-grid development	REGIE 8,750,000.00	3,725.26	286,701.02	290,426.28	8,459,573.72	3.32%
A 01 06	Short term expertise envelope	REGIE 50,000.00	3,454.11	2,433.06	5,887.17	44,112.83	11.77%
A 02	Technical and financial sustainability of existing systems is improved	500,000.00	97,138.73	6,660.44	103,799.17	396,200.83	20.76%
A 02 01	Planning, operation and maintenance	REGIE 120,000.00	22,466.11	3,093.62	25,559.73	94,440.27	21.30%
A 02 02	Strengthening of information systems	REGIE 120,000.00	73,949.44	4,196.38	78,145.82	41,854.18	65.12%
A 02 03	Implementation of remote monitoring systems	COGEST -	718.34	629.56	88.78	88.78	100.00%
A 02 04	Implementation of payment systems	COGEST -	4.84	-	4.84	4.84	100.00%
A 02 05	Implementation of remote monitoring systems	REGIE 260,000.00	-	-	-	260,000.00	0.00%
A 02 06	Implementation of payment systems	REGIE -	-	-	-	-	0.00%
A 03	Capacity building of FUNAE in planning and project management	3,170,000.00	1,343,961.63	562,980.43	1,906,942.06	2,469,922.49	60.16%
A 03 01	Project management at HQ level	REGIE 100,000.00	54,949.87	-	54,949.87	45,050.13	54.95%
A 03 02	Capacity building of Delegations	REGIE 150,000.00	36,376.03	74,302.13	110,678.16	39,321.84	73.79%
A 03 03	Technical assistance	REGIE 2,520,000.00	1,232,577.60	360,603.10	1,593,180.70	926,819.30	63.22%
A 03 04	Surveys, field trips, workshops and seminars, study tours	REGIE 400,000.00	20,058.13	128,075.20	148,133.33	251,866.67	37.03%
A 04	IVA	-	20,915.55	7,937.55	28,853.10	36,790.65	0.00%
A 04 01	IVA	REGIE -	3,541.35	-	3,541.35	3,541.35	100.00%
A 04 02	IVA	REGIE -	17,374.20	7,937.55	25,311.75	25,311.75	100.00%
A 05	New legal framework influenced by FUNAE	120,000.00	9,846.24	57,228.89	67,075.13	124,304.02	55.90%
A 05 01	Carrying out specialised studies to strengthen the legal framework".	REGIE 120,000.00	9,846.24	57,228.89	67,075.13	52,924.87	55.90%
A 06	R6 Sustainable solar powered irrigation systems are taken up by selected farmers in 2 provinces	3,802,000.00	187,644.98	259,622.99	447,267.97	3,354,732.03	11.76%
A 06 01	Sites selection and preparatory actions	REGIE 220,000.00	18,584.32	25,059.37	43,643.69	176,356.31	19.84%
A 06 02	IEC of beneficiaries and partners on SPIS	REGIE 60,000.00	-	-	-	60,000.00	0.00%
A 06 03	Technical participatory analysis and identification of most promising SPIS options	REGIE 200,000.00	-	32,505.88	32,505.88	167,494.12	16.25%
A 06 04	Support acquisition and implementation of SPIS through existing financing mechanisms and actors	REGIE 2,220,000.00	-	181.40	181.40	2,219,818.60	0.01%
A 06 05	Continuous learning and adjustment & dissemination of results	REGIE 20,000.00	-	-	-	20,000.00	0.00%
A 06 06	Technical Assistance (ITA and NTA)	REGIE 1,008,000.00	169,060.66	201,025.49	370,086.15	637,913.85	36.71%
A 06 07	Training costs and short term expertise envelope	REGIE 74,000.00	-	850.85	850.85	73,149.15	1.15%
A 07	R7 The technical and financial capacities of farmers, institutional partners and market actors for a sustainable use of solar powered irrigation systems are enhanced	1,732,500.00	26,946.93	106,238.00	133,184.93	1,599,315.07	7.69%
A 07 01	Support for implementation and use of SPIS and strengthening maintenance	REGIE 200,000.00	103.88	395.69	499.57	199,500.43	0.25%
A 07 02	Improving sustainable irrigation and agronomic practices linked with SPIS's use	REGIE 420,000.00	-	-	-	420,000.00	0.00%
A 07 03	Strengthening suppliers distributors and service suppliers of SPIS	REGIE 70,000.00	-	-	-	70,000.00	0.00%
A 07 04	Build local expertise on SPIS through collaboration with Research centres and learning centres	REGIE 667,500.00	10,541.56	40,420.90	50,962.46	616,537.54	7.63%
A 07 05	Capacity building of institutional partners with a focus on the provincial and local level	REGIE 60,000.00	-	1,494.71	1,494.71	58,505.29	2.49%
A 07 06	National Technical Assistance	REGIE 240,000.00	16,301.49	60,016.79	76,318.28	163,681.72	31.80%
A 07 07	Training costs and short term expertise envelope	REGIE 75,000.00	-	3,909.91	3,909.91	71,090.09	5.21%
A 08	R8 Initiatives to support an enabling environment for private and public investments in the irrigation sector are supported	262,000.00	-	-	-	262,000.00	0.00%
A 08 01	Supporting platforms to exchange and coordinate the actions of different actors	REGIE 32,000.00	-	-	-	32,000.00	0.00%
A 08 02	Support institutional actors in creating an enabling environment for SPIS uptake and dissemination	REGIE 130,000.00	-	-	-	130,000.00	0.00%
A 08 03	Short term expertise envelope	REGIE 100,000.00	-	-	-	100,000.00	0.00%
X	Contingencies	274,520.00	-	-	-	274,520.00	0.00%
X 01	Contingencies	274,520.00	-	-	-	274,520.00	0.00%
X 01 01	Contingencies	COGEST 63,000.00	-	-	-	63,000.00	0.00%
X 01 02	Contingencies	REGIE 211,520.00	-	-	-	211,520.00	0.00%
Z	General Means	2,518,980.00	809,582.98	277,473.14	1,087,056.12	1,431,923.88	43.15%
Z 01	Personnel Costs	1,284,600.00	576,802.48	179,840.48	756,642.96	527,957.04	58.90%
Z 01 01	Regional Administration & Finance	REGIE 326,540.00	331,855.18	6,001.20	337,856.38	11,316.38	103.47%
Z 01 02	Finance/admin/procurement staff	REGIE 958,060.00	244,947.30	173,839.28	418,786.58	539,273.42	43.71%
Z 01 03	Driver	REGIE -	-	-	-	-	0.00%
Z 02	Investment costs	195,000.00	102,717.45	21,509.45	124,226.90	70,773.10	63.71%
Z 02 01	IT equipment	REGIE 60,000.00	31,674.64	7,750.49	39,425.13	20,574.87	65.71%
Z 02 02	Office refurbishing	REGIE 15,000.00	273.88	226.37	500.25	14,499.75	3.34%
Z 02 03	Furniture and equipment	REGIE 15,000.00	1,468.68	2,728.47	4,197.15	10,802.85	27.98%
Z 02 04	Vehicles	REGIE 105,000.00	69,300.25	10,804.12	80,104.37	24,895.63	76.29%
Z 03	Operating Costs	726,380.00	123,853.27	75,733.87	199,587.14	526,792.86	27.48%
Z 03 01	Office consumable	REGIE 50,400.00	3,108.98	3,748.93	6,857.91	43,542.09	13.61%
Z 03 02	Communication costs	REGIE 54,000.00	8,377.13	4,994.87	13,372.00	40,627.93	24.76%
Z 03 03	Fuel and maintenance	REGIE 132,000.00	24,821.26	16,658.63	41,479.89	90,520.11	31.42%
Z 03 04	Mission costs	REGIE 126,000.00	19,444.94	9,337.99	28,782.93	97,217.07	22.84%
Z 03 05	Other operation costs	REGIE 5,000.00	13,632.02	9,271.34	22,903.36	17,903.36	458.07%
Z 03 06	Office rental	REGIE 270,000.00	45,543.86	31,389.70	76,933.56	193,066.44	28.49%
Z 03 07	Office renovation and maintenance	REGIE 22,000.00	79.07	-	79.07	21,920.93	0.36%
Z 03 08	Marketing and representation costs	REGIE 32,000.00	391.49	332.41	723.90	31,276.10	2.26%
Z 03 09	Training administrative staff	REGIE 20,000.00	-	-	-	20,000.00	0.00%
Z 03 10	ICT Maintenance and UBW Costs	REGIE 10,980.00	8,454.52	-	8,454.52	2,525.48	77.00%
Z 03 11	Financial transaction costs	REGIE 4,000.00	-	-	-	4,000.00	0.00%
Z 04	Audit, Follow-up and Evaluations	313,000.00	6,209.78	389.34	6,599.12	306,400.88	2.11%
Z 04 01	Audit	REGIE 95,000.00	-	-	-	95,000.00	0.00%
Z 04 02	Mid-term and final evaluation	REGIE 140,000.00	-	-	-	140,000.00	0.00%
Z 04 03	Follow-up and backstopping	REGIE 68,000.00	4,964.94	-	4,964.94	63,035.06	7.30%
Z 04 04	Monitoring	REGIE 10,000.00	-	-	-	10,000.00	0.00%
Z 99 98	Conversion rate adjustment	REGIE -	1,090.54	619.12	1,709.66	-	100.00%
Z 99 99	Conversion rate adjustment	REGIE -	154.30	229.78	75.48	75.48	100.00%
	<b>Total:</b>	<b>22,000,000.00</b>	<b>2,948,598.01</b>	<b>1,589,820.98</b>	<b>4,538,418.99</b>	<b>18,805,468.46</b>	<b>20.63%</b>
	COGEST	63,000.00	737.89	629.56	108.33	62,891.67	0.17%
	REGIE	21,937,000.00	2,947,860.12	1,590,450.54	4,538,310.66	17,388,698.34	20.89%
	<b>Total:</b>	<b>22,000,000.00</b>	<b>2,948,598.01</b>	<b>1,589,820.98</b>	<b>4,538,418.99</b>	<b>17,461,581.01</b>	<b>20.63%</b>

Budget vs current summarized

	Budget	Expenditure		Balance 31 / 12 / 2022	Financial execution rate of the year 2022	Total financial execution rate at the end of 2022
		Previous years	Year covered by report (n)			
<b>Total</b>	<b>22,000,000.00</b>	<b>2,948,598.01</b>	<b>1,589,820.98</b>	<b>17,461,581.01</b>	<b>7.23%</b>	<b>20.63%</b>
<b>Output 1</b>	9,620,000.00	452,560.97	311,679.54	8,855,759.49	3.24%	7.94%
<b>Output 2</b>	500,000.00	97,138.73	6,660.44	396,200.83	1.33%	20.76%
<b>Output 3</b>	3,170,000.00	1,343,961.63	562,980.43	1,263,057.94	17.76%	60.16%
<b>Output 5</b>	120,000.00	9,846.24	57,228.89	52,924.87	47.69%	55.90%
<b>Output 6</b>	3,802,000.00	187,644.98	259,622.99	3,354,732.03	6.83%	11.76%
<b>Output 7</b>	1,732,500.00	26,946.93	106,238.00	1,599,315.07	6.13%	7.69%
<b>Output 8</b>	262,000.00	-	-		0.00%	0.00%
<b>IVA ("output 4" pro memoria)</b>		20,915.55	7,937.55	- 28,853.10		
<b>Contingencies</b>	274,520.00			274,520.00	0.00%	0.00%
<b>General means</b>	2,518,980.00	809,582.98	277,473.14	1,431,923.88	11.02%	43.15%

### 3.10 Communication resources

To date the following articles were published on the “Open Enabel” website: 1) ‘Kick-starting the Baseline Study of the second phase of the Renewable Energy for Rural Development Project (RERD2)’, 2) ‘Rural electrification in Mozambique: how to find the right villages?’ and 3) *From water to energy: Digitalization and innovation go hand in hand in developing hydropower in Mozambique*. The second article “Rural electrification: how to find the right villages” was also published on ‘*Diario Economico*’ in Mozambique in English as well as Portuguese.

The presentation delivered by the intervention manager at the SE4A-2021 conference on Sustainable Energy for Africa<sup>59</sup>, was prepared for publication in the conference proceedings. The paper entitled “*Renewable energy and productive water for irrigation purposes in the provinces of Manica and Zambezia (Mozambique)*’ was to be published in November 2022.

The proceedings of a webinar organized by the Mozambican Association of Renewable Energy (AMER) with the title "Private sector perspectives on renewable energy in Mozambique. Edition: mini grids", to which the RERD2 intervention manager was panel member, was published on YouTube<sup>60</sup>. The webinar extensively discussed the issue of the Mozambican legal framework and the role of the private sector.

Two Enabel project information pamphlets: one for the electrification component, one for the irrigation component (A4 folded in 3), continue to be reproduced and shared with stakeholders that require more information on the programme such as in the conference mentioned below.



A Business Conference - Renewables in Mozambique took place on December 6th and 7<sup>th</sup> in Maputo 2022. The conference, transmitted online and attended by over 300

<sup>59</sup> The conference was held on 9 November 2021 and was co-organized by the Benin National Academy of Sciences, Arts and Letters (ANSALB) and the Royal Academy for Overseas Sciences of Belgium (ARSOM KAOW)

<sup>60</sup> <https://www.youtube.com/watch?v=Ggu4DWBELyg&t=4003s>

participants, was an opportunity to showcase RERD2 work on rural electrification and solar powered irrigation. Project pamphlets were distributed and the project partner TECNEL (part of the ENERSOL consortium) presented work on the two mini-grids in Nagonha and Idugo island (one of the slides is reproduced below).

**CONFÉRENCIA EMPRESARIAL**  
**RENOVÁVEIS EM MOÇAMBIQUE 2022**  
 BUSINESS CONFERENCE  
 Renovables in Mozambique 2022  
 MAPUTO 6/7 DEZEMBRO - DECEMBER

**azimut360** **TECNEL** **ENERSOL**

- 2x mini grids Zambezia
- Nagonha 200kWp + Ilha Idugo 230kWp
- Cap.baterias: 1100 kWh / 1300 kWh
- Potencia requerida: 180KVA
- Duracao: 12 meses
- Invest. Aprox: 6 milhoes Euros
- Consumidores: 70/3P + 1.890/1P
- Impacto: 5.000 pessoas / lote
- 60+71 toneladas CO2/ano

**Beneficiarios 5ha de Idugo**

- Jovens/colocionel
- JGP
- Agricultura local
- Agricultura local
- Secretaria/funcion. administrativo
- Centro de saude
- Escola
- Outros (a especificar)

Two SPIS promotion events to celebrate International Women’s Day under the theme *‘Promoting women participation and leadership in agriculture’* were highlighted on national television providing RERD2+ visibility and more importantly strengthening outreach/advocacy efforts for a more gender inclusive SPIS sector.

Quality photos taken by a professional photography mission of November 2021 delivered to the project early 2022 continue to support communication on and visibility of the project.