

SCALING UP ACCESS TO MODERN ENERGY SERVICES 2014-2021

FINAL PROJECT REPORT • JANUARY 2022



Project: Scaling up access to modern electricity services on a regional scale in rural sub-Saharan Africa by means of a fee-for-service business model

Donor: European Union
Contract: DCI-ENV/2014/348-266

Implementation period:
December 1, 2014 - July 31, 2021

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Front page:
Team members at Isingiro energy store in Uganda loading a truck with materials for an installation. In 2020, FRES Uganda finalized the installation of 3,700 solar home systems as part of this contract.

ACRONYMS

ABER	Burkinabé Rural Electrification Agency
ACP	African, Caribbean and Pacific
AEDD	Environmental and Sustainable Development Agency (Mali)
AER-Mali	Agence des Energies Renouvelables du Mali
AMADER	Agency for the Development of Domestic Energy and Rural Electrification (Mali)
ANEREE	National Agency for Renewable Energies and Energy Efficiency (Burkina Faso)
CNT	National Transition Council (Mali)
DGI	Directorate General of Taxes (Burkina Faso)
EDF	European Development Fund
EU	European Union
FRES	Foundation Rural Energy Services
kW	kilowatt
kWp	kilowatt peak
MDG	Millennium Development Goals
OHADA	Organization for the Harmonization of Business Law in Africa
SDG	Sustainable Development Goal
SHS	solar home system
SME	small and medium enterprise
UEMOA	West African Economic and Monetary Union
UNBS	Uganda National Bureau of Standards
UNREEEA	Uganda National Renewable Energy and Energy Efficiency Alliance
USEAS	Uganda Solar Energy Associations
Wp	watt peak

DESCRIPTION

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Title of the action	Scaling up access to modern electricity services on a regional scale in rural sub-Saharan Africa by means of a fee-for-service business model.
Contract number	DCI-ENV/2014/348-266
Start and end date of the reporting period	December 1, 2014 - July 31, 2021
Target countries and regions	<ul style="list-style-type: none"> • Mali: the regions of Sikasso, Ségou and Koulikoro • Uganda: 28 districts in the southwest of the country • Guinea-Bissau: the regions of Gabú, Bafatá, Quinara and Tombali • Burkina Faso: the provinces of Kénédougou, Houet and Tuy in the Hauts-Bassins region
Final beneficiaries and target groups	<ul style="list-style-type: none"> • Rural communities where the population has no access to the national electricity grid • Income-generating households whose main activity is farming, partly commercial • Small and medium enterprises (SMEs) including shops, cinemas, craftspeople • Rural institutions such as schools, clinics and places of worship

EXECUTIVE SUMMARY

The EU-funded project ‘Scaling up access to modern electricity services on a regional scale in rural sub-Saharan Africa by means of a fee-for-service business model’ commenced on December 1, 2014 and was successfully concluded on July 31, 2021.

All objectives and targets were met or exceeded while underspending the budget. This was despite numerous challenges and unforeseen circumstances, notably political instability in several project countries and the global outbreak of COVID-19.

A large part of the project’s success can be attributed to Foundation Rural Energy Services’ (FRES) fee-for-service model, now referred to as energy-as-a-service model, which gives customers access to solar electricity without having to purchase or maintain solar equipment themselves. With project support, FRES has proven the model’s efficacy by:

- Developing and expanding four commercial energy companies in Mali, Uganda, Guinea-Bissau and Burkina Faso, three of which are now financially sustainable.
- Connecting 9,363 households, small businesses and community organizations to affordable solar electricity, benefiting 46,500 people.
- Installing 8,328 solar home systems, 5 mini grids and 15 nano grids in underserved and off-grid rural areas.
- Employing and training local sales agents and technicians, so that solar systems can last for up to 20 years.
- Introducing innovations such as PayGo, a mobile payment system that has significantly improved payment rates and customer retention.
- Establishing partnerships with certified e-waste management companies in the region, ensuring proper recycling of batteries and setting an example for the industry.
- Diversifying the FRES portfolio of solar home systems (SHS) and mini grids to include nano grids, servicing a variety of off-grid energy demands.

FRES is now well placed to meet all energy needs as customers climb the energy ladder and require more capacity. The collaboration between FRES companies has been strengthened, enabling them to transfer knowledge and exchange experiences. Lessons learned during the implementation period were shared with rural electrification agencies and partners during workshops in all countries. Beyond the commercial opportunities this offers, FRES’ work is guided by the core promise of the Sustainable Development Goals (SDGs) to leave no one behind.

Our model of developing local organizations providing energy as a service is especially beneficial in countries that, because of political instability or limited economic prospects, are at greatest risk of being left behind. The model can be replicated in other countries or regions to further help to close the energy access gap and accelerate the transition to decarbonized energy systems in the decade of action to 2030.

RESULTS AND ACTIVITIES

The overall objective of the action was to scale up access to modern electricity services on a regional scale in sub-Saharan Africa. This objective was translated into three targets: (1) realize 8,100 modern energy connections for households and small businesses in four countries through SHS and nano grids; (2) provide 1,200 households and SMEs in Mali and Guinea-Bissau with access to electricity via solar mini grids; and (3) facilitate two regional

workshops for rural electrification agencies in the four countries. Throughout the implementation period, specific targets were adjusted but the main target of 9,300 new connections remained unchanged. The table below provides an overview of the targets set following the second contract addendum (see section 2) and the actual results achieved.

	Targets	Results	% achieved of target
Mini grids			
Total number of mini grids installed	5	5	100%
Number of mini grid connections	1,200	1,308	109%
Mini grid connections in Mali	850	856	101%
Mini grid connections in Guinea-Bissau	350	452	129%
SHS			
Total number of SHS installed	7,950	8,328	105%
Installed in Mali	2,500	2,644	106%
Installed in Uganda	3,700	3,700	100%
Installed in Guinea-Bissau	1,500	1,500	100%
Installed in Burkina Faso	250	484	194%
Nano grids			
Total number of nano grids installed	15	15	100%
Installed in Mali	5	5	100%
Installed in Guinea-Bissau	5	5	100%

	Targets	Results	% achieved of target
Installed in Burkina Faso	5	5	100%
Number of nano grid connections	150	95	63%
Nano grid connections in Mali	50	40	80%
Nano grid connections in Guinea-Bissau	50	25	50%
Nano grid connections in Burkina Faso	50	30	60%
Total new energy connections created			
Total	9,300	9,731	105%
Energy connections in Mali	3,400	3,540	104%
Energy connections in Uganda	3,700	3,700	100%
Energy connections in Guinea-Bissau	1,900	1,977	104%
Energy connections in Burkina Faso	300	514	171%
Rural electrification workshops			
Total number of workshops	2	4	200%
Total number of participants	n/a	210	n/a

1. Background

From left to right: Racif Abu Iala Sanha, Nelito José Quadé, Nafi Satu Bari and Sene Sambu modeling the new uniform worn by FRES Guiné-Bissau technical sales representatives. As energy-as-a-service companies, FRES companies employ over 200 field agents providing service and maintenance to our customers. Under this contract, 61 new permanent jobs were created.

1 Background

This project was one of 173 projects that were granted co-funding from the EU as part of the ACP-EU Energy Facility. The project contributed to the Millennium Development Goals (MDGs) in 2015, followed by the Sustainable Development Goals (SDGs) to 2030. It also aimed to demonstrate the strength of the FRES model of developing local capacity to increase access to modern and sustainable energy services with a long-term impact.

ACP-EU Energy Facility

Access to sustainable and modern energy is vital for satisfying basic human needs and a prerequisite for economic development. Yet one in five people worldwide – primarily in rural areas of sub-Saharan Africa and the Sahel – do not have access to electricity and the opportunities it offers. In 2005, the ACP-EU Council and European Commission established the ACP-EU Energy Facility as a co-financing instrument to support projects increasing access to sustainable and affordable energy, especially in rural and peri-urban areas in African, Caribbean and Pacific (ACP) countries.

Since 2005, the Energy Facility has invested €300 million in more than 170 projects in ACP countries. On December 1, 2014, the Energy Facility awarded FRES a grant of €10,666,666 for the project ‘Scaling up access to modern electricity services on a regional scale in rural

sub-Saharan Africa by means of a fee-for-service business model’. The project was successfully concluded on July 31, 2021, with all objectives and targets met or exceeded while underspending the budget.

From MDGs to SDGs

The overall objective of the project was to provide affordable and sustainable access to modern energy services for predominantly rural communities in four countries to improve living conditions, alleviate energy-related poverty and stimulate socioeconomic development.

At the time, the objective was linked to the MDGs 1 (end poverty and hunger), 2 (universal education), 3 (enhanced role for women in community organizations), 6 (improved health through refrigeration of vaccines) and 7 (environmental sustainability).

From 2015, the project supported the SDGs. FRES’ work directly contributes to ten of the 17 SDGs, notably goal 7, which explicitly recognizes the importance of access to affordable and clean energy.

FRES’ approach

FRES is a Dutch not-for-profit foundation that aims to advance electrification in rural Africa. We do this by establishing electricity companies under local management in areas that have no access to a national or regional electricity grid and that are insufficiently served by commercial solar energy providers. Our aim is for our companies to become financially sustainable in the long term. Expenses are kept to a minimum, and any profits are reinvested locally to support relevant expansion and finance future asset replacements without subsidies, Ensuring investments have a lasting impact.

1 Background

This proven approach sets us apart in several ways:

- **We go where others don't**

As a pioneer in bringing off-grid solar energy solutions to rural Africa, FRES proves it can be done. We target remote and often challenging areas that are at greatest risk of being left behind.

- **Energy as a service**

Over 20 years, we have refined and replicated a proven energy as a service model. Our companies provide electricity for a monthly fee that is generally cheaper than the cost of candles, batteries, paraffin or kerosine. In turn, customers are assured of a reliable energy supply and lifetime service. We install and retain ownership of our solar systems, taking care of all after-sales maintenance and replacement investments. This enables us to make premium technology affordable to our customers and beneficiaries.

- **Job creation on different levels**

Access to energy services is a prerequisite for economic development. FRES contributes to economic development by creating jobs in its own operations as well as commercial

opportunities for local suppliers. We also enable businesses to start up or expand by supplying electricity that makes entrepreneurial activities possible, including beyond daylight hours. Most of the jobs created are in rural areas, which experience high levels of unemployment and outmigration, particularly among young people.

- **Regional setup and lifetime service**

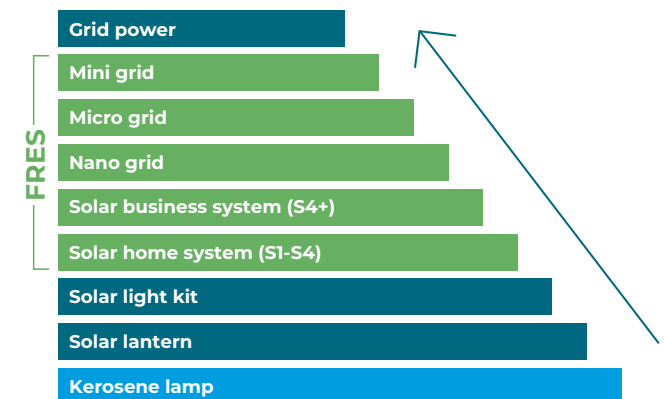
FRES provides lifetime service. Our companies in Mali, Uganda, Burkina Faso and Guinea-Bissau have a growing number of energy stores or service centers that are located close to our customers. Our technicians and service agents are out in the field daily, providing customer service and maintaining our regional networks of solar energy installations.

- **Replacement and recycling**

As part of our environmental responsibility and energy as a service promise to our customers, we ensure that systems are replaced and that all batteries used in our solar systems are properly recycled at the end of their life. FRES works with certified e-waste management companies in the region. This not only provides long-term, sustained use of the assets but also reduces waste and promotes circularity.

- **Climbing the energy ladder**

FRES provides affordable energy services for households living on \$2-3 a day and for customers who are 'climbing the energy ladder' and require more capacity. Our smallest SHS (S1) can power a small television while our largest SHS (S4) is suitable for refrigeration. Beyond the four preset levels, our technical teams can build fully customized solar business solutions and neighborhood networks (nano grids). For business hubs or villages, we can design, build and operate micro grids or mini grids.



2. Contract and addenda

Yeelen Ba technical sales agent Brama Barro explaining the PayGo meter to a customer in Bobo-Dioulasso, Burkina Faso. PayGo was initiated in the second addendum of this contract to improve payment rates and introduce mobile money. PayGo was implemented in all four countries, and 6,200 SHS systems received a hardware upgrade.



2 Contract and addenda

FRES exceeded its target of realizing 9,300 new energy connections under challenging circumstances such as political instability, increased insecurity in some of the countries and, at the end of the contract period, the outbreak of the COVID-19 pandemic. While the overall target of new energy connections remained 9300, specific targets and actions were amended in two contract addenda to respond to political and economic developments and to leverage new technologies and innovations. This section provides an overview of the original contract and the two addenda.

Original contract

FRES began implementing the project in 2014. Under the terms of the original grant contract, the project had the following targets:

1. Provide 8,200 households and SMEs in Mali, Uganda, Guinea-Bissau and Cameroon with access to electricity via SHS and nano grids.
2. Provide 1,100 households and SMEs in Mali and Guinea-Bissau with access to electricity via solar mini grids.
3. Facilitate two regional workshops for rural electrification agencies and local rural operators active in the four countries.

Addendum 1

In 2018, the EU approved an addendum request to extend the project by two years to the end of 2020. The request was made because FRES decided in 2017 to halt the process of establishing a company in Cameroon. This was largely due to serious doubts about the enabling environment for our planned investments there. In addition, in Mali, various requests by the government to transfer FRES mini grids to the national grid company, created an insecure investment climate in 2016 and 2017, delaying installation of the planned mini grids. The 2018 addendum guided our activities in 2019 and 2020, namely:

1. Identifying an alternative country for Cameroon, where operations would start no later than the end of 2020.
2. Redistributing 2,000 SHS originally planned for Cameroon between our existing companies. The final 500 SHS intended for Cameroon were eventually allocated to Burkina Faso, after it was selected as the fourth country (see Addendum 2).
3. Installing three mini grids in Mali according to plan.
4. Identifying additional investments for unspent budget, which was available thanks to FRES' competitive tendering as well as efficient use and control of the overall budget.

2 Contract and addenda

Addendum 2

The COVID-19 pandemic significantly impacted our activities in 2020. Commissioning of the mini grid installations in Mali was delayed by the late arrival of supplies. Moreover, a country-wide lockdown in Uganda meant that the installation of 500 SHS there had to be postponed. On October 19, 2020, the EU Delegation in Mali approved a second addendum. This entailed:

1. Extending the project period until July 31, 2021, enabling FRES to meet and in some cases exceed the project targets.
2. Approval of Burkina Faso as the fourth country. Activities in Burkina Faso started a month later, which included installing 250 SHS systems and five nano grids.
3. Approval to implement PayGo functionality, including the installation of PayGo-ready SHS in Burkina Faso and a hardware upgrade of all systems installed in Mali and Uganda, to improve payment rates and support long-term sustainability of the investments.
4. Approval to extend an existing mini grid in Mali, meeting the target of five mini grids in total (four in Mali and one in Guinea-Bissau).
5. Approval to install 15 nano grids in Burkina Faso, Guinea-Bissau and Mali as part of the additional investments identified in the first addendum.



Joselyne Muslime, managing director of FRES Uganda, with some of the solar panels installed under this contract. Twenty percent of all management positions within FRES are held by women.

3. Beneficiaries, objectives and targets

Mini grid manager Paulo Bidefa (left) accompanied by Cynthia Kpozoua (center) and Ido Verhagen (right) from FRES The Netherlands during a consultation with women farmers in Contuboe, Guinea-Bissau. In all the villages where FRES operates mini grids, we maintain close relationships with local communities to explore how we can accommodate growing and changing energy demands.

3 Beneficiaries, objectives and targets

Throughout the implementation period, FRES and the FRES companies contributed to the project's overall objectives. These were improving living conditions in communities in off-grid rural areas of Mali, Uganda, Guinea-Bissau and Burkina Faso through the use of sustainable and modern energy services while improving the climate for entrepreneurship. This section provides an overview of our beneficiaries and target countries as well as the indicators used to assess progress towards the objectives.

Our target countries

The project was initially due to be implemented in Mali, Uganda, Guinea-Bissau and Cameroon. However, FRES decided in 2017 to halt the process of establishing a company in Cameroon as a result of the operating conditions proposed by the government. These mainly related to tax exemptions and tariffs, which we felt were incompatible with our energy-as-a-service model and desire to establish a commercially viable venture.

Cameroon was subsequently replaced by Burkina Faso as the fourth project country (see the contract and addenda section for more details of this change). According to the World Bank's [The Energy Progress Report 2020](#), Burkina Faso has one of the largest energy access deficits in the world, indicating both the need and opportunity for FRES' services.

In all four countries, the project enabled FRES to extend its reach to new regions. However, national grid expansion to more developed regions and rural centers posed an additional challenge as the energy connections had to be realized in regions and villages not touched by the grid, which are generally less prosperous.

Yeelen Kura in Mali, which in 2014 was active in the Sikasso and Ségou regions, expanded its activities to Koulikoro. Among other things, two mini grids were established in Dogoni and Béléko,

FRES Uganda, which was servicing six districts in the southwest of the country, was able to expand its service area and now covers 28 districts. FRES Uganda was also able to extend its services to three refugee camps.

FRES Guiné-Bissau originally operated in the eastern region Gabú and expanded to neighboring Bafatá in 2017. In recent years, it also became active in the southwest of the country. By opening two new energy stores, in Catió and Buba, it now services SHS and nano grids customers in the regions of Quinara and Tomboli.

In Burkina Faso, Yeelen Ba, with his original homebase in Kénédougou, the eastern province of the Hauts-Bassins regions, expanded its reach to cover the whole region, including the provinces of Houet and Tuy.

3 Beneficiaries, objectives and targets

Our beneficiaries

Our beneficiaries consisted of rural communities that had no access to the national electricity grid and no prospects of being connected in the foreseeable future. These beneficiaries can be divided into four groups:

- income-generating households without access to (clean) electricity whose main livelihood is agriculture
- small businesses, including artisans, village shops, hairdressers, tailors, mechanics and mobile phone-charging companies
- rural community institutions such as schools, clinics and places of worship that play a key role in improving livelihoods and economic prospects in rural areas
- local employees of FRES companies as well as contractors and suppliers in the supply chain who benefit from structural employment.

Customer types provided with access to modern energy services by this contract

Households	7,169
SMEs	2,064
Schools	217
Clinics	65
Places of worship	120
Community centers	95

Our objectives and indicators

The table below provides a breakdown of the project's overall objectives as well as the indicators we used to assess impact as the project progressed. Impact was assessed in a final evaluation that was conducted in each country and discussed during the rural electrification workshops.

In addition, to put more focus on the impact of mini grids, an impact study was conducted with beneficiaries in two mini grid villages in Mali, Diaramana and Béléko. The results of these studies are highlighted in section 6 of this report.

Overall objectives	Impact indicators
Improve the living conditions of communities in rural areas of Mali, Uganda, Guinea-Bissau and Burkina Faso through the use of sustainable and modern energy services.	<ul style="list-style-type: none"> • Increased quantity of children's time spent on homework and education • Improved possibilities for healthcare • Increased use of communication means • Decreased safety risks • Reduction in other sources of energy (flashlights, kerosene lamps, candles, wood and batteries)
Improve the climate for entrepreneurship.	<ul style="list-style-type: none"> • Stores stay open longer • Increased number of small businesses in the villages • Increased access to goods and services in rural areas • Increased employment opportunities • Increased competence and knowledge of rural electrification agencies and rural operators

3 Beneficiaries, objectives and targets

Our targets and actions

While the overall target to create 9,300 new energy connections in rural areas remained unchanged during the contract period, some specific targets and actions were amended in two contract addenda to respond to political and economic developments and to leverage new technologies and innovations that became available. Most notably, the original 2,500 connections to be created in Cameroon were reallocated to Mali, Uganda and Guinea-Bissau in the first addendum. The second addendum introduced two new innovations – nano grids and PayGo – to better service changing energy demands in off-grid areas and to improve the sustainability of the investments respectively.

	Targets			Results	% achieved of target		
	Contract	Addendum 1	Addendum 2	Reporting date	Contract	Addendum 1	Addendum 2
Mini grids							
Total of mini grids installed	5	5	5	5	100%	100%	100%
Number of mini grid connections	1,100	1,100	1,200	1,308	119%	119%	109%
Mini grid connections Mali	850	850	850	856	101%	101%	101%
Mini grid connections in Guinea-Bissau	250	250	350	452	181%	181%	129%
SHS							
Total of SHS installed	8,200	8,200	7,950	8,328	102%	102%	105%
Installed in Mali	1,500	2,500	2,500	2,644	176%	106%	106%
Installed in Uganda	3,200	3,700	3,700	3,700	116%	100%	100%
Installed in Guinea-Bissau	1,000	1,500	1,500	1,500	150%	100%	100%
Installed in Burkina Faso	2,500	500	250	484	19%	97%	194%
Nano grids							
Total of nano grids installed			15	15			100%
Installed in Mali			5	5			100%
Installed in Guinea-Bissau			5	5			100%
Installed in Burkina Faso			5	5			100%
Number of nano grid connections			150	95			63%
Nano grid connections in Mali			50	40			80%
Nano grid connections in Guinea-Bissau			50	25			50%
Nano grid connections in Burkina Faso			50	30			60%
Total new energy connections created							
Total	9,300	9,300	9,300	9,731	105%	105%	105%
Total of energy connections in Mali	2,350	3,350	3,400	3,540	151%	106%	104%
Total of energy connections in Uganda	3,200	3,700	3,700	3,700	116%	100%	100%
Total of energy connections in Guinea-Bissau	1,250	1,750	1,900	1,977	158%	113%	104%
Total of energy connections in Burkina Faso	2,500	500	300	514	21%	103%	171%
Workshops for rural electrification agencies and local rural operators							
Total number of workshops	2	2	2	4	200%	200%	200%
Total number of participants			n/a	210			n/a
Specific project targets							
Jobs created	60	60	60	61	102%	102%	102%
Energy stores and service centers created	17	17	17	18	106%	106%	106%
Enabling mobile money and PayGo in four countries			4	4			100%
Hardware upgrade of SHS to PayGo in Mali and Uganda			6,200	6,200			100%

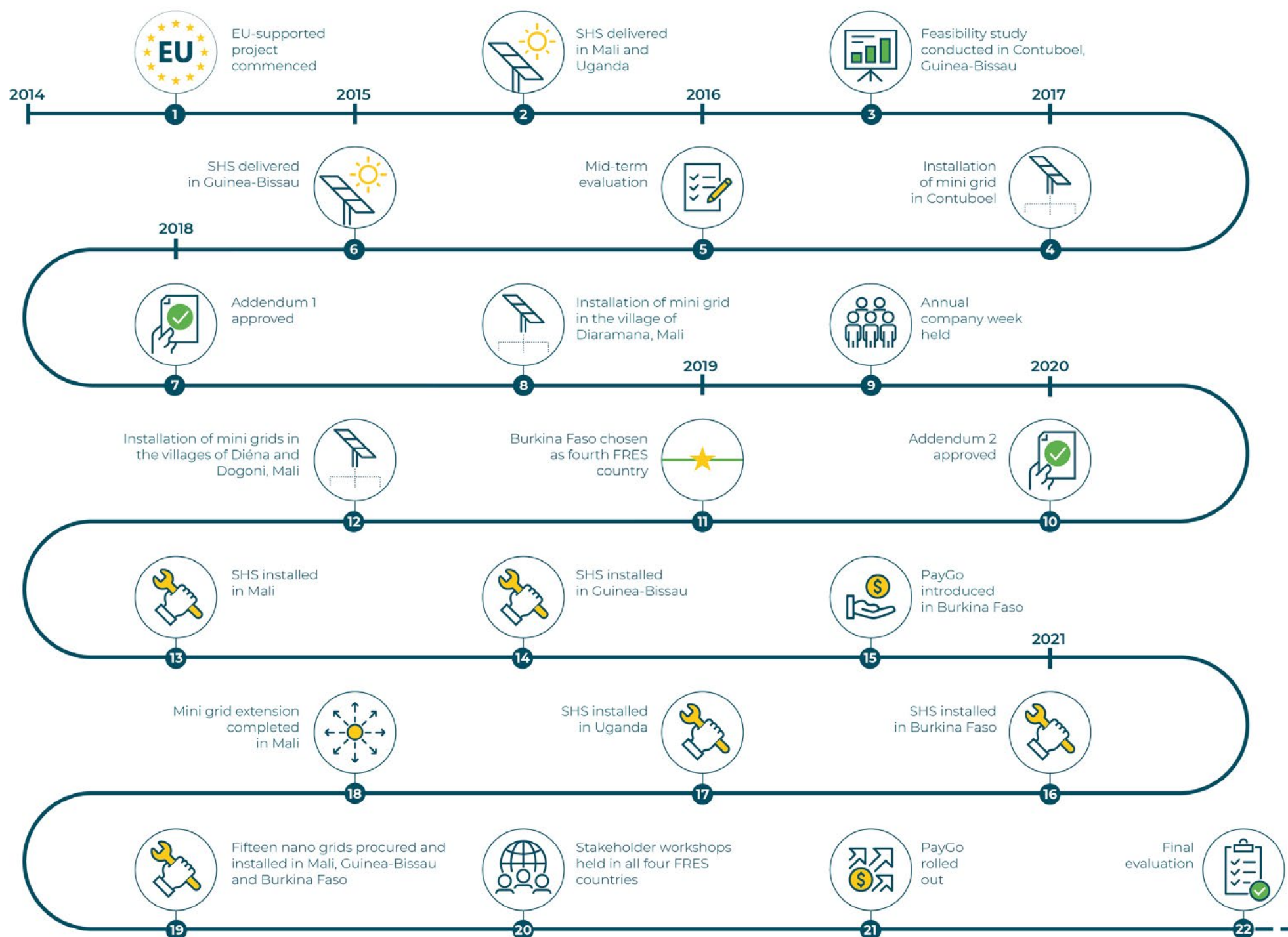
4. Project activities and highlights

Yeelen Kura's Sidiki Kondé inspecting the solar panels at the FRES mini grid in Diéna, Mali. The grid became operational in 2020 and was one of five mini grids realized under this contract. It currently supplies electricity to 267 customers.



4 Project activities and highlights

The implementation period lasted a total of 80 months, from December 1, 2014, to July 31, 2021. The chronogram in this section shows what we did over the course of the project, along with highlights and details of activities that had to be adjusted due to unforeseen circumstances.



Find a list of the activities with an explanation on page 19 >>

4 Project activities and highlights

No.	Year	Activity	Comments/highlights
1	2014	EU-supported project commenced	FRES began implementing the project activities in Mali, Uganda and Guinea-Bissau. Extensive market research was conducted in Cameroon with the aim of establishing a fourth company there.
2	2015	SHS delivered in Mali and Uganda	The first SHS were delivered in Mali and Uganda in June.
3	2016	Feasibility study conducted in Contuboel, Guinea-Bissau	A feasibility study was carried out in February prior to the installation of the mini grid in Contuboel, with support from FRES Mali – Yeelen Kura.
4	2017	Installation of mini grid in Contuboel	The mini grid was due to be installed and fully operational at the end of 2016. However, this was delayed by political and institutional crises in the country. The mini grid reached its target of creating 250 connections in 2017. This number was exceeded – and almost doubled – in 2021, with a total of 452 connections.
5	2017	Mid-term evaluation	A mid-term evaluation of the activities in Mali, Uganda and Guinea-Bissau was carried out between April and June.
6	2017	SHS delivered in Guinea-Bissau	The first SHS in Guinea-Bissau were delivered in November.
7	2018	Addendum 1 approved	The EU approved an addendum request to extend the project until the end of 2020. The request was made because of the insecure investment climate in Mali. In addition, we decided in 2017 to halt the process of establishing a company in Cameroon, after it became clear that the enabling environment was unfavorable.
8	2018	Installation of mini grid in the village of Diaramana, Mali	The installation was initially planned for 2016. However, following various attempts by the Malian government to expropriate our mini grids, further investment was put on hold till 2018.
9	2019	Annual company week held	The annual gathering of all the FRES general managers took place in Amsterdam from October 27-31.
10	2020	Addendum 2 approved	On October 19, the EU Delegation in Mali approved a second addendum to extend the project period until July 31, 2021. This was due to the impact of COVID-19 on our activities in 2020.
11	2020	Burkina Faso chosen as fourth FRES country	After activities in Cameroon were halted, we looked for an alternative country. The final choice for Burkina Faso was made in October 2020, in close consultation with the EU Delegation in Mali.
12	2020	Installation of mini grids in the villages of Diéna and Dogoni, Mali	Installation and commissioning of the mini grids were delayed several months following a coup d'état in August and the COVID-19 pandemic, which affected the arrival of supplies.
13	2020	SHS installed in Mali	FRES Mali exceeded its target of 2,550 installations, connecting a total of 2,644 customers.
14	2020	SHS installed in Guinea-Bissau	FRES Guiné-Bissau met its target of 1,500 SHS connections.
15	2020	PayGo introduced in Burkina Faso	PayGo, a mobile payment system that reduces fee collection costs and significantly increases payment rates, was successfully piloted in Burkina Faso.
16	2021	SHS installed in Burkina Faso	FRES Burkina Faso met its installation target, creating 484 SHS connections.
17	2021	SHS installed in Uganda	FRES Uganda met its target of connecting 3,700 SHS. The installations planned for 2020 were delayed because of COVID-19-related restrictions.
18	2021	Mini grid extension completed in Mali	Another coup d'état in May and ongoing COVID-19 restrictions delayed several activities in Mali. Despite the challenges, we completed a mini grid extension in the town of Béléko and connected a total of 856 customers to this and our three other mini grids in Mali, which were put into service in 2020.
19	2021	Fifteen nano grids procured and installed in Mali, Guinea-Bissau and Burkina Faso	As proposed in Addendum 2, FRES installed its first 15 nano grids. As well as serving small clusters of households and businesses, nano grids give FRES companies more flexibility to meet the growing energy needs of their customers. The nano grids resulted in 95 new connections.
20	2021	Stakeholder workshops held in all four FRES countries	The workshops planned for 2019 and delayed because of COVID-19 were held in June and July 2021. The workshops brought together national policymakers, energy authorities and private sector rural operators to discuss ways to advance green electrification while raising the profile of the FRES brand. The workshop in Mali was attended by the Minister of Mines, Energy and Water, who praised FRES' 20-year track record of providing solar energy solutions in the country.
21	2021	PayGo rolled out	Following the successful pilot in Burkina Faso in 2020, PayGo was rolled out to all FRES companies.
22	2021	Final evaluation	The final evaluation of the project took place between June and July. It had been planned for 2020 but was postponed because of COVID-19 and the project extension. An overview of the evaluation is available in section 7.

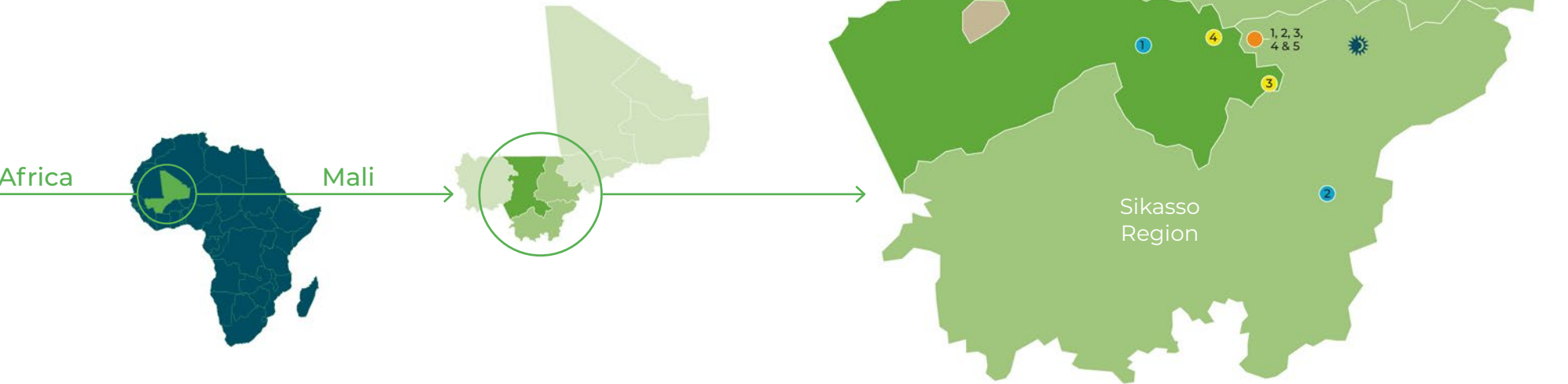
5. Activities by country

Yeelen Ba technicians leaving the company's head office in Orodara, Burkina Faso to install new solar home systems (SHS). In October 2020, the EU approved Burkina Faso as the fourth country under this contract. Within nine months of the project's end, Yeelen Ba realized 484 new SHS and nano grid connections.

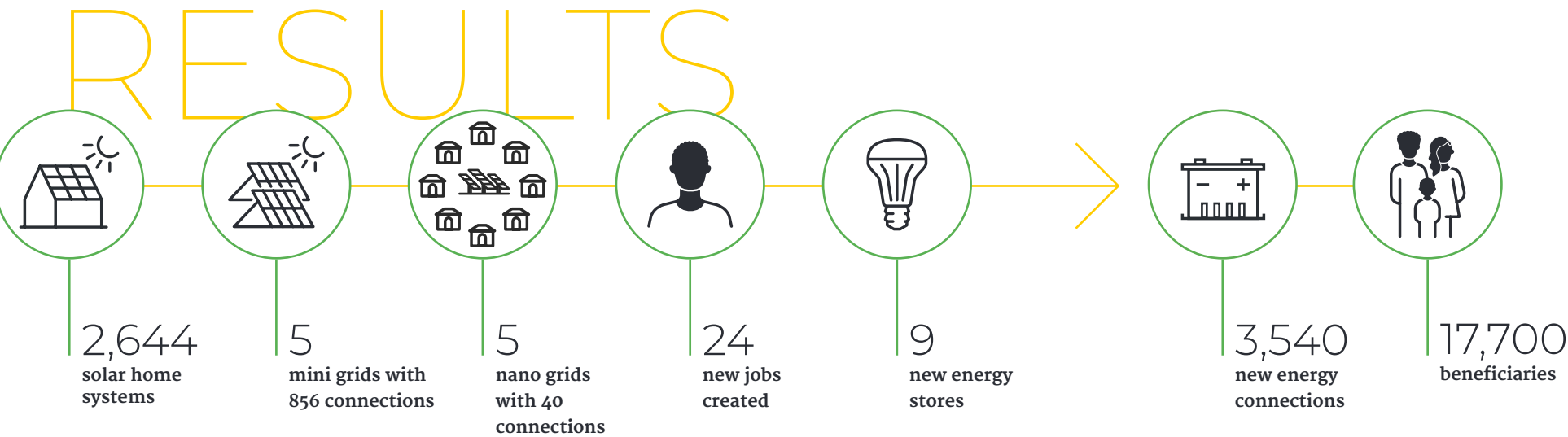


MALI

FRES Mali – Yeelen Kura was established in the Sikasso region in 2001. It has since expanded to the neighboring regions of Ségou and Koulikoro. The company initially supplied SHS. With the support of this project, Yeelen Kura has been able to scale up energy access with 3,540 connections reaching 17,700 beneficiaries.

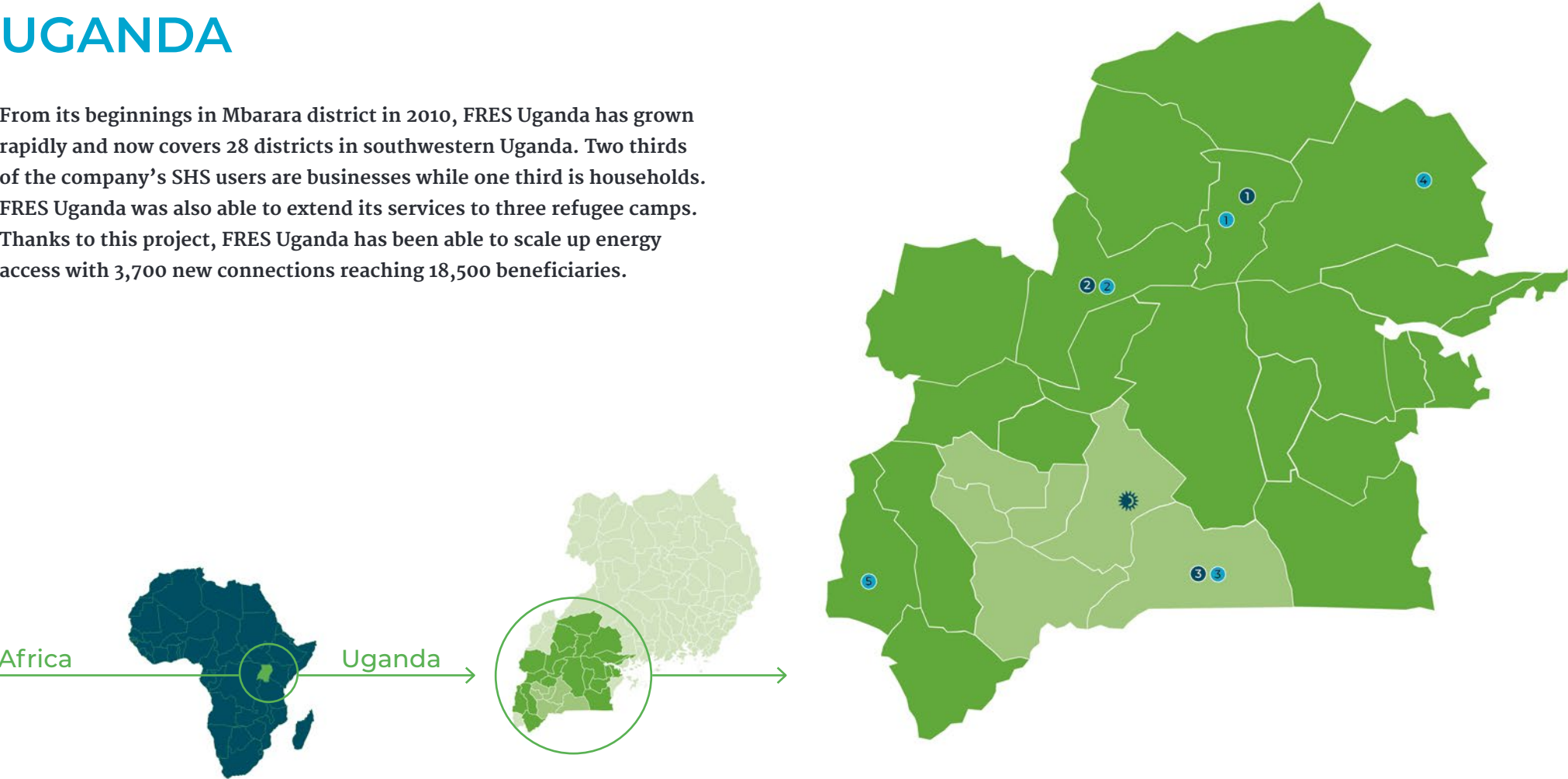







- Yeelen Kura head office, Koutiala
- Area covered before 2014
- Expansion made possible by this contract
- Mini grids and SHS energy stores
 - 1. Diaramana
 - 2. Diéna
 - 3. Dogoni
 - 4. Béleko
- Nano grids
 - 1. Dougoutiguila
 - 2. Sibila
 - 3. Konina koro
 - 4. Sirakorola
 - 5. Konkala
- SHS energy stores
 - 1. Dioïla
 - 2. Sikasso
 - 3. San
 - 4. Mandiakuy
 - 5. Sy



UGANDA

From its beginnings in Mbarara district in 2010, FRES Uganda has grown rapidly and now covers 28 districts in southwestern Uganda. Two thirds of the company’s SHS users are businesses while one third is households. FRES Uganda was also able to extend its services to three refugee camps. Thanks to this project, FRES Uganda has been able to scale up energy access with 3,700 new connections reaching 18,500 beneficiaries.

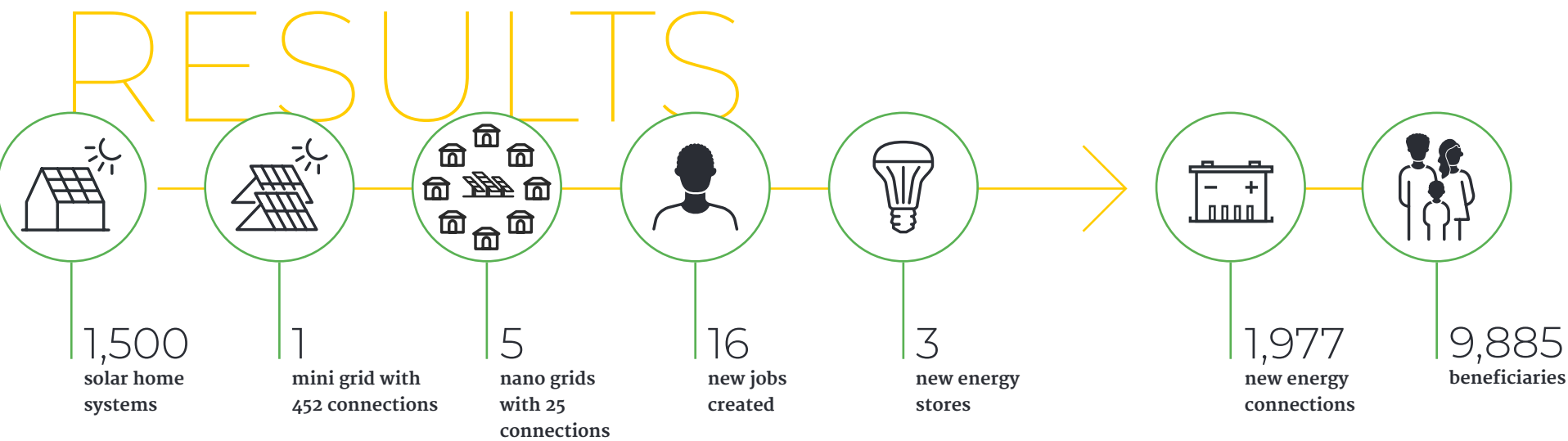
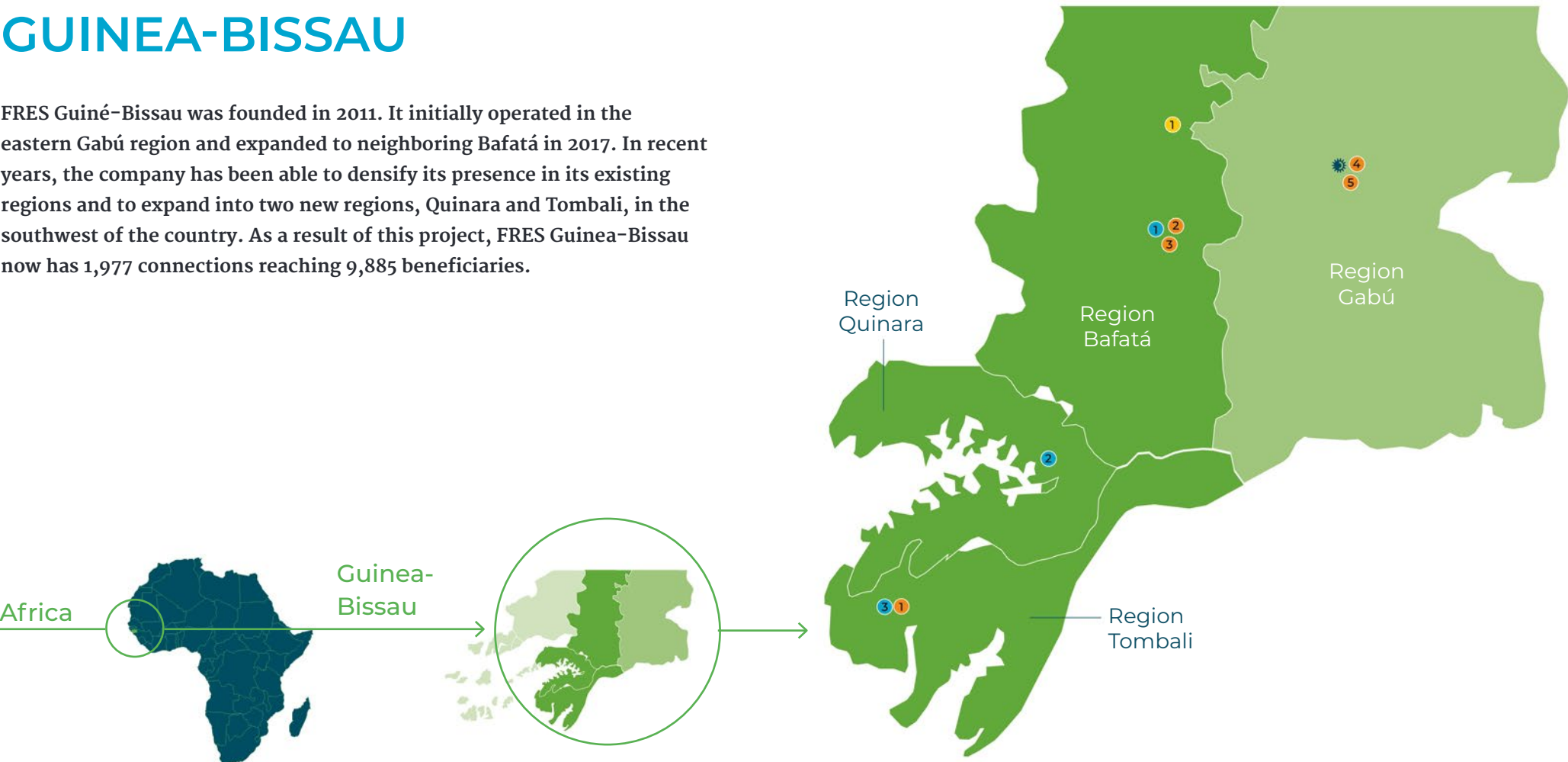


-  Headoffice FRES
Uganda, Mbarara
-  Area covered
before 2014
-  Expansion made
possible by this
contract
-  **SHS energy stores**
 1. Kyegegwa
 2. Rwamwanja
 3. Nakivale
 4. Bukuya
 5. Kanungu
-  **Refugee settlements
serviced by
FRES Uganda**
 1. Kyaaka
 2. Rwamwanja
 3. Nakivale



GUINEA-BISSAU






FRES Guiné-Bissau was founded in 2011. It initially operated in the eastern Gabú region and expanded to neighboring Bafatá in 2017. In recent years, the company has been able to densify its presence in its existing regions and to expand into two new regions, Quinara and Tombali, in the southwest of the country. As a result of this project, FRES Guinea-Bissau now has 1,977 connections reaching 9,885 beneficiaries.

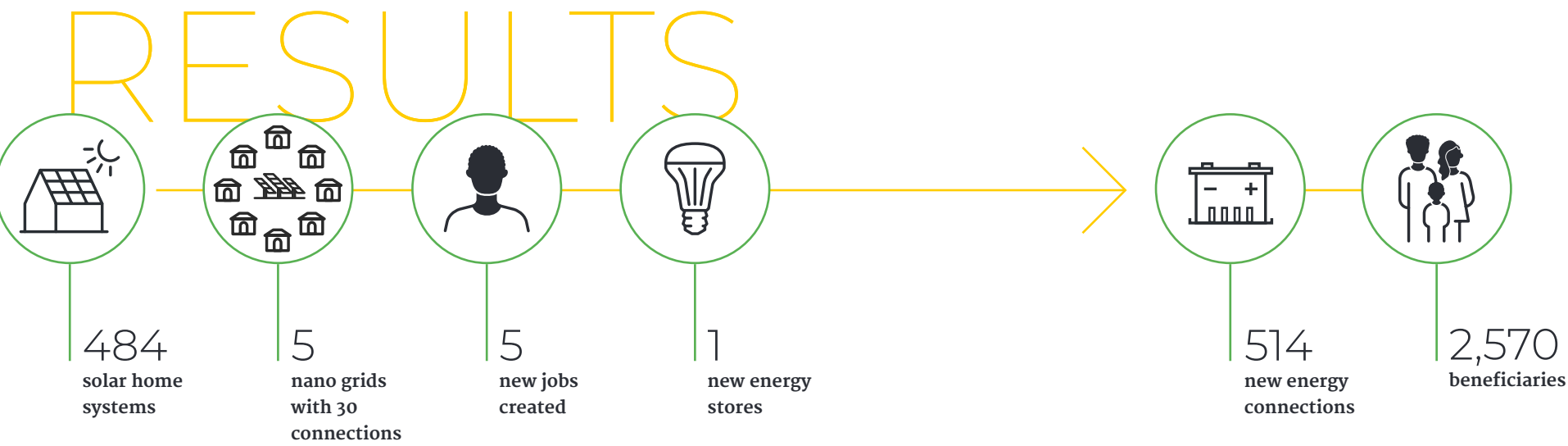


BURKINA FASO

FRES Burkina Faso – Yeelen Ba was established in 2008 in Kénédougou, the eastern province of the Hauts-Bassins region. With EU support, Yeelen Ba has been able to extend its services to the whole region, including the provinces of Houet and Tuy. The company now provides energy access to 2,570 beneficiaries via 514 new connections.



-  Headoffice
Yeelen Ba, Orodara
-  Area covered before 2014
-  Expansion made possible by this contract
-  **Nano grids**
 1. Orodara
 2. Bobo-Dioulasso
 3. Sindo
 4. Sérékéni
 5. Lollio
-  **SHS Energy stores**
 1. Bobo-Dioulasso



5 Activities by country

Providing energy as a service means that FRES companies install and maintain solar energy installations for an affordable monthly service fee. To uphold the lifetime service guarantee to our customers, expanding to new regions and realizing new energy connections was accompanied by a growing number of energy stores, creating permanent jobs and providing training to our new recruits. All objectives and targets were met or exceeded while underspending the budget. This was done in often challenging circumstances, a brief overview of which is presented here.

Challenges in Mali

In the past seven years, FRES Mali has encountered numerous challenges, which delayed the realization of our activities. Various requests by the Malian government to transfer FRES mini grids to the national grid company created an insecure investment climate in 2016 and 2017. Consequently, mini grid investments were put on hold until new locations outside the government's concession area could be identified. Activities only restarted in 2018. In August 2020, the country experienced a coup d'état, followed by the COVID-19 pandemic and another coup d'état in May 2021. These events – and the supply chain disruptions they incurred – delayed the installation and commissioning of the mini grids as well as the planned workshop with policymakers and energy sector representatives. Despite these challenges, we were able to achieve all the objectives and targets for Mali before the project ended.

Challenges in Uganda

The COVID-19 pandemic heavily impacted our operations in 2020. All countries went through a lockdown in the spring of 2020. However, the countrywide lockdown imposed in Uganda continued throughout the year, as a result of which the installation of 500 SHS and a stakeholder workshop had to be postponed to the following year. The lockdown in 2020 and a new lockdown in 2021 also resulted in liquidity problems for many of our customers, especially schools that have been closed almost continuously since March 2020. By waiving part of the service fees, FRES Uganda has been able to retain most of its customers and help them through this difficult period.

Challenges in Guinea-Bissau

The mini grid in Contuboe was due to be fully operational at the end of 2016. However, this was delayed because of the political and institutional crises that started in 2015. As a result of the

increased customs clearance time these entailed, the installation of the mini grid could not be finalized until June 2017. The COVID-19 pandemic led to further delays in the purchase and delivery of materials. In addition, the stakeholder workshop, which was planned for 2020, had to be postponed until 2021.

Challenges in Burkina Faso

Cameroon was initially intended to be the fourth project country. However, it became clear that the enabling environment was not compatible with our business requirements and policies. Consequently, in 2017, we decided to halt the process of setting up FRES Cameroon. We conducted an in-depth feasibility study and proposed Burkina Faso as the new project country. The EU Delegation in Mali approved this proposal in October 2020, and we began investments in Burkina Faso a month later. Having to identify a fourth country delayed the project's operational action plan. The limited time for procurement and installation along with COVID-19-related restrictions made it very challenging to achieve the targets for Burkina Faso within the project's timeline. Even so, we were successful, and in the case of SHS connections, even exceeded the target.

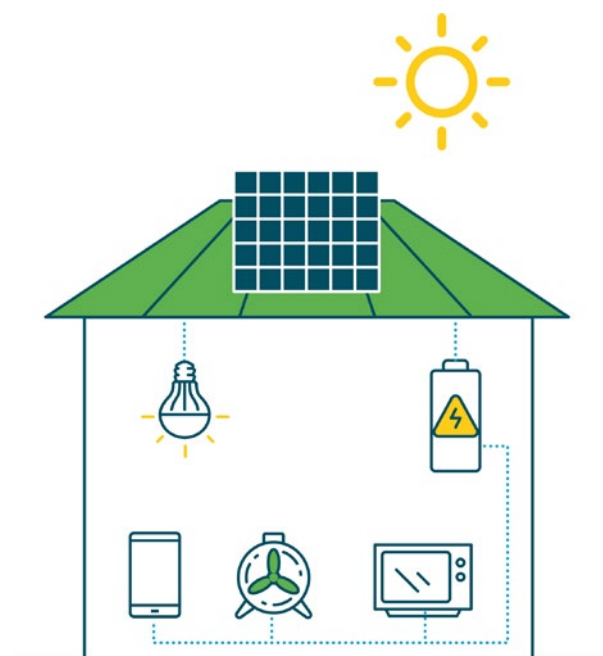
6. Realized installations

Ayesigamukama Pison (left) and Namanya Osbert (right), a technician and intern at FRES Uganda's Isingiro energy store, installing a solar system for a Somali family of eight in Nakivale Refugee Settlement. Under this contract FRES Uganda realized 650 energy connections in three refugee camps in the southwest of the country.



6 Realized installations

FRES provides premium-quality electricity services for household, commercial and productive use in rural areas not reached by the national grid. We focus on affordability for households living on \$2–3 a day and for customers who are climbing the energy ladder and require more capacity. With over 200 technicians and service agents in the field, we maintain regional networks of solar home systems, nano grids (small neighborhood networks), mini grids and village lighting, solar water pumping and productive use platforms. This section presents an overview of the technologies implemented under this contract.



Solar home systems

Solar home systems (SHS) are ideal for individual households and small businesses. SHS customers can choose between pre-set service levels – from 80 watt peak (Wp) up to 320 Wp – based on their needs and budget. The entry-level models provide sufficient electricity to power several lamps and a radio, small fan, mobile phone charger or television. The highest service level also covers refrigeration.

Project target

A key project target was to provide 8,200 households and SMEs in Mali, Uganda, Guinea-

Bissau and Burkina Faso with access to electricity via SHS and nano grids.

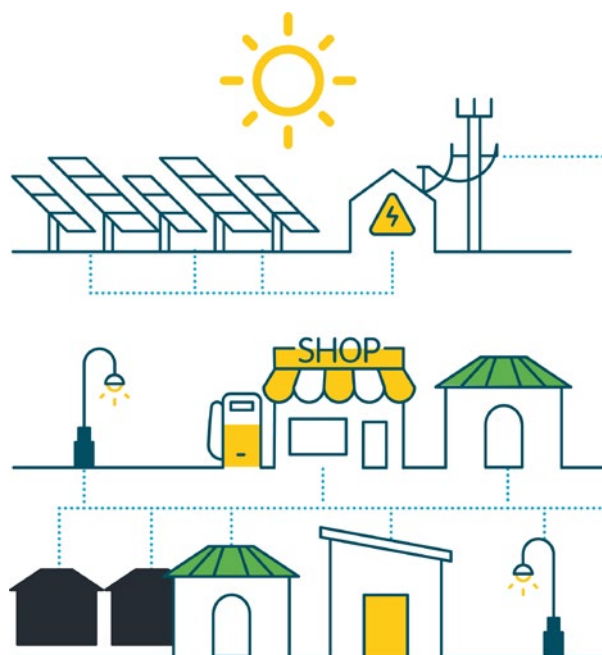
What we achieved

Over the course of the project, we installed a total of 8,328 SHS in households, small businesses and community buildings.

The numbers per country are:

Mali	2,644 SHS
Uganda	3,700 SHS
Guinea-Bissau	1,500 SHS
Burkina Faso	484 SHS

6 Realized installations



Mini grids

A mini grid is a practical and cost-effective electricity solution for communities. It is a small electricity network that can connect between 350 and 500 consumers such as households, businesses, hospitals, schools and other institutions. It can also supply streetlighting within a radius of a few kilometers from the power plant.

Project target

The target was to provide 1,200 households and SMEs in Mali and Guinea-Bissau with access to electricity via solar mini grids.

What we achieved

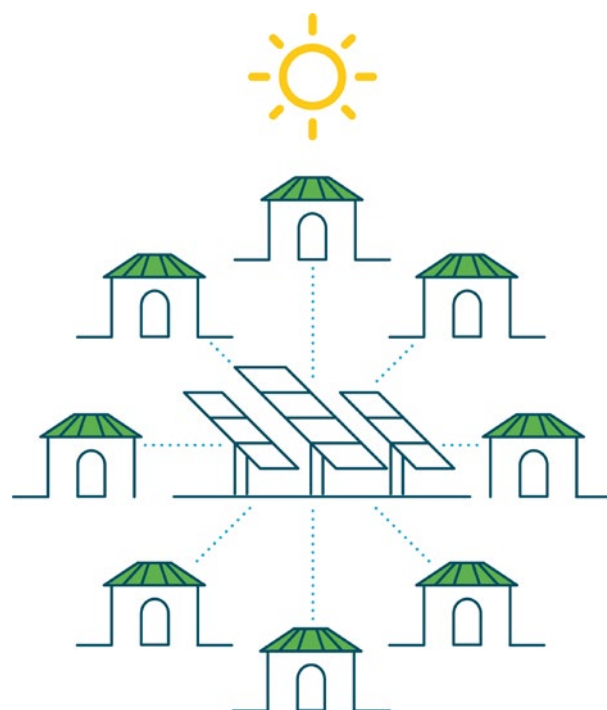
Between 2017 and 2021, we connected 1,308 customers to five mini grids (four in Mali and one in Guinea-Bissau). These are described below. The highlights of the impact study of two of the mini grids in Mali can be found in section 7 of this report.

Contuboel, Guinea-Bissau (2017)	Located in the Bafatá region, this mini grid has a capacity of 100 kilowatt peak (kWp). It became operational in July 2017 and connects 452 customers.
Diaramana, Mali (2018)	The mini grid in Diaramana, a village and commune in the Ségou region of southern-central Mali, became operational in December 2018. It has a capacity of 75 kWp and connects 215 customers.
Diéna, Mali (2020)	Also in the Ségou region, the Diéna mini grid has a capacity of 50 kWp. The mini grid was installed in 2020 and became operational in April 2021. It connects 267 customers.
Dogoni, Mali (2020)	Installed in Dogoni, a small town and rural commune in the Sikasso region of southern Mali, this mini grid has a capacity of 50 kWp. It was installed in 2020 and became operational in April 2021, connecting 217 customers.
Béléko, Mali (2021)	The extension of an existing mini grid in Béléko, a village and commune in the Koulikoro region of southwestern Mali, has a capacity of 50 kWp. The extension became operational in 2021 and connects 157 customers. In total the mini grid in Béléko connects 384 customers.

6 Realized installations

Nano grids

One of the innovations we introduced in the countries where we work is nano grids. Nano grids are smaller than mini grids but larger than SHS, supplying solar electricity to up to eight connections. A major advantage over SHS



is the 220-volt system, which can power all consumables for private and business use. As nano grids are modular and transportable, they also provide more flexibility for FRES companies to grow with their customers' energy needs while enabling customers to climb the energy ladder.

Project target

The target was to install 15 nano grids (five per country) in Mali, Guinea-Bissau and Burkina Faso, with five to eight connections per nano grid depending on the energy demands of the connected customers.

What we achieved

We achieved the target, installing 15 nano grids and connecting 95 new customers.

Mali	5 nano grids with a total of 40 connections
Burkina Faso	5 nano grids with a total of 30 connections
Guinea-Bissau	5 nano grids with a total of 25 connections

PayGo

In 2020 and 2021, FRES enabled PayGo for all its SHS. PayGo is a mobile payment system that requires electricity fees to be paid up front for an SHS to become operational. Before PayGo was introduced, debt collectors had to visit customers with arrears each month and had few options in the event of non-payment except to repossess an entire system.

In addition, PayGo allows customers to pay with mobile money. This significantly reduces FRES' operational costs and improves the security of our field agents, who no longer have to carry around large amounts of cash. The move to PayGo was also motivated by the growing size and complexity of our customer databases as well as increasing reporting requirements.

The impact of this innovation is already being felt, with all countries reporting higher payment rates and fewer customer suspensions and terminations. Technical training on the use of PayGo was provided to all staff in May 2021.

7. Evaluation

Field staff from the FRES Uganda energy store in Ntungamo with members of the team from FRES The Netherlands after a project evaluation session. The Dutch team visited all four countries to discuss lessons learned with field agents and to tap into their knowledge and experience from daily contact with our customers.



7 Evaluation

Evaluation was an integral and ongoing part of the project. FRES carried out a mid-term evaluation as well as a final evaluation in each of the countries, the results of which were discussed during the workshops with authorities. In addition, FRES commissioned an impact study to track the changes and experiences of customers in two Malian villages where solar electricity through mini grids was introduced. Also, in 2021, a team from FRES The Netherlands visited our four companies to discuss lessons learned with field staff who are in daily contact with our customers. This section provides the main results of the evaluation activities and lessons learned.

Lessons from the field

One of the strengths of the FRES model is having a strong field presence with over 200 agents in daily contact with our customers. They not only provide service to our customers but also keep us informed about changing energy demands. During a visit in spring 2021, the FRES The Netherlands team tapped into this knowledge to evaluate the project with field staff and gather ideas for improving our services.

- *Improving business sustainability and security*

One of the biggest challenges for all FRES companies is achieving an acceptable payment rate. This is crucial for the sustainability of our operations and thus the security of our investments. By enabling PayGo in all companies, a process that was completed in 2021, we are not only improving payment rates but also our after-sales service, limiting

credit exposure, reducing operational costs and customer attrition, minimizing fraud risks and improving the security of our field staff by transitioning from cash-based payments to mobile money.

- *Clustering our presence*

As an energy as a service company, proximity to our customers is key for meeting our service promise. However, the low population density in rural areas brings technical and logistical challenges in terms of connecting new customers. This was confirmed during field visits to evaluate the project. Our field staff suggested a new way of clustering our presence. This involves establishing a few regional centers that can house our stocks and serve as a base for our technical teams while setting up smaller service centers in villages with service

agents available to give advice and perform small maintenance jobs. This new clustering model was introduced in 2021 in Guinea-Bissau and Uganda.

- *Demand for larger systems and energy for productive use*

We identified a high demand for larger systems and energy for streetlighting, refrigeration, agro-processing equipment, solar water pumping and other productive uses. This led us to review our offering and broaden its scope to include larger systems and multifunctional platforms. Several of these are already in use, including by women's cooperatives.

- *Climbing the energy ladder*

We have seen that energy demands have changed significantly in recent years. Besides lighting, our SHS customers want to be able to connect at least a television or fridge as well. This shows us that people are climbing the energy ladder, which requires our offering to be upgradable and flexible. Continuous innovation through the introduction of systems like nano grids and PayGo is therefore key to meeting our current customers' demands and attracting new customers.

7 Evaluation

Rural electrification workshops

The past years have shown that buy-in from national governments and local authorities is essential to yield long-term results. Getting this buy-in requires close collaboration and policy dialogues with public sector stakeholders as well as an adequate understanding of the country's socioeconomic and political context.

FRES organized workshops in all project countries between June and July 2021. The workshops were held at the end of the project period. This was so that we could draw lessons from our activities, compare the enabling environments in the four countries, and make and discuss recommendations for the coming decade toward 2030. Because of the COVID-19 pandemic, four individual events were organized (one workshop per country), instead of the planned two, and were held online as well as in person.

Main objectives

The main objectives of the workshops were:

1. To strengthen collaboration and communication with national policymakers and authorities at the policy dialogue level and increase cross-national learning in the areas of green energy and rural electrification.

2. To share good practices in the region and improve understanding of how to create a better enabling environment for private actors in the green rural electrification sector.

Key outcomes

All objectives were achieved and resulted in several outcomes that will help FRES strengthen its position in the coming years. In addition, the FRES companies were able to increase their visibility, both during the events and through the media coverage the events generated. The workshops and key outcomes are summarized below.

- FRES Uganda was the first company to kick off the workshop series on June 1 in Kampala. Approximately 110 delegates took part, 30 of whom attended physically and 80 of whom participated virtually. Key actors present included the commissioner of renewable energy, Uganda Solar Energy Associations (USEAS), Uganda National Renewable Energy and Energy Efficiency Alliance (UNREEEA), Uganda National Bureau of Standards (UNBS) and the Ministry of Finance, Planning and Economic Development. Part of the discussion focused on the relevance of tax exemptions on imports of solar materials.

These exemptions allow FRES to import the best materials in the international market while keeping service fees affordable for rural households and small businesses. We also learned about UNBS' plans to establish a solar helpline which, among other things, will enable the public to access information on quality solar services.

- FRES Burkina Faso organized the second workshop in the series, the topic of which was increased use of clean, affordable energy in rural areas. The workshop, which took place on June 15 in Ouagadougou, benefited from technical support from the National Agency for Renewable Energies and Energy Efficiency (ANEREE). The session brought together about 50 participants (physical and virtual). Besides ANEREE, the following key actors were present: the Green Climate Fund, the Burkinabé Rural Electrification Agency (ABER) and the Litigation and Legislation Department of the Directorate General of Taxes (DGI). One of the main takeaways from the event was a better understanding of the tax advantages available to energy operators. FRES Burkina Faso was also invited to two other events later that month. The first was a national consultation on the

7 Evaluation

accreditation process for entities wanting to access the Green Climate Fund; the second was an ANEREE-hosted workshop on reforms and business opportunities for the energy sector.

- FRES Guinée-Bissau organized the third workshop on June 23 in Bissau. The workshop focused on strengthening collaboration and communication between the state and private sector through a favorable enabling environment for the green electrification sector. The session attracted 30 participants (physical and virtual). The key actors present included a representative from the Directorate General of Energy (Ministry of Energy and Natural Resources), a representative from the Ministry of Environment and Biodiversity, representatives from two commercial banks (BDU and Banque Atlantique), the resident representative from the West African Economic and Monetary Union (UEMOA) in Guinea-Bissau and his special advisor, the representative from the European Development Fund (EDF) in Guinea-Bissau, the EU representative for Hyphenate Guinea-Bissau, two FRES customers who traveled from Gabú especially for the occasion and FRES Guinée-Bissau's customs agent. Direct stakeholder contact and dialogue during the event resulted in follow-up meetings

with the EU and Ministry of Energy and Natural Resources to discuss possible financing for two additional mini grids. Talks with the ministry were also initiated regarding crucial topics such as temporary exemption from customs duties and expansion to other parts of the country.

- FRES Mali organized the final workshop on July 8 in Bamako, in collaboration with the Supervisory Ministry of Energy through the Agence des Energies Renouvelables du Mali (AER-Mali). The theme was increased use of clean energy in rural areas. The workshop brought together about 20 experts and professionals from the state's technical service teams, legislative bodies, civil society and journalists. The guests of honor were the Minister of Mines, Energy and Water, the Energy Commission representative for the National Transition Council (CNT), the EU representative in Mali, FRES The Netherlands' managing director and a representative from the Embassy of The Netherlands in Mali. The workshop sparked debate on a range of issues in the energy sector, notably legislative challenges, tariff setting and capacity building. While very helpful for initiating political dialogue, the workshop also exposed the knowledge gaps among lawmakers. FRES Mali has since been

invited to contribute to discussions aimed at advancing rural electrification, including by Energie du Mali, the national utility, and the Environmental and Sustainable Development Agency (AEDD). We are hopeful that our expertise and private sector perspective will help to turn discussion into political action.

Besides the specific outcomes in each country, the workshops also had several general outcomes that will benefit FRES as a whole. These are:

- insight into rural electrification projections
- greater understanding of rural electrification legislation and policies
- stronger relationships with key industry stakeholders
- identification of leads for potential new partnerships
- identification and initial implementation of approaches to improve the enabling environment
- better understanding among stakeholders of the FRES model and the sustainable solution it offers to the after-sales service problems in the energy sector that often result in solar systems being abandoned.

7 Evaluation

Impact study

FRES began implementing the project in four countries in 2014 and completed it in 2021. In view of the project's length and complexity as well as the significant financial investment made, FRES contracted an independent team to conduct a socioeconomic study assessing the impact of access to electricity on local beneficiaries. The study was carried out between April and June 2021 in Béléko and Diaramana in Mali, where FRES installed mini grids with project support.

Béléko

Béléko is a village in the Koulikoro region of southwestern Mali with 4,687 inhabitants. The main livelihood is agriculture (cotton, corn and peanuts). The village has 5 schools, 4 health centers, 3 pharmacies, 1 market, 7 water supplies, 1 cereal bank and 1 bank.

Béléko's mini grid was installed in 2020. It has a capacity of 50 kWp and provides 364 customers with electricity. For the impact study, interviews were conducted with 165 people representing a cross-section of FRES beneficiaries (households, businesses, community facilities, men, women, teenagers and so on).

Impact was measured against ten indicators derived from the project's logical framework (see annex) on a scale of 1 (unsatisfactory) to 5 (very satisfactory).

Diaramana

Diaramana is a village in the Ségou region of southern-central Mali with 5,164 inhabitants. The principal crops cultivated are cotton, peanuts, cereals (millet, sorghum, corn), rice and red or white hibiscus. The village has 6 schools, 5 health centers, 1 administrative center, 1 market, 10 water supplies, 4 cereal banks and 1 bank. Diaramana's mini grid was installed in 2019. It has a capacity of 75 kWp and provides 157 customers with electricity. Interviews were conducted with 134 people representing a cross-section of FRES beneficiaries.

The results

The results of the study showed that in both villages, there is better lighting as well as better security in households and the wider community. Schoolchildren have more opportunities to study after dark, and children and teenagers can play outside at night under streetlighting. Productive-

use customers have a positive perception of the mini grid and have been able to develop or diversify their income-generating activities. They have noticed a greater availability of certain consumer products and an increase in their turnover. Some businesses, such as tailors, can work more quickly. Community-use customers, like churches and mosques, reported being able to perform their activities better and a rise in attendance rates. Beneficiaries also reported that radios – an important source of information and entertainment – have greater coverage and visits to community healthcare centers have increased.

Given the short time that the mini grids have been operational (around three years for Diaramana and less than a year for Béléko), certain impacts could not be captured. Many respondents also said they consider the electricity fees to be high. Nonetheless, the study concluded that the project has real possibilities to transform socioeconomic conditions in the villages, if the current pricing can be addressed.

Mid-term and final evaluation

As part of the contract, a mid-term and final evaluation were conducted by third parties. The mid-term evaluation was carried out between April and June 2017. The progress made was assessed and recommendations to achieve the project’s objectives were provided. The final evaluation was carried out between April and June 2021 by the consultants who organized the rural electrification workshops. The results of the evaluation highlighted the challenges faced and opportunities for the future, which were then discussed during the workshops.

The full reports of the workshops, impact study and the evaluations highlighted in this section are all available on our [website](#).

1 This number is based on the standard industry multiplier of five beneficiaries per connection. However, the actual number is higher. On average, residential compounds in Mali that have a mini grid connection are home to three households with 10-40 members.

Impact

FRES used a similar set of indicators as the impact study in Mali to evaluate overall impact across the four project countries. This is shown below.

No.	Indicator	Our impact
1	Sustainable and affordable access to solar-based energy in rural areas of Mali, Uganda, Guinea-Bissau and Burkina Faso for 9,300 households, SMEs and other beneficiaries	A total of 9,363 households, SMEs and other beneficiaries have access to sustainable and affordable electricity via SHS and solar mini grids. With support from this project, we have been able to exceed our target, benefiting 46,500 people. ¹
2	Increased quantity of children's time spent on homework and education	Access to electricity allows children to devote more time to studying because (1) they have more opportunities to learn at home at night, by using streetlights or neighbors' lighting, and (2) girls whose households benefit from electricity spend less time preparing meals, which gives them a little more time for learning.
3	Increased use of communication means	The use of communication means has increased because of (1) many more options to use mobile phones (charging points, mobile phone credits and a larger number of phone sales and repair shops), (2) an increase in the use of and ability to watch TV at home or along the main roads, and (3) a significant geographical increase in radio coverage, enabling more airtime and content.
4	Decreased safety risks	Lighting has helped improve security. Due to the lighting of houses and major roads, travel has increased and burglaries have decreased.
5	Improved possibilities for healthcare	The possibilities for healthcare have improved. It is safer for people to travel to healthcare centers in the evening, and healthcare centers have better facilities for conserving medicines.
6	Reduced use of fossil fuels	The use of solar energy has reduced or replaced the use of other energy sources (kerosene lamps, oil lamps etc.).
7	Increased access to goods and services in rural areas	Access to goods and services has increased: (1) fresh or refrigerated products (water, ice, milk, chilled drinks, juice) are more readily available, (2) there is a higher number of telephone credit vendors, (3) more possibilities for photocopying documents and printing, and (4) religious services (church and mosque) have improved.
8	Increased number of small businesses in the villages	There is a greater number of SMEs in the villages: (1) households with energy access have established small, home-based businesses, and (2) existing SMEs have diversified their activities.
9	Increased employment opportunities	FRES companies have employed a total of 61 people.
10	Increased competence and knowledge of rural electrification agencies and rural operators	Most customers are very familiar with FRES, identify with our objectives and mission and are satisfied or very satisfied with our services, which they regard as fulfilling an important personal and community need. This is also the case for other rural electrification agencies/operators, with the exception of Mali. Here, our latest evaluation showed that people in areas where we operate have little knowledge of AMADER, the public operator for renewable energy.
11	Strengthened cooperation between the FRES companies	The active exchange of knowledge and experience between FRES companies has become part of our organizational culture. The companies have benefited from each other's expertise through: <ul style="list-style-type: none">• annual company weeks• joint training sessions (in Burkina Faso for PayGo)• technical assistance• training and monitoring by FRES Mali for the deployment of SHS in Uganda,• the mini grid in Guinea-Bissau and the evaluation of FRES Burkina Faso's sustainability• close collaboration on the implementation of new technologies (nano grids and PayGo)• evaluation of our portfolio and projects during field visits.

8. Accountability

SOCIETE DES SERVICES DECENTRALISES
SSD-FRES-MALI-YEELLEN KURA

Faciliter l'accès à l'énergie innovante et accessible aux populations non couvertes par le réseau

MISSION

Etendre les activités aux zones non couvertes par le réseau électrique national

Exploiter le potentiel solaire

The rural electrification workshop in Bamako, Mali on July 8, 2021 was opened by the Honorable Minister of Mining, Energy and Water, Lamine Seydou Traoré. He congratulated Yeelen Kura on its 20-year track record and for setting an example by providing solar energy solutions to households, entrepreneurs and villages in the country.

8 Accountability

Visibility

Over the years, FRES companies have made use of various marketing tools and materials to increase their visibility and highlight the EU's support for the project:

In the field

- The head office and all energy stores have signs carrying the EU and FRES logos.
- Stickers with the EU logo are affixed to company cars and motorcycles.
- During working hours, technicians and installation teams wear polo shirts and caps with the EU and FRES logos.

Marketing materials and tools

- Three promotional videos were produced about the FRES companies. They can be found on www.fres.nl.
- We developed and broadcast numerous television and radio commercials to highlight our activities.
- All FRES companies have created marketing materials such as banners, brochures, T-shirts and caps.

Beneficiary relations

- Awareness and sensitization campaigns (physical and on the radio) were run regularly in all countries.

Stakeholder relations

- FRES Uganda participated in the first Uganda Europe Business Forum in 2020.
- We organized a workshop in each FRES country to bring together key actors in the rural electrification sector and raise FRES' profile. See section 7 for an overview of the workshops' participants, objectives and outcomes.
- The workshops resulted in media attention in all four countries, including an [item](#) on the evening news in Mali.

8 Accountability

Budget

By the end of the project, FRES had achieved or exceeded all objectives and targets while underspending the budget. The total eligible costs for the period December 1, 2014 up to and including July 31, 2021 amounted to €7,887,470. This is 74% of the original budgeted amount of €10,666,666. The expenditures were audited annually by PricewaterhouseCoopers (PwC) Accountants NV in The Netherlands. The reasons for the underspend are as follows:

- Smart purchasing approach: Over the years, FRES has invested a great deal of time in identifying and purchasing high-quality, reasonably priced materials from a network of

trustworthy suppliers. Effective procurement, following EU procurement rules, resulted in lower expenditures on supplies and services. We will leverage and continue to build this network in future projects.

- Lower expenditure on the fourth country: In Burkina Faso, which replaced Cameroon as the fourth project country in 2020, FRES had been collaborating with a Burkinabé company since 2008. Therefore, there was no need to invest in start-up costs, as the company was already established. This allowed FRES to focus on scaling up and, despite the limited contract period remaining, rapid implementation of the project activities.

- Sharp project management: The contract was managed by FRES' head office in Amsterdam and local projects by the financial department of our local companies. Each subproject was accompanied by project budgets and monitoring of expenditures.

As agreed in the project addenda, additional investments were identified for the unspent budget. These included the installation of 15 nano grids in Burkina Faso, Guinea-Bissau and Mali as well as the implementation of PayGo in all four countries and the hardware upgrade to PayGo of the installed SHS systems in Mali and Uganda.

8 Accountability

Description of expenditure	Total
1. Human resources	€ 857,441.00
1.1 Salaries (gross amounts, local staff)	€ 325,912.00
1.2 Salaries (gross amounts, expat/international staff)	€ 472,247.00
1.3 Per diems for missions/travel	€ 59,282.00
2. Travel	€ 139,346.00
2.1 International travel	€ 136,639.00
2.2 Local transportation	€ 2,707.00
3. Office equipment, vehicles and supplies	€ 493,520.00
3.1 Purchase or rent of vehicles	€ 350,117.00
3.2 Furniture, computer equipment	€ 71,637.00
3.3 Spare parts/equipment for machines, tools	€ 71,012.00
3.4 Other: training material	€ 754.00
4. Local office	€ 35,096.00
4.1 Vehicle costs	€ 24,981.00
4.2 Office rent	€ -
4.3 Consumables - office supplies	€ -
4.4 Other services	€ 10,115.00
5. Other costs, services	€ 356,402.00
5.1 Publications	€ 8,213.00
5.2 Studies, research	€ 58,005.00
5.3 Auditing costs	€ 95,325.00
5.4 Evaluation costs	€ 12,588.00
5.5 Translation, interpreters	€ 9,223.00

Description of expenditure	Total
5.6 Financial services	€ 53,325.00
5.7 Costs of conferences	€ 3,376.00
5.8 Visibility actions	€ 46,414.00
5.9 Technical training	€ 64,697.00
5.10 Operations manual	€ 5,236.00
6. Other	€ 272,301.00
6.1 Rural electrification workshops	€ 57,938.00
6.2 Market field study Cameroon	€ 10,539.00
6.3 Tender support	€ 17,702.00
6.4 Costs related to company creation	€ 8,868.00
6.5 Costs related to licenses and customs SHS	€ 177,254.00
7. Subtotal direct eligible costs of the action (1-6)	€ 2,154,106.00
8. Administrative costs	€ 96,110.00
9. Subcontracting related to construction activities	€ 5,637,254.00
9.1 Works	€ -
9.2 Supplies	€ 5,538,512.00
9.3 Services	€ 98,742.00
10. Total eligible costs (7+8+9)	€ 7,887,470.00
11. Contingencies	€ -
12. Total eligible costs of the action (10+11)	€ 7,887,470.00

8 Accountability

Monitoring and reporting

Between 2014 and 2021, FRES provided the EU with regular information on all aspects of the project's implementation, as set out in the contract. Details of the activities carried out to ensure proper running of the project as well as the interim narrative and financial reports submitted are described below. This final report covers the whole project, thereby fulfilling the EU's last reporting requirement. The reports highlighted below can be found [on our website](#).

- *Semester reports*

From the start of the project, FRES provided the EU with semester reports showing progress toward the project objectives. In total, 13 semester reports were submitted.

- *Audited financial interim reports*

All FRES companies were audited on a yearly basis, according to OHADA rules (Organization for the Harmonization of Business Law in Africa) by PwC. In total, there were seven audits.

- *Mid-term and final evaluation*

Evaluation was an integral part of the project. A mid-term evaluation was carried out by

an external party in 2017 to assess progress toward the objectives in the logical framework. The final evaluation was conducted in each of the countries. The results were presented and discussed during the rural electrification workshops

- *Rural electrification workshops*

FRES organized four rural electrification workshops in each of the countries to share our lessons learned and experiences and to discuss collaborations towards achieving SDG 7 by 2030. The workshop reports are available on our website.

- *Field trips*

Field trips to the FRES companies are a crucial element of our work. To strengthen relations between the companies, make the right strategic decisions and gain a clear understanding of processes, customers and the climate we work in, it is important to see the operations in person. FRES carried out as many field visits as possible. However, this was challenging, especially in the last three years, because of COVID-19 restrictions and security issues in some of the countries.

- *Impact study*

FRES began implementing the project in four countries in 2014 and completed it in 2021. In view of the project's length and complexity as well as the significant financial investment made, FRES contracted an independent team to conduct a socioeconomic study assessing the impact of access to electricity on local beneficiaries. The study was carried out between April and June 2021 in Béléko and Diaramana in Mali, where FRES installed mini grids with project support.

- *Internal cooperation between the FRES companies*

To strengthen cooperation between the companies, we organized monthly online meetings with the board of directors. These served as a platform to plan and discuss any pressing issues and make related decisions. Further, physical meetings were held annually at the head office in The Netherlands between the board of directors and management teams of each company. These provided an open forum for discussion and enabled us to maintain a productive working relationship and to flag potential issues that might not always be evident in written reports and teleconferences.

8 Accountability

- *Procurement rules/process*

For both the SHS and mini grids, FRES The Netherlands took the lead in developing and advertising the tender proposals. This was so the general managers could concentrate on business planning and day-to-day operations. The tenders were advertised to international parties with experience supplying and installing solar energy technology in Africa. Selection of the winning tenders was subject to the approval of the FRES Board and its network of technical advisors. One of the conditions of the tenders was that the supplier install the systems in close cooperation with the FRES companies. Another condition was that the supplier train local staff, to ensure an efficient and effective transfer of technical skills and experience. Tender evaluation reports are available from FRES The Netherlands.



Annexes

Warehouse keeper Mamadou Keita at Yeelen Kura's head office in Koutiala, Mali with a stock of used batteries. As part of FRES' environmental responsibility and energy-as-a-service promise, we have partnered with accredited e-waste recyclers in Rwanda, Ghana and Senegal to ensure all batteries used in our solar systems are properly recycled at the end of their lives.

SPECIFIC OBJECTIVES OF THE ACTION

The specific objectives of the action are listed in the table below according to the logical framework and consider the modifications presented in Addendum 2.

No.	Specific objectives	Indicators/Target value	Results	Achieved
SO1	Equip 8,100 customers (households and small businesses) in Mali, Guinea-Bissau, Uganda and Burkina Faso with photovoltaic kits (SHS) and nano grids.	8,100 connections with SHS and nano grids installed in households, public buildings and small businesses: · Mali: 2,550 · Uganda: 3,700 · Guinea-Bissau: 1,550 · Burkina Faso: 300	<p>As of July 31, 2021, a total of 8,328 SHS have been installed in households, public buildings and small businesses since 2015. Their breakdown by country is as follows:</p> <ul style="list-style-type: none">· Mali: 2,644 SHS· Uganda: 3,700 SHS· Guinea-Bissau: 1,500 SHS· Burkina Faso: 484 SHS <p>In Mali, the number of connections realized was higher because the demand for systems with one battery (S1, S2) appeared to be higher than systems with two batteries (S3, S4) than anticipated.</p> <p>As of July 31, 2021, all nano grids have been contracted and installed, five each in Mali, Burkina Faso and Guinea-Bissau. In total, this resulted in 95 additional connections in addition to the SHS connections.</p> <ul style="list-style-type: none">· Mali: 5 nano grids with a total of 40 connections· Burkina Faso: 5 nano grids with a total of 30 connections· Guinea-Bissau: 5 nano grids with a total of 25 connections <p>The number of connections per nano grid depends on the energy demand of each individual connection. A total number of 10 is possible with only households; the number is lower when productive-use customers are also connected.</p> <p>Combined, the action resulted in 8,423 connections with SHS and nano grids. Per country, the total result is as follows:</p> <ul style="list-style-type: none">· Mali: 2,684 connections with SHS and nano grids· Uganda: 3,700 connections with SHS· Burkina Faso: 514 connections with SHS and nano grids· Guinea-Bissau: 1,525 connections with SHS and nano grids	104%
		44 additional local employees hired	In 2021, a total of 43 additional hires were realized. The hiring of additional employees breaks down as follows: · Mali: 10 out of 8 planned · Uganda: 16 out of 20 planned · Guinea-Bissau: 12 out of 8 planned · Burkina Faso: 5 out of 8	98%
		13 energy stores	In 2021, a total of 14 stores were opened and pre-existing service centers extended in Uganda. · Mali: 5 out of 4 planned · Uganda: 5 out of 5 planned · Guinea-Bissau: 3 out of 3 planned · Burkina Faso: 1 out of 1	108%
SO2	Provide solar electricity to 1,200 customers (households and small businesses) using solar mini grids in Mali and Guinea-Bissau.	5 mini grids designed, installed and operational in Mali and Guinea-Bissau	<p>In 2021, there were a total of 5 mini grids designed, installed and operational.</p> <p>Mali:</p> <ul style="list-style-type: none">· 1 mini grid (75 kWp) installed in the village of Diaramana in October 2018 and 100% operational in December 2018.· The 2 mini grids intended for Diéna and Dogoni were installed during the second half of 2020.· The extension of the mini grid in Béléko was installed during the first half of 2021 (4 out of 4 planned). <p>Guinea-Bissau:</p> <ul style="list-style-type: none">· 1 mini grid (100 kWp) designed and 100% operational in July 2017 in Contuboe.	100%
		1,200 customers connected to mini grids in Mali and Guinea-Bissau: · Mali: 850 customers · Guinea-Bissau: 350 customers	<p>As of July 31, 2021, a total of 1,308 customers were connected to the 5 mini grids.</p> <p>Mali</p> <ul style="list-style-type: none">· A total of 856 customers were connected to the network under the project<ul style="list-style-type: none">- 215 in Diaramana- 267 in Diéna- 217 in Dogoni- 157 in Béléko (extension) <p>Guinea-Bissau:</p> <ul style="list-style-type: none">· A total of 452 customers have been connected to the network in Contuboe.	109%
		- 16 additional hiring of local employees	<p>In 2021, a total of 18 additional employees have been hired.</p> <p>Mali:</p> <ul style="list-style-type: none">· total: 14 out of 12 planned <p>Guinea-Bissau:</p> <ul style="list-style-type: none">· total: 4 out of 4 planned	113%
		- 4 Energy stores	<p>In 2021, a total of 4 stores were opened in Mali and Guinea-Bissau.</p> <p>Mali:</p> <ul style="list-style-type: none">· 1 energy store opened in Diaramana in October 2018.· 2 new energy stores opened in November 2020 in Diéna and Dogoni (total 3 out of 3 planned). <p>Guinea-Bissau:</p> <ul style="list-style-type: none">· 1 energy store opened in Contuboe in October 2017 (total 1 out of 1 planned).	100%
SO3	Organize two workshops on rural electrification.	Participation of relevant stakeholders, including ministries of energy and rural electrification. AMADER from Mali, rural electrification agencies (REAs) from Uganda, Ministry of Energy from Guinea-Bissau, AER from Cameroon and other potential stakeholders from the ministries of energy.	This activity took place between June and July 2021 in all four countries. In view of the COVID-19 situation, the workshops were organized virtually as well as physically. This kept the number of physical participants down and allowed those who could not make it to the workshop location to connect online. All the workshops were a success, all the objectives were achieved, and the FRES companies had the opportunity to increase their visibility. The participation of relevant stakeholders included the ministries of energy and rural electrification. AMADER from Mali, REA from Uganda, the energy ministry of Guinea-Bissau, ABER from Burkina Faso other key players in the sector. Bringing together all these different players has shown the need for closer collaboration and communication between all players in the renewable energy sector to rationalize regulations and activities.	100%
SO4	Strengthen north-south cooperation between FRES companies.	Annual meeting with all general managers and other members of the management team in The Netherlands / Africa to set goals and exchange experiences and knowledge.	<p>The annual company week (ACW) is a forum where representatives of the management of each of the African FRES companies can exchange best practices and discuss strategies and objectives.</p> <p>In 2019, the ACW was held in Amsterdam, October 27-31.</p> <p>In 2020, a virtual meeting was held with each FRES companie on May 26 for health reasons.</p> <p>All FRES companies continued to hold board meetings once a month to review operational aspects and review objectives. In addition, weekly meetings with operations managers take place to exchange knowledge and provide operational support.</p> <p>Due to Covid-19, in 2021 ACW did not take place, but the management visits FRES NL to the companies during the workshops that were organized allowed a lot of discussion on practices, objectives and strategies. If the health crisis allows us, FRES is keen to continue organizing the ACW in 2022 and the years to come.</p>	100%
		An intensive exchange of knowledge and experiences will take place between the new company (new country) and the other FRES companies in order to make the start-up activities and operations in the new country successful.	Field studies carried out in Benin and Zambia have not confirmed the advisability of opening one of these two countries. FRES therefore resumed prospecting. Two new countries have been identified, Burkina Faso and Burundi. The final choice of Burkina Faso was made in October 2020 in close consultation with the EU Delegation in Mali.	100%
		A feasibility study, design, installation and operation of a mini grid in Guinea-Bissau, with the support and monitoring of Yeelen Kura.	<p>The recommendations of the technical and economic studies of the FRES mini grids in Mali were shared between Mali and Guinea-Bissau for implementation in Contuboe.</p> <p>In February 2016, a detailed assessment of energy needs was carried out by executives from Yeelen Kura and FRES Guiné-Bissau. The result of this study formed the basis of the technical design (and the technical specifications for the tender for the supply) for the solar power plant. The implementation was monitored by FRES NL, Yeelen Kura Mali and engineers from Solar23 Germany. In February 2017 and during the installation and acceptance of the Contuboe plant, an engineer from Solar23 trained 2 technicians from FRES Mali and 2 technicians from FRES GB.</p> <p>Operational missions to the Contuboe plant were carried out by an engineer from Solar23 during the first half of 2018, a third mission was carried out in August. The exploitation of the mini grid is stil ongoing , but without the supervision of Yeelen Kura. FRES GB maintains the mini grid with the collaboration of Solar23.</p>	100%

ACTIVITIES AND RESULTS

With reference to the logical framework and the description of the action, an overview of the activities and results is provided below.

Activity 1: Feasibility studies for the mini grids in Mali and Guinea-Bissau

No.	Sub-activities	Achieved
A1.1	Support from Yeelen Kura in Guinea-Bissau for the pre-feasibility study	100%
A1.2	Conclusion and recommendation of the study for the design and operation of mini grids	100%
Description & results	<p>Mali:</p> <ul style="list-style-type: none">• A technical and economic evaluation of mini grids in Mali has taken place. An action plan, investment plans and technical specifications had been drawn up and approved at the end of 2016 to replace diesel by solar in 3 existing hybrid mini grids in the villages of Kouri, Yorosso and Niena. The choice fell on mini grids to use clean energy and be financially sustainable (no diesel costs). The implementation was scheduled for the second half of 2017, however it was decided to halt investments in these networks as these villages are due to be transferred to the national electricity company EDM SA in 2018. <p>Guinea-Bissau:</p> <ul style="list-style-type: none">• In February 2016, a detailed assessment of the energy needs was carried out by executives from Yeelen Kura and FRES Guiné-Bissau. The result of this study formed the basis of the technical design for the solar mini grid at Contuboei and was used in the procurement process. The energy requirement assessment, technical design and tender procedures were finalized in the first half of 2016.	

Activity 2: Acquisition of five 50 kWp mini grids

No.	Sub-activities	Achieved
A2.1	Project design, preparation and publication of the tender dossier	100%
A2.2	Preparation, publication and selection of calls for tenders	100%
A2.3	Preparation and delivery of equipment	100%
Description & results	<p>Guinea-Bissau:</p> <ul style="list-style-type: none">• The technical design and drafting of the tender documents for the solar power plant was carried out and completed in May 2016 by the GSES consultancy office.• On April 6, 2016, FRES launched a call for tenders (request for proposals, RFP) for the supply, delivery and acceptance of the solar power plant. The RFP was published on the FRES website and in the national and international press under international conditions of an open tender. The opening / evaluation of the tender took place at FRES headquarters on May 9, 2016. A total of 4 proposals were received. After an official evaluation, the contract was awarded to Solar23. The final contract was signed between FRES and Solar23 on May 27, 2016.• On July 1, 2016, a negotiated competitive acquisition procedure was opened for the supply and installation of the mini grid. Local and national candidates submitted their bids and finally Global Power Electrical SARL (GPE) from Mali was selected to supply the network.• The realization of the preliminary local mini grid infrastructure was completed in October 2016. At that time, the construction of the solar power plant and the grid was to take place and the mini grid was to be fully operational at the end of 2016. However, the customs clearance times in Guinea-Bissau took longer than expected, following the unstable political situation in the country, the installation of the solar mini grid could not be finalized until June 2017. The target was reached at the end of 2017 with 253 new customers. <p>Mali:</p> <p>Following the various requests to transfer FRES mini grids in Mali to the national grid company, FRES decided to stop its investments in the expansion of solar mini grids in 2016 and 2017. In 2016, Yeelen Kura was to transfer a mini grid to the national electricity company EDM SA. In June 2017, a letter from the rural electrification agency AMADER was received, requesting the transfer of 3 of the 5 villages where Yeelen Kura operates solar or hybrid mini grids. The value of the assets was fixed and accepted by Yeelen Kura. Memoranda of understanding were signed by Yeelen Kura and AMADER. However, the national presidential elections have interrupted this process for the time being, and with the reorganization of the government in September 2018, it is still not clear whether the nationalization of these villages by EDM SA remains a priority of the new Ministry of Energy. Since then, Yeelen Kura has continued to operate the mini grids and provide electricity to the people of these villages. Discussions with local authorities are ongoing and local legal advice has been requested.</p> <ul style="list-style-type: none">• Actions have been taken to install a new mini grid in another area in our concession. The village of Diaramana has been selected.• On February 1, 2018, FRES launched a call for tenders (request for proposals, RFP) for the supply, delivery and acceptance of the solar power plant. The RFP was published on the TED website under number 2018 / 5022-047183, on the FRES website and in the national and international press according to the rules for open international tenders.• The opening / evaluation of the tender took place at FRES headquarters on March 9, 2018. A total of 5 proposals were received. After a formal evaluation, the contract was awarded to Asantys Systems GmbH. The final contract was signed between FRES and Asantys on April 30, 2018.• In June 2018, negotiated competitive procurement procedures were opened for the acceptance of local works. All works were accepted in mid-September 2018.• Discussions have been undertaken with AMADER in order to identify new areas of opportune implantation.• In June 2019, a call for tenders was published for the acquisition of 2 power plants for the municipalities of Dogoni and Diéna.• The tender was awarded in October 2019 to Johs. Graham-Haansen. The contract was signed in November 2019. At the same time, on-site work started in early November 2019. The mini grids were delivered during the first half of 2020 and put into service, taking into account the delays in delivery of certain components (meters) at the end of December 2020.• The extension of an existing network instead of the 5th mini-network was carried out at the Béleko site. The purchase of the equipment was made locally and finalized in June 2021	

Activity 3: Implementation of 5 solar mini grids and 1200 connections

No.	Sub-activities	Achieved
A3.1	Activities prior to installation, sales, marketing and awareness	100%
A3.2	Installation of local infrastructure and distribution network	100%
A3.3	Installation of solar power plants	100%
A3.4	connection	100%
Description & results	<p>Mali:</p> <ul style="list-style-type: none">• Sensitization meetings for the start of construction works of the mini grids took place with the team of Yeelen Kura, the customary chiefs and the administrative officials of these villages (Mayor, Sub-Prefect): in Diaramana (2018), Dogoni (2020), Diéna (2020), site validation extension Béleko (2020), awareness activities Béleko (2021).• The Diaramana mini power plant was installed and commissioned in 2018.• The infrastructures and the distribution network for Dogoni and Diéna were completed at the end of 2020.• The mini power plants of Dogoni and Diéna were commissioned in the first half of 2021. The partial reception of the power plants could be carried out at the end of 2020 but the logistical constraints linked to the coronavirus partially delayed the delivery of equipment and certain component were delivered in insufficient number (battery connections, communication systems, energy measurement devices).• The meters ordered for the two new sites were installed during the first half of 2021. 217 customers are connected to the Dogoni plant, 267 to Diéna, and 157 to the Béleko plant. <p>Guinea-Bissau:</p> <ul style="list-style-type: none">• The mini grid in Contuboei was installed and commissioned in 2017.• The mini grid connected 452 customers in 2021. Initially, the power station was planned for 250 customers. This is explained by the overall consumption level of the mini power plant, which was lower than expected and which made it possible to connect additional customers.	

Activity 4: Extensive feasibility study in Cameroon to determine specific locations to connect 2,500 households and small businesses

No.	Sub-activities	Achieved
A4.1	Determination of the exact locations of operations	100%
Description & results	FRES has requested authorization from the regulatory authority for its activities in the West and Northwest region of Cameroon. The process was halted after meetings with the Ministry of Energy in December 2016 and January 2017 indicated that the national rules do not meet the minimum requirements for FRES to operate in a financially sustainable manner through the standard fee (see Activity 5). In 2019, other options were studied concerning the establishment of a new FRES entity; Zambia, Burundi and Burkina Faso were studied and considered. Contacts were made during the first half of 2020 with the EU Delegation in Mali to discuss these different options and obtain their opinions and Burkina Faso was chosen as the fourth country.	

Activity 5: A company created in the northwest of Cameroon

No.	Sub-activities	Achieved
A5.1	Legal creation	100%
A5.2	Recruitment of general manager	n/a
A5.3	Company creation	100%
Description & results	<p>In 2017, FRES decided to stop the process of launching and recruiting the director after the legal creation of «FRES Cameroon». The decision was made after Cameroon's Ministry of Water and Energy informed that it could only exempt FRES Cameroon from certain taxes if the company used a hire-purchase model instead of a service fee or if it could lower its prices. After careful consideration of the proposed conditions, the action area chosen by FRES was not accepted by the government of Cameroon either. FRES has decided that these conditions are not compatible with its operational requirements, strategies and policies. As a result, FRES officially withdrew from any application procedure involving the creation of a new company in Cameroon.</p> <p>Following the decision shared with the EU not to intervene in Cameroon, new studies and surveys were carried out by FRES, 3 countries were potentially selected, Zambia, Burkina Faso and Burundi. Burkina was chosen as the fourth country. Such a decision implies a long-term commitment from FRES as well as the agreement of the EU. Addendum 2 was validated in October 2020 taking into account the operational feasibility in the country chosen to be able to deliver and install the SHS and then connect new customers within the allotted time (until July 31, 2021).</p>	

Activity 6A: Acquisition of 2,200 SHS (including 1,800 SHS assigned to the EU project)

No.	Sub-activities	Achieved
A6A.1	Project design, preparation and publication of the tender dossier	100%
A6A.2	Publication of the call for tenders and selection	100%
A6A.3	Preparation and delivery of equipment	100%
Description & results	A public tender was launched in December 2014 for the supply of SHS components for Mali and Uganda. The tender was won by Solar23 and the final contract was signed March 2015. The equipment was delivered in lots and the first lots were received. For Mali, end of June 2015; For Uganda, mid-June 2015.	

Activity 6B: Acquisition of 1,800 SHS (including 1,200 SHS assigned to the EU project)

No.	Sub-activities	Achieved
A6B.1	Project design, preparation and publication of the tender dossier	100%
A6B.2	Publication of the call for tenders and selection	100%
A6B.3	Preparation and delivery of equipment	100%
Description & Results	A public tender was launched in November 2015 for the supply of 1,800 SHS components for Mali, Uganda and Cameroon. The winner of this tender was the supplier Asantys, who signed the final contract in December 2015. The equipment was delivered in lots. 1,200 SHS (including 600 assigned to the EU project) were delivered to Yeelen Kura in Mali in April and August 2016. 600 SHS were delivered to FRES Uganda in May 2016.	

Activity 6C: Acquisition of 2,600 SHS

No.	Sub-activities	Achieved
A6C.1	Project design, preparation and publication of the tender dossier	100%
A6C.2	Publication of the call for tenders and selection	100%
A6C.3	Preparation and delivery of equipment	100%
Description & Results	<p>A public tender was launched in April 2016 for the supply of SHS components for Mali, Uganda, Cameroon and Guinea-Bissau. The tender was awarded to Solar23 who signed the final contract in June 2016. The equipment was delivered in lots:</p> <ul style="list-style-type: none">• Lot 1 for Mali: 300 SHS delivered in December 2016• Lot 2 for Uganda: 800 SHS delivered mid-May and mid-June 2017• Lot 3 for Guinea-Bissau: 1,000 SHS delivered in November 2017• Lot 4: Planned for Cameroon: 551 SHS in stock at Solar23 were delivered to FRES Uganda in July 2018.	

Activity 6D: Acquisition of 2049 SHS

No.	Sub-activities	Achieved
A6D.1	Project design, preparation and publication of the tender dossier	100%
A6D.2	Publication of the call for tenders and selection	100%
A6D.3	Preparation and delivery of equipment	100%
Description & results	<ul style="list-style-type: none">• The prior announcement of a public tender was published in October 2018 for the supply of components for 2,049 SHS for Mali, Uganda and Guinea-Bissau (publication reference: EuropeAid / I39 929 tender). The previous acquisition of 2,600 SHS resulted in the provision of 51 more systems by the supplier Solar23, which were sent to Uganda (see Activity 6 C).• This acquisition concerns 2,049 SHS: 49 SHS to reach the target of 3,200 in Uganda, and 2,000 SHS according to Addendum 1. The selection of the call for tenders took place in April 2019 and the signing of the contract in July 2019. The equipment was delivered in lots:<ul style="list-style-type: none">- Lot 1 and 2 - for Mali: 1000 SHS, delivered in H1 2020 in two lots, on February 5 and 27, 2020.- Lot 1 - for Uganda: SHS 549, delivery on February 24, 2020.- Lot 1 - for Guinea-Bissau: 500 SHS, delivery received in March 2020.	

Activity 7: Installation of SHS (according to Addendum 2)

No.	Sub-activities	Achieved
A7.1	Activities prior to installation, marketing and awareness	100%
A7.2	Installation activities - Mali	100%
A7.3	Installation activities - Uganda	100%
A7.4	Installation activities - Guinea-Bissau	100%
A7.5	Installation activities - Burkina Faso	100%
Description & results	<p>Uganda:</p> <ul style="list-style-type: none">• It was not possible to install all the SHS in stock in S1 2020 following the covid-19 measures taken by the government. In S2 2020, 289 SHS could be installed (cumulative total of 3,440 at the end of December 2020), the remaining 260 were installed in S1 2021. <p>Mali:</p> <ul style="list-style-type: none">• The target of 1,500 SHS connections was reached during 2019 (initial target).• Actual number of SHS (Addendum 2) installed at the end of June 2020 = 501, despite the covid-19 restrictions. This growth is explained by the combined action of a promotional campaign with a 50% discount on the connection fee and the fact that the population stayed longer at home given the curfew introduced in Mali (increasing needs for access to lighting and television).• In the S2 of 2020, 548 SHS were installed, for a cumulative total of 2,644 SHS. <p>Guinea-Bissau:</p> <ul style="list-style-type: none">• The target of 1,000 SHS connections was reached in 2018 (initial target).• The 500 SHS (Addendum 2) received in March 2020 were installed as planned in S2 2020 (total of 1500). <p>Burkina Faso:</p> <ul style="list-style-type: none">• As of July 31, 2021, a total of 484 SHS have been installed.	

Activity 8: Organize two workshops with stakeholders from rural electrification agencies and ministries of energy

No.	Sub-activities	Achieved
A8.1	Invite participants, location selection and logistics planning	100%
A8.2	Workshop held	100%
Description & results	<ul style="list-style-type: none">• The workshops has been anticipated since the 2019, but for organizational constraints related to covid-19 they have been postponed to S1 2021.• Finally, in order to be able to realize the workshops, the following measures have been taken to limit the number of participants, while respecting the COVID measures:<ul style="list-style-type: none">- The workshops were divided into four individual workshops, one per FRES company- The workshops were both virtual as well as physical to limit the number of physical participants and enable those who could not make it to the workshop location to connect online.• Preparations started in early 2021 in collaboration with local consultants and the FRES team and the workshops took place between June and July 2021.• In each country the following key actors took part which gave rise to relevant information and discussions on subjects essential to the activities of the FRES companies:<ul style="list-style-type: none">- Uganda:<ul style="list-style-type: none">• About 110 delegates participated in the workshop including the Commissioner of the Ministry of Energy and Mining Development of Uganda, Uganda Solar Energy Associations (USEAS), Uganda National Renewable energy and Energy Efficiency Alliance (UNREEEA), Uganda Bureau of Standards (UBS) and Ministry of Finance, Planning and Economic Development.- Burkina Faso:<ul style="list-style-type: none">• About 50 delegates participated in the workshop including the National Agency for Renewable Energies and Energy Efficiency (ANEREE), the Designated National Authority of the Green Climate Fund (AND / FVC), the Burkina Faso Rural Electrification Agency (ABER) and the Litigation and Legislation Department of the Directorate General of Taxes (DGI).- Guinea-Bissau:<ul style="list-style-type: none">• About 30 delegates participated in the workshop including the representative of the Directorate General of Energy (Ministry of Energy and Natural Resources), representative of the Ministry of the Environment and Biodiversity, representatives of the 2 commercial banks, BDU and Banque Atlantique, Resident representative of UEMOA and Guinea-Bissau and its Special Advisor, FED representative in Guinea-Bissau, EU representative for Guinea-Bissau, 2 loyal customers of FRES and the freight forwarder of FRES.- Mali:<ul style="list-style-type: none">• About 30 delegates participated in the workshop including the Minister of Mines, Energy and Water, the representative of the Energy commission of the National Council of the Transition (CNT), the Representative of the Embassy of The Netherlands in Mali, and the Representative of the European Union in Mali. In addition, a webinar with simultaneous French-English-French translation enabled FRES partners to follow the workshop online (virtual).• The workshops were successful, the objectives were achieved and visibility increased. Bringing together the sector's key actors showed the need for closer collaboration and communication between all actors in the rural electrification sector in order to rationalize regulations and activities.	

Activity 9: Organize two workshops with stakeholders from rural electrification agencies and ministries of energy

No.	Sub-activities	Achieved
A9.1	Desk research	100%
A9.2	Field research	100%
Description & results	Research was carried out in the second half of 2018 to identify the country that will replace Cameroon. Based on their socioeconomic and political situations as well as their rural electrification rates, Zambia, Burundi and Burkina Faso were shortlisted. Further studies and discussions with authorities and national organizations have been undertaken. Burkina Faso, which seemed a priority given its rural electrification rate among the lowest in the world, was finally selected (October 2020).	

Activity 10: Business creation and installation in the fourth country

No.	Sub-activities	Achieved
A10.1	Legal creation	100%
A10.2	Recruitment of general manager	100%
A10.3	Company creation	100%
Description & results	Addendum 2 validated in October 2020 validated the choice of Burkina Faso because the legal entity already existed. This allowed the SHS (250) and nano grids (5) to be installed before the project closed in July 2021.	

Activity 11: Acquisition of 300 SHS in the fourth country (Burkina Faso)

No.	Sub-activities	Achieved
A11.1	Project design, preparation and publication of the tender dossier	100%
A11.2	Publication of the call for tenders and selection	100%
A11.3	Preparation and delivery of equipment	100%
Description & results	By the end of 2020, the preparation of the tender was initiated following the EU's agreement on the choice of the 4th country. The tender was published in early 2021 and the equipment was delivered in April 2021.	

Activity 12: Installation of additional SHS (nano grid) in participating countries, use of the remaining budget for this program

No.	Sub-activities	Achieved
A12.1	Project design, preparation and publication of the tender dossier	100%
A12.2	Publication of the call for tenders and selection	100%
A12.3	Preparation and delivery of equipment	100%
Description & results	FRES has introduced a new technical offer, nano grids, validated in Addendum 2. The call for tenders was launched in February 2021 (5 nano grids for Mali, 5 for Guinea Bissau and 5 for Burkina Faso). The nano grids have been installed in July 2021.	

Activity 13: Monitoring and evaluation

No.	Sub-activities	Achieved
A13.1	FRES company board meetings	100%
A13.2	Uganda, Mali and Guinea-Bissau: operational assessment	100%
A13.3	Mid-term and final evaluation by external consultant	100%
Description & results	<ul style="list-style-type: none">• The FRES companies have been overseen by the Board of Directors. The Board monitored and assessed: number of customers, operational excellence, financial sustainability, non-payment, expenses per customer, customer complaints, overheads and investments.• Monitoring was based on: regular communication between the Board and the CEO / management through monthly teleconferences to discuss progress, monthly operational and financial report. Biannual meetings at company headquarters and / or at FRES headquarters and annual consolidation.• Additional support was offered to the general managers of FRES Uganda and FRES Guiné-Bissau: in 2018 an advisor guided them remotely in terms of improvements in the performance of the company.• Board members visited FRES Uganda in November 2018, October 2019 and March 2020 (to assess the performance of the company and assess the expansion of the national network on the ground); FRES Guiné-Bissau in October 2020 and March 2021 (to monitor the finances and operations of the company).• The <i>operational evaluations</i> for FRES Guiné-Bissau (February), FRES Uganda (April) and Yeelen Kura (May, during the AWC) took place in 2018. A <i>mid-term evaluation</i> was carried out in April and June 2021 and sent to the EU delegations.• The <i>final evaluation</i>: following the validation of Addendum 2 was postponed to S2 2021. COVID-19 impacted the initial organization envisaged (classic external evaluation carried out by international consultants. Consequently, the final evaluation was limited to an evaluation by the consultants of the workshops and an evaluation of activities by the local teams in all four countries.	

Annexes

PROCUREMENT AND CONTRACT HISTORY

The history of all contracts (works, supplies, services) exceeding €60,000 awarded for the implementation of the action is presented below.

No.	Object	Amount	Tendering procedure	Name of contractor
1	Supply contract	€ 72,156.40	Negotiated competitive procedure	Solar23
2	Supply contract	€ 1,074,608.75	International public invitation to tender	Solar23
3	Supply contract	€ 705,046.88	International public invitation to tender	Asantys
4	Supply contract	€ 944,644.40	International public invitation to tender	Solar23
5	Supply contract	€ 308,077.46	International public invitation to tender	Solar23
6	Supply contract	FCFA 65.580.500	Negotiated competitive procedure	Global Power Electrical SARL
7	Supply contract	€ 283,252.39	International public invitation to tender	Asantys
8	Supply contract	FCFA 43,028.388	Negotiated competitive procedure	Entreprise malienne des bâtiments, de construction métallique et industrielle
9	Supply contract	FCFA 42,192.143	Negotiated competitive procedure	Global Power Electrical SARL
10	Supply contract	€ 838,379.54	International public invitation to tender	Solar23
11	Supply contract	€ 457,218.24	International public invitation to tender	John Graham Hansen
12	Supply contract	€ 76,383.20	Simplified procedure	Solar23 GmbH
13	Supply contract	€ 90,589	Simplified procedure	Solergie NV
14	Supply contract	€ 94,045	Simplified procedure	Solarworx GmbH

Annexes

1. Panels purchased for Mali, to complete the 1,000 SHS (including 600 SHS assigned to the project). Costs will be allocated on the following basis:
 - 60% under the EU grant contract DCI-ENV / 2014 / 348-266
 - 40% under the grant contract UE DCI-ENV/2014/352-384
2. Under this supply contract, 2,200 SHS were purchased: 1,200 SHS for Uganda and 1,000 SHS for Mali. For financial administration and to meet the expected objectives under EU projects, the purchase of 1,000 SHS for Mali was distributed among two EU projects:
 - 600 SHS under the EU grant contract DCI-ENV / 2014 / 348-266
 - 400 SHS under the EU grant contract DCI-ENV / 2014 / 352-384
3. Under this supply contract, 1,800 SHS were purchased (whereof 1,200 assigned to this project):
 - 1,200 SHS (whereof 600 assigned to the EU project) were delivered to Yeelen Kura in Mali in April and August 2016
 - 600 SHS were delivered to FRES Uganda in May 2016
4. Under this supply contract, 2,200 SHS were purchased:
 - Lot 1 for Mali: 300 SHS
 - Lot 2 for Uganda: 800 SHS
 - Lot 3 for Guinea-Bissau: 1,000 SHS
 - Lot 4, originally for Cameroon: 551 SHS sent to Uganda
5. Under this supply contract, a 100 kWp solar power plant (village of Contuboel in Guinea-Bissau) was purchased: including design, delivery, installation and training.
6. Under this supply contract, a distribution network was purchased (village of Contuboel in Guinea-Bissau).
7. Under this supply contract, a 75 kWp solar power plant (village of Diaramana in Mali) was purchased including design, delivery and installation.
8. Under this supply contract, construction work and a distribution network were purchased locally (village of Diaramana in Mali).
9. Under this supply contract, construction work and a distribution network were purchased locally (village of Diaramana in Mali).
10. Under this supply contract, 2,049 SHS were purchased:
 - Lot 1 for Mali: 500 SHS
 - Lot 2 for Uganda: SHS 549
 - Lot 3 for Guinea-Bissau: 500 SHS
 - Lot 4 for Mali: 500 SHS
11. Under this supply contract, 2 solar power plants for the municipalities of Dogoni and Diéna in Mali were acquired.
12. Under this supply contract, 300 SHS for Burkina Faso were purchased.
13. Under this supply contract, 15 nano grids for Mali, Guinea-Bissau and Burkina Faso were purchased.
14. Under this supply contract, 6,200 PayGo switches for Mali and Uganda were purchased including design, delivery, installation and training.

LOGICAL FRAMEWORK AND INDICATORS

All the provided reporting, impact assessments and evaluations of the action are based on the objectives and indicators in the logical framework below.

	Intervention logic	Indicators	Sources and means of verification	Assumptions
Overall objectives	What are the overall broader objectives to which the action will contribute?	What are the key indicators related to the overall objectives?	What are the sources of information for these indicators?	
1	Improve living conditions of populations in rural areas of Uganda, Mali, Guinea-Bissau and in Burkina Faso through the use of sustainable modern energy services.	<ul style="list-style-type: none">- Increased quantity of children's time spend on homework and education- Improved possibilities for healthcare- Increased use of communication means- Decrease of safety risks- Reduced use of fossil fuels- Reduced emission of greenhouse gases (CO2) if compared to fossil fuel-based electricity	Socio-economic impact assessment	Continued political stability for the action, specifically in Mali and Guinea-Bissau.
2	Improvement of climate for entrepreneurship.	<ul style="list-style-type: none">- Stores stay open longer- Increased number of small businesses in the villages- Increased access to goods and services in rural areas- Increased employment opportunities- Increased competence and knowledge with rural electrification agencies and with rural operators	Socio-economic impact assessment	Continued political stability for the action, specifically in Mali and Guinea-Bissau.
Specific project outputs	What specific output is the action intended to achieve to contribute to the overall objective?	Which indicators clearly show that the objective of the action has been achieved?	What are the sources of information that exist or can be collected? What are the methods required to get this information?	Which factors and conditions outside the beneficiary's responsibility are necessary to achieve that objective (external conditions)? Which risks should be taken into consideration?
1	Provide at least 8100 customers (households and small enterprises) in Mali, Guinea-Bissau, Uganda and Burkina Faso with solar home systems (SHS) and nano grids: <ul style="list-style-type: none">- Mali: 2550 SHS- Uganda: 3700 SHS- Guinea-Bissau: 1550 SHS- Burkina Faso: 300 SHS and nano grids	<ul style="list-style-type: none">- At least 8100 SHS installed at households, public buildings and small businesses- 44 additional local staff employed- 13 energy stores	<ul style="list-style-type: none">- Yearly narrative and financial report audited by an international accountant- FRES annual report	<ul style="list-style-type: none">- National government continues to support the companies with fiscal exemptions like custom duties.- Remoteness of villages and hamlets does not make maintenance unviable.- Financial capability of target group.
2	Provide 1200 customers (households and small enterprises) in Mali and Guinea-Bissau with electricity via solar mini grids. <ul style="list-style-type: none">- Mali: 850 customers- Guinea-Bissau: 350 customers	<ul style="list-style-type: none">5 mini grid units designed, installed and maintained in Mali and Guinea-Bissau- 1200 mini grid customers connected in Mali and Burkina Faso and/or Guinea-Bissau- 16 additional local staff employed- 4 energy stores	<ul style="list-style-type: none">- Yearly narrative and financial report audited by an international accountant- FRES annual report	<ul style="list-style-type: none">- National government continues to support the companies with fiscal exemptions like custom duties.- Correct dimensioning of capacity and sufficient quality of constructions and installations- Technical capacity of staff- Support of local authorities- Financial capability of target group
3	Facilitate two workshops for REAs in Mali, Guinea-Bissau and Burkina Faso	Participation of relevant stakeholders from ministries of energy and rural electrification, specifically in Mali's AMADER, Guinea-Bissau's Ministry of Energy, and fourth country's REA.	<ul style="list-style-type: none">- Event programme- Event minutes	Strong commitment for active participation is needed from the national government
Expected results	The results are the outputs envisaged to achieve the specific objective. What are the expected results (enumerate them)?	What are the indicators to measure whether and to what extent the action achieves the expected results?	What are the sources of information for these indicators?	What external conditions must be met to obtain the expected results on schedule?
1	Sustainable and affordable access to solar-based energy in rural areas in a fourth country.	<ul style="list-style-type: none">- At least 64 kilowatt (kW) increase production capacity through PV- 400 households with access to energy- 75 businesses with access to energy- 25 public buildings with access to energy- 4000 people with access to energy	Narrative Report	
2	Sustainable and affordable access to solar-based energy in rural areas in Mali and Guinea-Bissau.	<ul style="list-style-type: none">- At least 554 kW increase production capacity through PV (SHS)- 250 kWp installed capacity through PV (mini grid)- 31 km electrical lines created- 4,806 households with access to energy- 154 businesses with access to energy	Narrative Report	
3	Sustainable and affordable access to solar-based energy in rural areas in Uganda	<ul style="list-style-type: none">- At least 586 kW increase production capacity through PV- 2,004 households with access to energy- 1,536 businesses with access to energy- 160 public buildings with access to energy- 29,600 people with access to energy	Narrative Report	
4	Strengthen south-south cooperation between the FRES companies.	<ul style="list-style-type: none">- 5 missions for exchanges of knowledge between the 4 countries- Annual meetings <p>Extensive exchange of knowledge and experience will take place between the new company to be created in a fourth country and the other FRES companies in order to make the start-up activities and operations in a fourth country a success.</p>	<p>Narrative reports</p> <p>Final feasibility report</p>	FRES companies in Mali, Burkina Faso and Uganda should actively stimulate exchange of knowledge and experience between them
		Mini grid feasibility study, design, installations and operation of mini grid in Guinea Bissau, with the strong support and monitoring of Yeelen Kura.	Delivery / completion document from the mini grid supplier.	Continued political stability for the action, specifically in Mali and Guinea-Bissau.

Colophon

This report was published by FRES (Foundation Rural Energy Services) as final report of the contract DCI-ENV/2014/348-266.

More information on the project and reports referred to in this publication can be found on our website at <https://fres.nl/eu-regional-reports/>

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Guardian Guardian Ussumane Baldé and technician Sabino Bidante at the FRES mini grid in Contuboei, Guinea-Bissau. The mini grid in Guinea-Bissau was the first of five mini grids to be realized under this contract. Operational since 2017, it now supplies electricity to 452 customers.