Energising Development
Progress Report 2022

endev

Energising change

Partnership between

The German Federal Ministry for Economic Cooperation and Development

The Netherlands Ministry of Foreign Affairs

The Norwegian Agency for Development Cooperation

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Collaborative Labeling and Appliance Standard Program (CLASP)

Nordic International Support Foundation (NIS)

Practical Action

Netherlands Development Organisation (SNV)

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EnDev at a glance

733 million people worldwide live without electricity and about 2.4 billion people lack access to clean cooking solutions. This has a dramatic impact on quality of life, environment, health, education and income opportunities. EnDev's involvement focuses on providing access to modern, renewable energy. This is a pivotal factor in strengthening socio-economic development and combatting climate change.

EnDev's drive is to improve the lives of the most vulnerable people, ensuring no one is left behind. Economic opportunities and green jobs are created by building markets for modern, renewable energy. EnDev contributes to reducing greenhouse gas emissions to protect our planet's climate. Its approach is to empower structural, self-sustaining change; kickstarting market and sector development that evolves further without support by EnDev.

EnDev's work is about people. Results are monitored and reported rigorously. EnDev's achievements on helping people, schools, health centres, and companies gain access to electricity or improved cooking technologies can be found in this report. This report also presents EnDev's impacts on gender, job creation, and reduced carbon emissions.

EnDev is a strategic partnership. Dedicated donors, partners and individuals work together to support social development and economic growth by providing access to modern, renewable energy in more than 20 countries around the globe. The driving force behind EnDev is the partnership of Germany, the Netherlands, Norway, and Switzerland.; donors who are committed to accelerating energy access and socio-economic development.

Key achievements

28.7 million
People with access to modern energy

7.1 million
People with access to modern electrical services

21.5 million
People with access to modern cooking solutions

89,800
Micro, small and medium-sized enterprises with access to modern energy for productive use

2.75 million
tonnes of CO_2 emissions saved per year

31,500
Social institutions with access to modern energy, including 18,970 schools and 2,180 health centres

1. Executive summary

The EnDev core programme aims to achieve sustainable access to modern energy for 30.1 million people by 2025 with a currently allocated total budget of EUR 502,6 million. The EnDev partnership, including associated projects, aims to reach a total of 42.1 million people by 2025. By the end of 2022, EnDev facilitated sustainable access to modern energy services and technologies in total for 28.7 million people, 31,500 social institutions, and 89,800 micro, small and medium-sized enterprises. In 2022, 2.8 million people, 648 social institutions and 8,100 micro, small and medium-sized enterprises were reached additionally. 33,520 people are employed either in the related supply chains or directly in the enterprises that were provided with energy access. EnDev interventions saved 2.75 million tonnes of CO_2 emissions in 2022.

Key trends
Regionally, the focus continues to be on sub-Saharan Africa. Since 2010, 72% of the funds were committed to sub-Sahara Africa, 69% of the global results can be attributed to this region. 75% of the target achievement on household level comes from access to thermal energy (cooking), while households with access to electrical energy contribute 25% to the overall target achievement.

From a total of 31,500 social institutions reached, 648 received access in 2022 which is an overall increase of 2% compared to 2021. In total, 2,177 health centers and rural clinics were provided with access to modern energy.

Until the end of 2022, a total of 89,800 micro, small and medium-sized enterprises was reached. In 2022, 8,100 micro, small and medium-sized enterprises received new or improved access which is an overall increase of 10%. With 55% of the enterprises gaining access to thermal and 45% to electrical energy the share in 2022 stands nearly at parity.

Financial situation
In 2022, EnDev has received additional core funding from BMZ of EUR 19.5 million. Additionally, an amount of EUR 43.73 million new earmarked funds were secured from several donors, such as EUR 19 million from DGIS for implementing the DSS component. As a result, additional total funding of EUR 63.23 million was secured.

EnDev's total available budget since 2010 sums up to EUR 512.02 million whereof EUR 502.64 million have been allocated. Consequently, the funding gap of EUR 3.32 million as of 2021 was successfully closed in 2022.

EnDev's Consultative Group (CG) held two meetings in 2022. The 26th EnDev Consultative Group meeting took place in Bonn in June 2022 and was chaired by BMZ. The virtual 27th EnDev Consultative Group meeting took place in November 2022 and was chaired by the Netherlands (DGIS).

Portfolio development
In 2022, a comprehensive portfolio review was carried out and proposed to continue with a portfolio of 20 countries including one additional new country (Niger) for implementation as well as two countries phasing out (Bolivia and Guinea). Conditional on the approval of EnDev's Consultative Group (CG), all countries were requested to develop and submit a proposal in the portfolio-wide strategic programming cycle.

For the programming, EnDev further developed and institutionalised a *leave-no-one-behind* framework to address discrimination, exclusion, and inequalities of certain vulnerable groups. In parallel, EnDev significantly increased its commitment to the promotion of gender equality and women's self-empowerment and published its first Gender Strategy and operational guidelines. LNOB and Gender (combined as

LNOB+), along with Higher-Tier Cooking (HTC), were emphasized as programmatic priority areas for the multi-annual indicative programming until 2025.

In 2022, Germany's Last Mile Initiative enabled EnDev to support rural health facilities in the procurement of solar-powered refrigeration systems, various energy systems, and medical supplies in Ethiopia, Liberia, Malawi, Mali. The *Energising Health* trajectory contributes to improved health care in rural sub-Saharan Africa and thus to a wider distribution of COVID-19 vaccines to tackle the pandemic. Under the umbrella of leaving-no-one behind and with support of the Dutch government, EnDev began rolling out its new, flagship *demand-side subsidies (DSS)* component. The objective of the component is to pilot innovative DSS mechanisms in Liberia, Malawi, Niger and Uganda to facilitate access to modern, reliable, and affordable energy services for low-income and displaced populations who are currently not reached by commercial markets. It is envisaged that each of these pilots will be handed over to, and scaled up by, government agencies and development finance institutions, in particular the World Bank.

EnDev witnessed the further development of the associated project *Strengthening the Entrepreneurial Ecosystem for Clean Cooking (SEE-CC)* that introduces a new private sector approach to promote clean and affordable cooking technologies. With the end of 2022, the course was set for the start of the *Higher-Tier Clean Cooking (HTCC)* component, that helps develop and strengthen supply of higher-tier clean cooking technologies in Bangladesh, Cambodia, Ethiopia, and Uganda. It is funded by the Dutch Ministry of Foreign Affairs and the EU.

Building on the successful engagement of EnDev with international philanthropies, EnDev expanded its reach to include concrete cooperation activities with the recently launched Global Energy Alliance for People and Planet (GEAPP). At the end of 2022, a cooperation with GEAPP in Malawi, focussing on productive use of energy, was agreed upon and further areas of cooperation will be identified in the near future.

Challenges

In 2022, global supply chain issues caused by the COVID-19 pandemic still affected operations negatively (particularly solar energy products). Additionally, the effects of the Ukrainian war have further exacerbated the economic situation of many countries, resulting in inflation with the increase in the price of many products causing reduced disposable incomes of households. Especially increased poverty and reduced food security became a priority for many Governments and households.

Besides these global challenges, the security situation in some countries has become more volatile and made implementation more challenging, most notably in Ethiopia and DRC where EnDev staff had to be evacuated and operations halted for a while. Likewise, the security situation in Mali needs close monitoring as the tense security situation continues to worsen. It should be noted that EnDev is one of the few programmes still operational in Mali, which underlines the strong value of long-term engagements paired with close Government and civil society contacts.

Partnerships and innovation

EnDev has continued its cooperation with strategic partners in 2022. As an example, the cooperation with the World Bank could be expanded in various ways and new milestones in EnDev's partnership for scale agenda could be set. EnDev was requested, for example, to assist the local partners in Tanzania with the design and roll-out of two new RBF facilities as part of the World Bank supported *Tanzania Rural Electrification Expansion Program* (TREEP). Additionally, new partnerships were entered into (e.g. GEAPP) and existing (e.g. GOGLA and CCA) cultivated and strengthened.

Building upon the first round of EnDev's Innovation and Learning Agenda, EnDev launched its second Innovation Fund and is currently harvesting the results of nine innovation pilot projects targeting leave no-one behind, productive use of energy and data and digitalisation. Here, especially successful were the application of electric cooking in clean mini-grids in Kakuma refugee settlement, Kenya, as well as the establishment of renewable energy cold storage facilities for market vendors in Kigali, Rwanda.

2. Outcomes and impacts

2.1 Dashboard

Since 2005, EnDev facilitated sustainable access to modern energy services and technologies for about 28.7 million people, 89,800 micro, small and medium-sized enterprises (MSMEs) as well as 31,500 social institutions (SIs).

While 7.14 million people achieved access to electrical energy services, 21.54 million people were provided with access to improved and more modern forms of thermal energy, which results in a share of 25%-75%. Beyond that, the shares for electrical and thermal energy are at 36%-64% for SIs as well as 45%-55% for MSMEs.

EnDev is well on track to achieve its targets by 2025 ahead of time for providing people at household level and MSMEs with access to modern energy services. At the same time, the growth rate for SIs was lower compared to previous years but is still within reach by 2025 (Figure 2-1).

The geographic focus continues to further shift to sub-Saharan Africa with a total share of people reached since 2010 of 69% (53% in East-Africa and 16% in West-Africa). At the same time, the remaining 5 countries in Asia and Latin America (Bangladesh, Cambodia, Laos, Nepal, Bolivia) are generating substantial outcomes for which reason the overall share for both regions is still at a combined accounting for 31% (20% in Asia and 11% in Latin America) (Figure 2-2).

The trend stated above gets even clearer when looking at the committed funds until 2025, where sub-Saharan Africa is at a share of 72% (50% in East-Africa and 22% in West Africa), which will be reflected in outcome shares for these regions even more strongly in future. As for the outcomes, the relative share of committed funds for Asia and Latin America is decreasing and is quite in line with the overall outcome a combined share of 28% (16% in Asia and 12% in Latin America) (Figure 2-3).

Figure 2-1
People, MSMEs and SIs reached since 2005

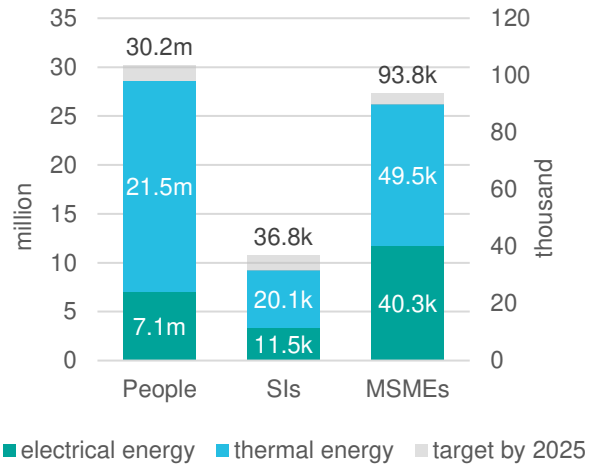


Figure 2-2
People reached by region since 2010

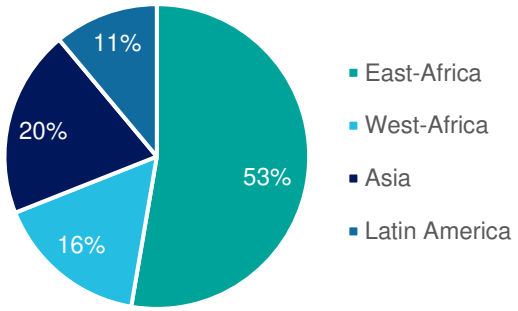


Figure 2-3
Funding by region since 2010

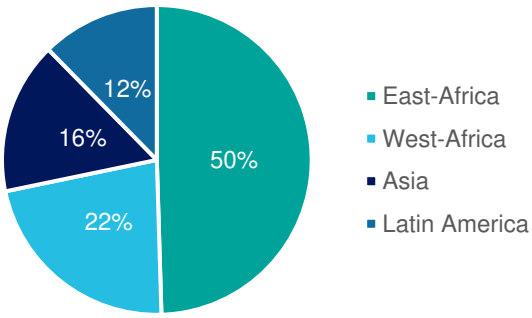


Table 2-1

Countries[1] and technologies in 2022

Countries	Improved cookstoves	Biogas	Higher-tier cooking	Soalr PV stand alone systems	Mini-grids	Grid
Bangladesh	●		● AP	○		
Benin	●			●		○
Bolivia	○			●		●
Burkina Faso		AP				
Burundi	●					
Cambodia (with Laos)	●		● AP			
Democratic Republic of the Congo (DRC)	●			●	●	
Ethiopia	●		AP	●	●	
Kenya	AP	AP	●	●	○	
Liberia (with Sierra Leone and Guinea)	●			●	●	
Madagascar	●					
Malawi	●			●		
Mali	●	AP		●	●	
Mozambique	●			●	○	●
Nepal	●		●		●	●
Niger		AP		●		
Rwanda	●	○		○	●	
Senegal	AP			●	●	●
Tanzania	●		●	○		
Uganda	●	AP	AP	●	○	○

[1]Components that phased out are shown in lighter colour. Components that are being implemented as part of an associated project are designated by the abbreviation “AP”

2.2 Energising Lives: Social development

By December 2022, EnDev reached 28.7 million people. In 2022 the number of people that received new or improved access is 2.8 million and a significant increase of 40% compared to the annual achievement of 2021 (2.0 million) as well as an 11% growth of total results since 2005. Figure 2-6 shows the development of the target achievement over the last five years.

The results presented above indicate that energy access markets further recover from the COVID-19 induced shock that was particularly evident in 2020 where the average result of previous years was halved (0.9 million). 2022 reached a level that is already 50% above the annual achievement of the pre-COVID-19 years (2018 and 2019), which was at 1.9 million people reached on average.

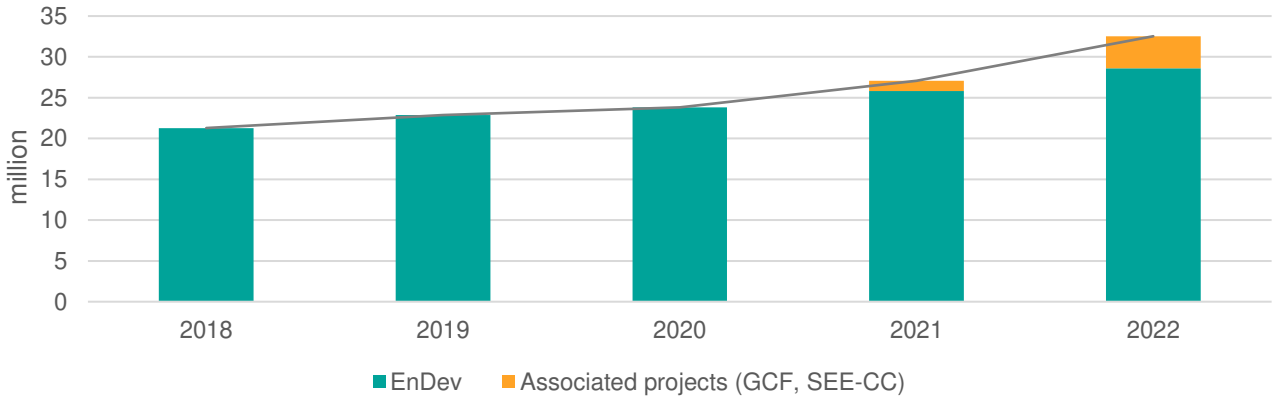
Taking into account the average funds spent in 2018 and 2019 (33 million EUR) as compared to the years 2021 and 2022 (39 million EUR), it can be observed that while there was an increase of only 19% of funds spent, the average number of people reached increased by 30%. This indicates that EnDev's ambition to break away from the linear relationship between inputs and results as a market development facilitator is realised at country level. It affirms the expectation that EnDev core is well on track to reach the target of 30.15 million people set for 2025.

In addition, to the above-described results of the EnDev programme, results of the EnDev associated projects begin to have an effect on the partnership's overall progress as well as future outlook.

- The Green Climate Fund (GCF) co-financed project *Promotion of climate-friendly cooking: Kenya and Senegal (GCF)* increased its results also due to a recovery of the ICS market in both country contexts. In 2022 the project reached 3.9 million people with access to improved cooking technologies. Until the end of 2024 a total of 11.2 million people is expected to be reached.
- The contribution of the *Africa Biodigester Component* (ABC) from activities in Burkina Faso, Kenya, Mali, Niger, and Uganda, is estimated to reach additional 250,000 people by 2025. In addition, the *Higher-Tier Cooking Component*, aims to reach 600,000[2] people by 2025 in Bangladesh, Cambodia, Ethiopia, and Uganda. No results can be reported for 2022 as implementers were mobilised and activities started, with the delivery of the first results from 2023 onwards.

Adding the associated project's results until 2022 as well as its further expected results to the target of EnDev core, the EnDev Partnership overall global target is 42.1 million people until 2025.

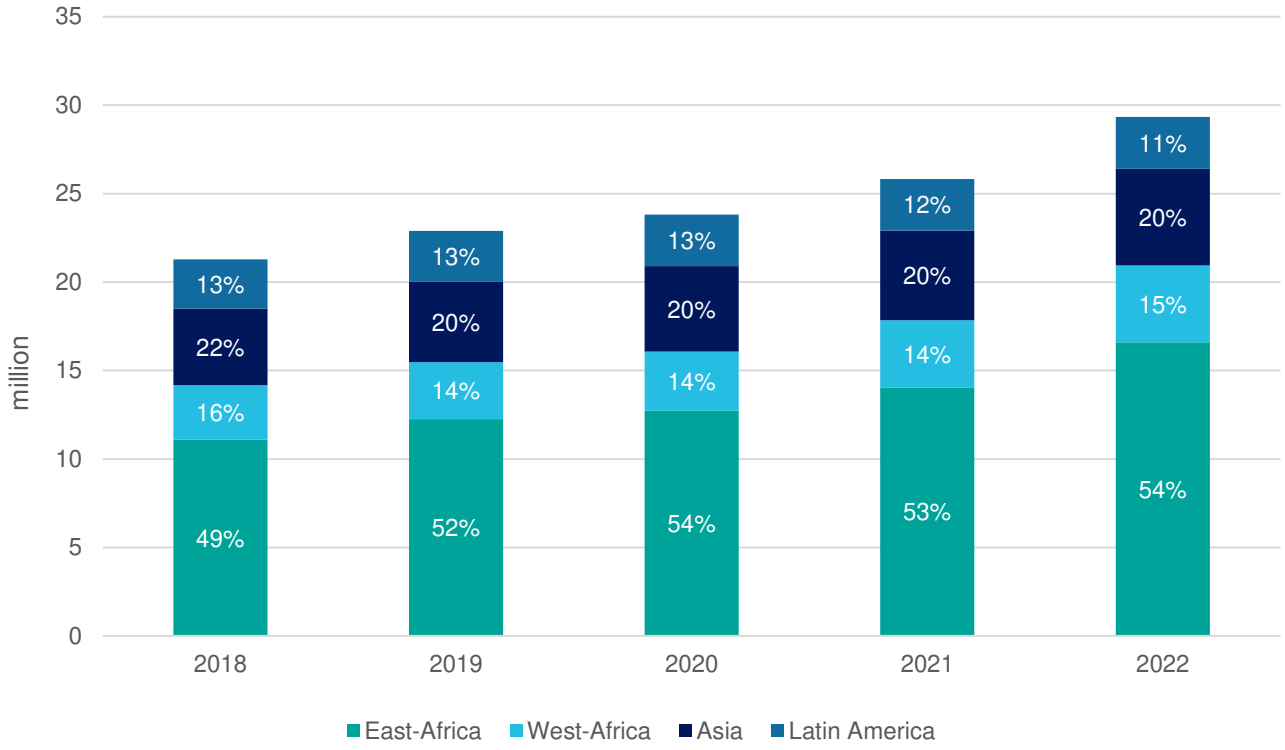
Figure 2-4
Number of people reached incl. associated projects since 2005



During the past years, EnDev has increasingly focused on sub-Saharan Africa. This can be clearly seen in the growth rates of the respective regions since 2005 until 2022. 18% growth has been achieved in East-Africa (16.6 million people), 14% growth in West-Africa (4.4 million people) and 8% growth was realised in .

Asia (5.5 million people). With only Bolivia as the remaining country in Latin America (2,9 million people) there is hardly any growth notable (1%). Accordingly, 69% (+2% since 2021) of the overall results were achieved in sub-Saharan Africa.

Figure 2-5
Number of people reached by region since 2005



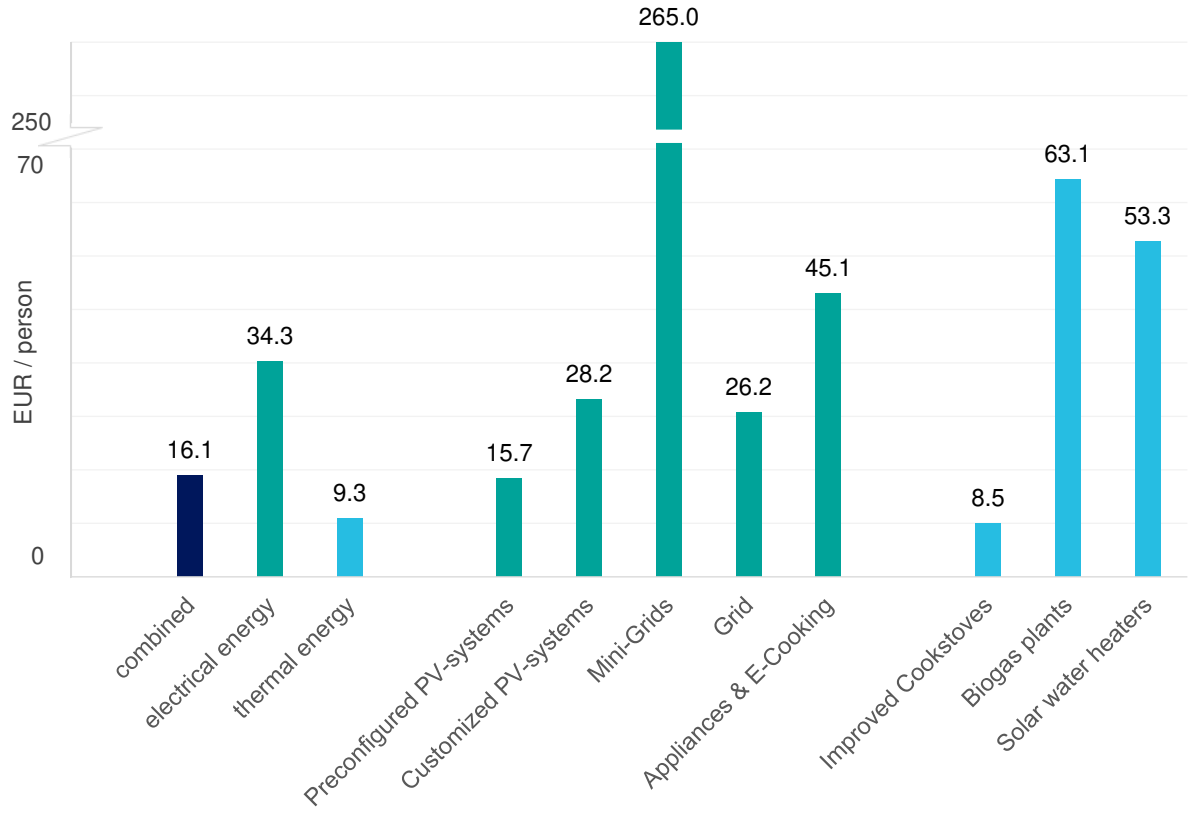
EnDev has been able to ramp up its target achievement significantly for modern cooking solutions, whereas access to electrical energy has not been able to grow on the same trajectory: The largest share of the annual target achievement at household level comes from access to modern cooking solutions 89% in 2022 (2021: 68%; 2020: 72%) while households with access to electricity contribute 11% in 2022 (2021: 32%; 2020: 28%) to the overall target achievement (Figure 2-5). In other words, in 2022, 2.5 million additional people were reached with cooking energy technologies and additional 316,000 people gained access to electricity.

Value for money

The average expenditure from 2009 until 2022 to reach one person is at EUR 16.1 across all promoted technologies. Disaggregated by access to electrical and thermal energy, the average costs are at EUR 34.3 and EUR 9.3 respectively (Figure 2-6).

While over the recent years, with an average growth rate of 12% since 2017 (COVID-19 shock of 2020 excluded) both expenditures as well as the number of people reached were growing evenly, the number of MSMEs reached within the area of Productive Use of Energy was growing with a comparably high average rate of 16%, both with regards to growth rates before 2017 as well as to the growth rate of people reached.

Figure 2-6
Value for money as of 2022



Access levels according to the MTF for electricity and clean cooking

According to the multi-tier framework (MTF) for electricity access, EnDev's target achievement in electrification can be attributed as follows:

Table 2-2
Number of people reached by electrification access level since 2010

Access level	Number of people reached (growth p.a.)	Total share in 2022 (trend[2])	Appliances, systems & technologies
Tier 5	865,466 (+0%)	13,9% (↘)	e.g. Grid, Mini-Grid, Customized PV-Systems (≥ 2kW capacity)
Tier 4	810,710 (+8%)	14,0% (↗)	e.g. Customized PV-Systems, Mini-grid, Limited Grid (≥ 800W capacity)
Tier 3	249,091 (+3%)	4,1% (→)	e.g. Mini-Grid, Customized PV-systems (≥ 200W capacity)
Tier 2	1,739,717 (+2%)	28,5% (↘)	e.g. Customized / Preconfigured PV-systems (≥ 50W capacity)
Tier 1	2,329,665 (+6%)	39,6% (↗)	e.g. Preconfigured PV-systems (≥ 3W capacity)
total	**6,247,670**	**100%**	

Based on EnDev's project level methodology corresponding with the MTF for Cooking, EnDev's target achievement in clean cooking can be attributed as follows:

Table 2-3
Number of people reached by clean cooking access level since 2010

Access level	Number of people reached	Total share in 2021 (trend[2])	Exemplary service level
Tier 5	61.574	0,4%	Access to needed quantity of energy source: ≥ very good Health protection: ≥ very high; Convenience: ≥ very high
Tier 4	440.943	2,6%	Access to needed quantity of energy source: ≥ good Health protection: ≥ high; Convenience: ≥ high
Tier 3	142.253	0,8%	Access to needed quantity of energy source: ≥ fair Health protection: ≥ fair; Convenience: ≥ fair
Tier 2	8.831.417	51,1%	Access to needed quantity of energy source: ≥ limited Health protection: ≥ limited, Convenience: ≥ sufficient
Tier 1	7.796.823	45,1%	Access to needed quantity of energy source: ≥ deficient Health protection: ≥ low; Convenience: ≥ low
Tier 0	75.447	0,4%	Access to needed quantity of energy source: ≥ highly deficient Health protection: ≥ very low; Convenience: ≥ very low
total	**17.286.883**	**100,0%**	

[2] positive: > +0,25%, stagnating: [-0,25%; +0,25%], negative: < -0,25%

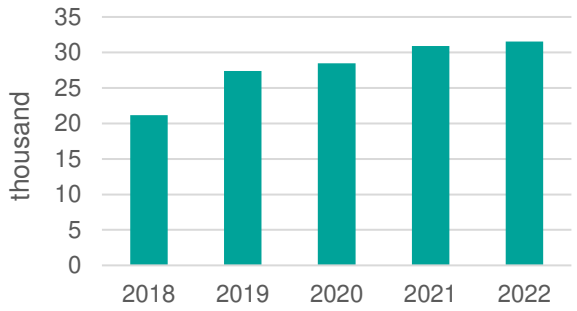
Indoor air quality

In most cases women are responsible for cooking and thus benefit most from improved cookstoves that emit fewer pollutants. Considering the above figure on the number of people with access to tier 2 cooking solutions and assuming that $^{1}/_{5}$ of the average household are women and $^{2}/_{5}$ are young children, it can be estimated that around 1.9 million women and 3.8 million young children benefit from lower exposure to hazardous pollutants like particulate matter and carbon monoxide.

Social Institutions

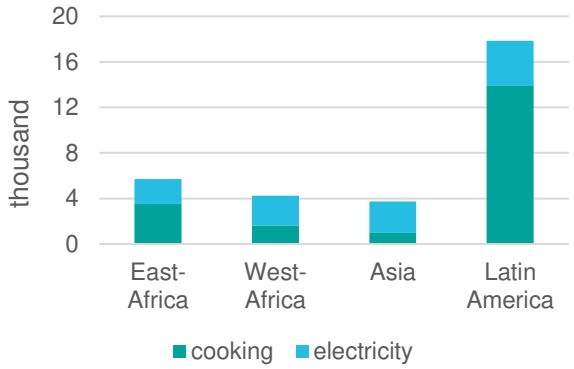
In the course of 2022, additional 648 social institutions (SIs) received new and improved access to modern energy services.
Equal emphasis was placed on electrical and thermal energy resulting in a 50:50 ratio.
Overall historic EnDev results reached a total of 31,549 SIs so far. In the context of its continuous long-term trend the programme's ambition is still in sight (Figure 2-7).
In 2023, it is expected that the number of health centers reached in Africa will increase further due to EnDev's special focus on *Energising Health*, which is aiming at providing access to energy and cooling capacities to more than 800 health facilities. *Energising Health* is implemented in Ethiopia, Liberia, Malawi, Mali and Senegal as a part of the German Last Mile Initiative.

Figure 2-7
Number of Social Institutions reached since 2005



Since 2005, the largest contribution to SI target achievement is still within Latin America with 57% (17,863 SIs) of the total result.
Sub-Saharan Africa (incl. East-Africa and West-Africa) contributes 32% (9,952 SIs), and the remaining 12% (3,737 SIs) were achieved in Asia. (Figure 2-8)

Figure 2-8
Number of Social Institutions reached by region and technology since 2005

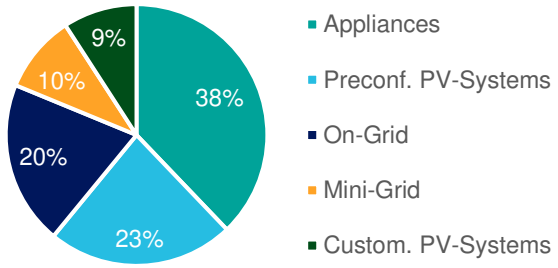


Overall, 67% of SIs reached since 2005 can be accounted either to health centers or educational institutions. In total 2,177 health institutions and 18,978 educational institutions were provided with access to modern energy. In 2022 alone, 56% of the additionally reached SIs were either Schools (318), mainly kitchens of Primary, Secondary as well as Higher educational institutions, or Health Centers (42) using the provided energy to illuminate their workplaces as well as to cool necessary medical material.

2.3 Energising Opportunities: Economic development

Since 2005, EnDev has provided access to modern energy to 89,800 micro, small and medium-sized enterprises (MSME). About half of these MSMEs were reached with access to electricity (45%), mainly with diverse appliances and/or primary power supply from solar PV-systems (Figure 2-9).

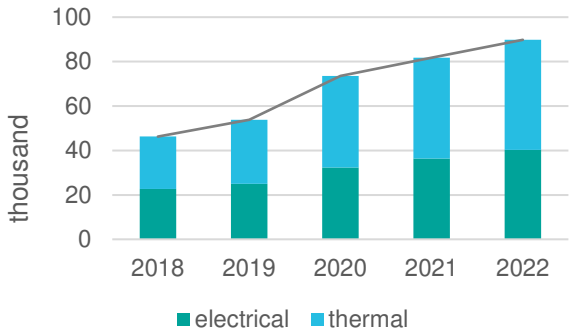
Figure 2-9
Number of MSMEs reached with access to electricity by technology since 2005



The other half of the MSMEs (55%) reached since 2005 used thermal energy technologies such as regular and specialized institutional improved cooking solutions.

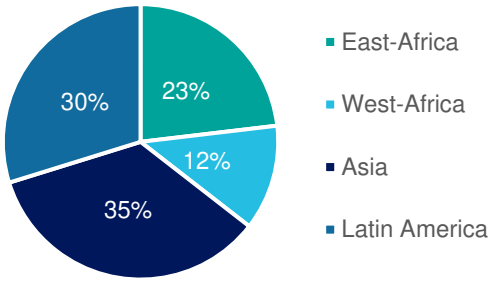
In 2022, an additional 8,100 MSMEs received new or improved access to modern energy. This is an annual growth rate of 10% compared to the overall result until 2021 and is slightly lower than the average annual growth rate since 2018, which is at 12%. (Figure 2-10)

Figure 2-10
Number of MSMEs reached since 2005



In total, 12 countries contributed to the additional results of 2022. With 48%, the largest share of additional MSMEs reached in 2022 are in East-Africa (six countries). This is followed by 31% in Latin America, where Bolivia is the sole remaining country, 18% in Asia (two countries) and lastly 3% in West-Africa (three countries). As a result, the overall share of MSMEs reached in Africa since 2005 increased from 31% to 35% (East-Africa and West-Africa) (Figure 2-11).

Figure 2-11
Number of MSMEs reached since 2005 by region



Typically, companies achieving initial or improved energy access through EnDev support are small (below 10 employees). In the previous reporting period, 80% of supported companies had 1-4 employees (micro-sized enterprises), 16% had 5-9 employees (small-sized enterprises) and 4% (medium-sized enterprises) had more than 10 employees. In 2022, this distribution was nearly replicated with 81%, 16% and 3% respectively.

Figure 2-12
Number of MSMEs reached in 2022 by sector

Looking at the economic activities of MSMEs reached in 2022, the most important sector remains the food and beverage sector (53%), followed by agriculture and manufacturing - both at 21% of the supported MSMEs. Last but not least, service activities and retail trade were the main activity of 5% (Figure 2-12) of supported companies.

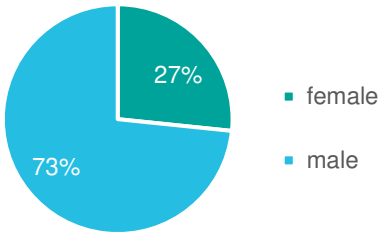
In the food and beverages sector, EnDev mainly supports local restaurants and bakeries with institutional biomass cookstoves (Tier 1-3), and increasingly with e-cooking solutions (Tier 5).

In the agricultural sector, supported farmers and MSMEs benefited mainly from irrigation systems, but also from other diverse agricultural appliances, e.g., for cooling, threshing, grain sorting, and incubating. Irrigation systems remain the only well-established PUE applications for small-scale agriculture off-grid while the other primary production appliances are typically used in grid-extension or mini-grid settings.

In the manufacturing sector, the largest share of MSMEs in 2022 used electrical appliances for food packaging and processing. Other typical uses were milling, sawing (furniture production), and sewing (for clothing and shoes).

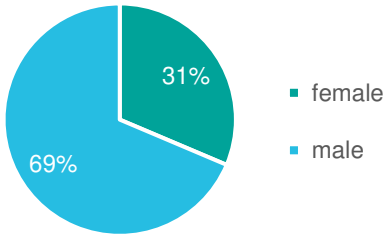
Small stores and kiosks are the most important business type in the service sector and the most demanded application is lighting (Tier 2-3) to extend opening hours and provide security. The MSMEs also acquired a variety of other appliances (mainly Tier 2) such as for hairstyling or cooling and phone charging.

Figure 2-13
MSMEs reached in 2022, head of business by gender



As a result of various activities mainstreaming the gender-based approaches within EnDev interventions, good progress was made in 2022 on gender indicators. In particular, 27% of supported MSMES were led by women, predominantly in businesses related to agricultural and food production.

Figure 2-14
MSMEs reached in 2022, gender of employees



Similarly, 31% of all employees in supported MSMEs were women, and they were employed mainly in those same sectors with high female leadership which were related to agricultural and food production. Bolivia contributed the largest absolute numbers of female employees by country in 2022, showing not only the overall size of their productive use intervention, but also the impact of their targeted support for women's cooperatives in rural areas with instruments such as the Women's Energy Fund (see p. 27).

Employment effects

As a result of EnDev activities in 2022, 33,520 people were in jobs (2021: 31,899). 8,670 people worked in the production of cooking energy technologies and 1,832 people in respective sales and distribution chains. For solar systems the number of people having jobs along the distribution chain was 1,576.

During the operational phase of mini-grids, 5,864 people worked in operations and maintenance, administrative and managerial tasks. Temporary jobs that exist during the construction are not considered. Within enterprises that received access to energy it is estimated that as an indirect result of EnDev 15,578 part-time jobs exist. Employment effects of 2022 are presented in Table 2-4.

Table 2-4
Employment effects – people in jobs

	Direct			Indirect
	Production & Assembly	Distribution & Sales	Operations & Maintenance	MSME application of technologies
cooking energy	8,670	1,832		
solar lights		1,576		15,578
mini-grids			5,864	
Total	**33,520 people in jobs**			

2.4 Energising Climate: Combating climate change

Annual savings of CO_2 emissions show a continued growth. In 2022, 2.75 million t CO_2 were saved that can be attributed to EnDev. The overall CO_2 savings of EnDev since 2005 accumulate accordingly to 22.31 million t CO_2 by the end of 2022.

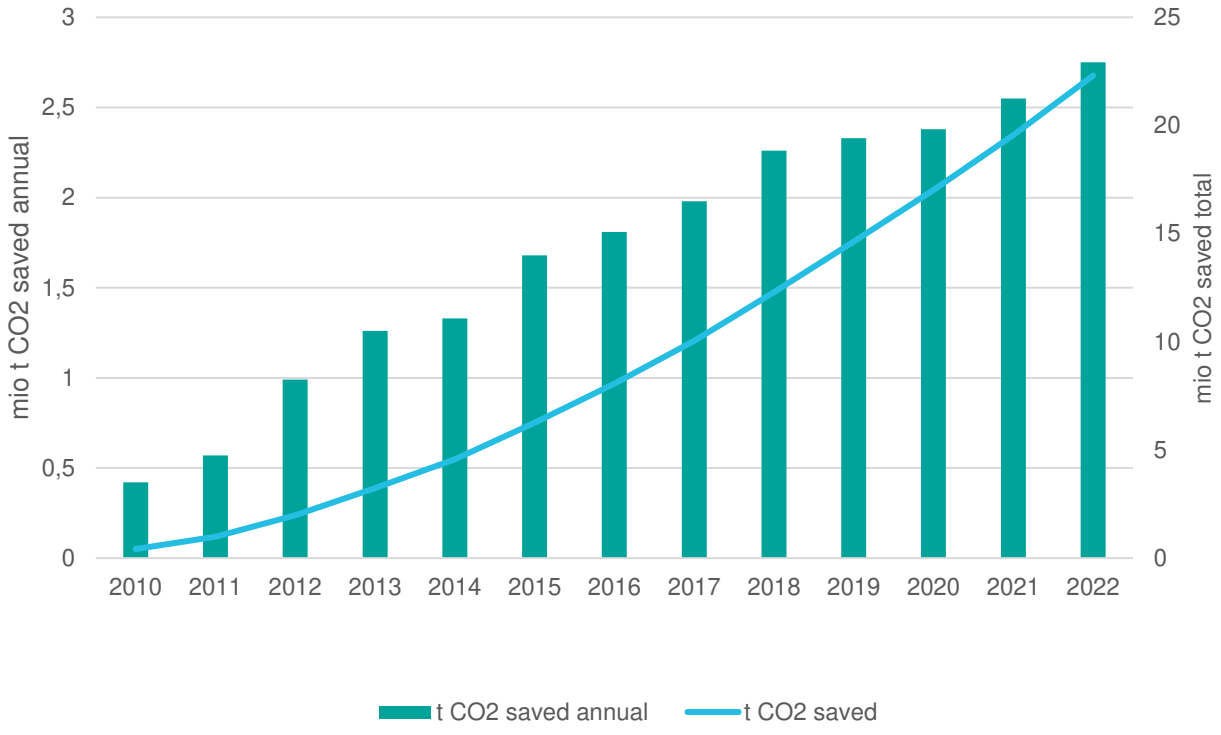
95% of the 1.4 million additional systems supplied in 2022 that are contributing to EnDev's CO_2 emission savings were achieved through cooking technologies, while the remaining 5% were achieved through photovoltaic systems of different capacities, ranging from small-sized preconfigured PV-systems up to larger sized Mini-Grids.

Regionally, a total of 53% and 47% of the additional systems contributing to the CO_2 emissions saved in 2022 can be attributed to East-Africa and West-Africa, respectively, which again shows a substantial focus shift on sub-Saharan Africa.

The share of the annual emissions reduction of ongoing projects is with 2.57 million t CO_2 saved per year at 93%. Based on this significant contribution by the main portfolio it is expected that the annual CO_2 savings will continue to further increase in upcoming years.

Besides the 1.4 million additional systems' CO_2 emission savings that can be attributed to EnDev, another 1.1 million systems were supported via CO_2 -certificates, predominantly by Gold Standard (GS) (1 million) and are therefore not included into EnDev's emission savings calculation.

Figure 2-15
CO_2 savings since 2005



3. Partnerships

In 2022, energy access continued to gain political momentum on a global level, with significant events such as the Sustainable Energy for All Forum, the Clean Cooking Forum, the Global Off-Grid Solar Forum and COP27 drawing attention to the core impact areas of EnDev. These forums were a chance for a diverse range of governmental, non-governmental and private sector actors to take the stage and offer insights on energy and climate initiatives. EnDev remains committed to engaging with both established political partners and emerging actors in advancing its goals in this area.

Partnerships for scale

In 2022, with support of the Dutch government, EnDev began rolling out its new, flagship demand-side subsidies (DSS) component. The objective of the component is to pilot innovative DSS mechanisms in four countries in sub-Saharan Africa (Niger, Uganda, Malawi, Liberia) to facilitate access to modern, reliable, and affordable energy services for low-income and displaced populations (and host communities) who are not currently reached by commercial markets. Critically, it is envisaged that each of these pilots will be handed over to, and scaled up by, government agencies and development finance institutions, in particular the World Bank. Throughout 2022, the World Bank's *Energy Sector Management Assistance Program* (ESMAP) continued to be closely involved in the DSS component design and rollout. These efforts are underpinned by EnDev's continued involvement as a core member of the *End-User Subsidy Lab*, founded in 2021 by the *Global Off-Grid Lighting Association* (GOGLA), ESMAP and *Africa Clean Energy* (ACE).

Complementary to the DSS component, a first-of-its-kind cooperation between EnDev and the World Bank was kicked-off in Tanzania in late 2022. Building on the earlier success of EnDev Tanzania's results-based financing (RBF) scheme for pico-PV systems, EnDev was requested to assist the Tanzanian Rural Energy Agency with the design and rollout of two new RBF facilities – one for off-grid solar systems and one for cooking solutions – as part of the World Bank-supported *Tanzania Rural Electrification Expansion Program* (TREEP). This cooperation signals a major milestone in EnDev's "partnerships for scale" agenda.

Finally, in late 2022, EnDev broke ground on a new partnership with the *Global Energy Alliance for People and Planet* (GEAPP) to implement a variety of productive use interventions in Malawi, thereby strengthening value chains in the sugar, dairy, rice and chili value chains. As a first-of-its-kind partnership for the programme, implemented jointly with *GET.invest*, EnDev will continue to strengthen cooperation with GEAPP and other Alliance members in the coming year.

Thematic cooperation

In 2022, EnDev strengthened partnerships with GOGLA and the *Clean Cooking Alliance* (CCA), the two leading industry associations for off-grid solar and clean cooking. In early 2022, EnDev countries contributed market information for GOGLA's semi-annual *Off-Grid Solar Market Report* – the most definitive market intelligence publication in the sector. This cooperation will continue for the foreseeable future.

EnDev was also a sponsor of the landmark *Clean Cooking Forum*, which was hosted in Accra, Ghana in October 2022. At the forum, the *Strengthening the Entrepreneurial Environment – Clean Cooking (SEE-CC)* (funded by the European Commission, Danida and The Netherlands) was launched successfully representing the associated projects *African Biodigestor Component* (ABC) and Higher Tier Cooking Component (HTCC). In a side-event to the forum, EnDev,

together with GET.invest, supported clean cooking companies with B2B matchmaking and a training called *Clean Cooking Finance Masterclass* in which nine companies participated. In addition, aa number of emerging relevant initiatives were presented, including the *RBF Accelerator,* the *Delivery Units Network (DUN)* and the *User Insights Lab*, each of which EnDev contributes to.

In 2022, EnDev reaffirmed its *Energising Climate* commitment through both continuing and new partnerships. EnDev (on behalf of GIZ's DeveloPPP programme) continued to serve as a member of the Steering Committee of the D-REC Initiative – a three-year, multi-stakeholder initiative designed to establish a platform for trading Distributed Renewable Energy Certificates – while also exploring new opportunities to engage (directly or indirectly) with voluntary carbon market actors in the future.

Together with GOGLA, EnDev engaged in a joint activity to address the problem of e-waste as a result of end-of-life products not being recycled. Through the Kenya Solar Waste Collective approach, supported by both the GOGLA and EnDev teams from Nairobi, a Producer Responsibility Organisation was established where the majority of major market players collaborate to address e-waste collection and recycling. The intention is to allow for similar approaches to be followed in neighbouring Uganda and Rwanda, after which other EnDev countries can follow.

Innovation fund

As part of EnDev's Learning and Innovation Agenda (ELIA), 2022 saw the launch of nine innovation pilot projects under a EUR 2 million **innovation fund** After an initial pitch event, nine projects were selected (out of 20 total submissions) on the themes of leave no-one behind, productive use of energy and data and digitalisation. The projects have been implemented over the course of the year by GIZ, SNV, Practical Action and Maeve in seven countries (Bangladesh, Kenya, Malawi, Nepal, Rwanda, Tanzania and Uganda).

Despite the individuality of each innovation project, there are some key takeaways that can be gleaned from the process:

- While implementing innovation projects in a short time frame can be challenging, the innovation funds provided a valuable resource for testing ideas and concepts that otherwise may not have been invested in using core funding.
- Special attention has been paid to showcasing the innovation projects approaches across country teams (i.a. during the EnDev Global Knowledge Exchange) and towards adoption of successful approaches in core programming.
- As innovation projects are testing new partnerships, supply chains and contexts, unforeseen developments took place, requiring more time for implementation than anticipated, especially in the start-up period.

These pilots generate substantial interest among EnDev implementers and the broader SDG 7 community.

In the spotlight:
Social Impact Incentives (SIINC) off-grid energy pilot

Country	Kenya
Objective	Pilot a scalable SIINC model for the off-grid energy sector in Sub-Saharan Africa
Target groups	Households and MSMEs
Project period	November 2019 – December 2022
Financed by	The Swiss Agency for Development and Cooperation (SDC)

Since 2013, EnDev has been successfully developing energy access markets through projects using results-based financing (RBF) mechanisms. Output-based financial incentives have helped companies address many of the common market barriers such as building up inventories and distribution networks. However, experience from the field also shows that – unless an RBF project design explicitly sets conditions to target pro-poor market segments – the private sector tends to address the market segment with the highest profit margin first, i.e., “low hanging fruit” customers.
While this might be acceptable for initial market development, RBF projects run the risk of leaving the demand of poor or otherwise underserved market segments unattended.

The SIINC (‘Social Impact Incentives’) approach takes the RBF approach to the next level. What is innovative about SIINC is its specific focus on *social outcomes* (i.e., enterprises are incentivised to enhance their positive impact on customers' lives), bringing together the financial sector, private enterprises and development cooperation.

SDC and EnDev hence embarked on the journey to pilot SIINC specifically for the off-grid energy sector in Sub-Saharan Africa. Overall, the project was able to prove the SIINC concept: Already during the one-year pilot project, it triggered companies to shift towards a deeper impact business model. In this context, the pilot established working processes and generated lessons learnt from the perspective of technical cooperation for expanding the use of SIINC across EnDev and other publicly funded energy access programmes. Key recommendations for scaling the approach include to choose simple, but relevant impact metrics from a pre-defined impact matrix for the business model at hand and to find an adequate pay-out schedule in the form of a staggered incentive model. A comprehensive lesson learnt report from the SIINC project will soon be published on the EnDev website.

4. LNOB and gender

EnDev's long-standing experience working with vulnerable populations has led to the development of a holistic “leave no one behind” (LNOB) approach in 2022. Integrated into the portfolio, LNOB allows EnDev to target at-risk communities with specific measures, drive progress at scale and elevate ambition levels. EnDev also advances gender equality and women's self-empowerment. Through its Gender Strategy, EnDev integrates gender-transformative and intersectional approaches across all countries.

EnDev’s LNOB approach

In 2022, EnDev further developed and institutionalised LNOB within its implementation structures. LNOB is a framework that represents the programme’s commitment to addressing discriminations, exclusions and inequalities of certain vulnerable groups through context-specific approaches and measurable results. The following groups are targeted by EnDev’s LNOB interventions:

1. **Refugees, internally displaced persons (IDPs), and host communities:** According to UNHCR, there are around 102.5 million people who were forcefully displaced in 2022, including 21.7 million refugees. Even though access to reliable and safe energy is a key development objective, the topic has not received sufficient global attention to date.
2. **Socio-economically disadvantaged women:** Generally, women continue to lag behind in energy access statistics. When they do have access, women tend to remain at lower tiers of service. In addition to gender-sensitivity and mainstreaming, EnDev fosters gender-transformative measures to address gender-related context-inherent inequalities that prevent women from participating at local markets.
3. **Poorest of the poor:** Energy access is crucial for poverty alleviation, economic growth and improved living standards. As such, it is imperative that the poorest of the poor gain access as a key driver of sustainable livelihoods.
4. **Other LNOB target groups:** This category includes (but is not limited to) people with disabilities, indigenous groups and ethnic minorities, which are also lagging behind in energy access due to their often marginalised status within societies.

EnDev’s gender ambition

EnDev has significantly increased its commitment to the promotion of gender equality as a means of achieving sustainable development. This includes recognising and valuing the contributions of women, ensuring their meaningful participation in decisions that affect their lives and their communities, and ensuring equitable benefits to both men and women. To further enhance its impact in this area, EnDev has prioritised two core processes during the reporting period:

Gender Strategy: EnDev finalised its Gender Strategy, which articulates the gender ambitions of the programme and provides a comprehensive framework to support its effective implementation. EnDev’s gender ambition is **to promote gender equality and women’s self-empowerment through expanding access to modern energy services for households, social institutions and**

micro-, small- and medium-sized enterprises in developing countries.

This will be achieved through the following impacts:

1. Poverty alleviation (through reduction in time and effort spent on domestic chores);
2. Economic development (through increased income via entrepreneurship and productive use of energy);
3. Improved health (through reduction in indoor air pollution and improved healthcare services); and
4. Improved education (through the provision of improved electricity and cooking services for educational institutions).

To facilitate the uptake of the EnDev Gender Strategy at country level, a comprehensive set of Operational Guidelines detailing the requirements and providing technical guidance for the design, implementation, monitoring and evaluation of activities was published.

Gender Action Plans: Three country projects (Ethiopia, Tanzania and Uganda), building on the gender analysis, pioneered Gender Action Plans in 2022 that translated into gender transformative project implementation and are now leading as role models and key change agents within the programme by developing and piloting new innovative approaches. So far this has resulted in the following:

- **EnDev Uganda:** Two large-scale improved cookstove (ICS) producers have been supported to improve the work environment for female workers (e.g. constructing female toilets and other facilities, employing at least 50% female staff across all production processes, etc.).
- **EnDev Tanzania:** Women have been supported in moving up the agricultural value chain and increasing their income.
- **EnDev Ethiopia:** A platform has been provided for peer-to-peer exchange for women in the male-dominated energy sector, in cooperation with the Ethiopian Women in Energy (EWiEn) association.

In Numbers: Gender in EnDev

- **14.3 million women and girls** gained access to energy
- **1.9 million women and 3.8 million young children** benefit from lower exposure to hazardous pollutants through the use of transitional cooking solutions
- **2,156 MSMEs** reached in 2022 were led by women. On average, **31% of all employees** in supported MSMEs were women
- **2,180 health centres** received access to energy, which also improves essential health services for women and children

Bolivia

Scents from the Amazon

Griselda Huallata is vice president of SHAN, a women's cooperative in the remote Tsimané community in Bolivia. The Tsimané are one of the 36 indigenous nations recognized by the Bolivian Constitution. They live in the Pilón Lajas Biosphere Reserve and Communal Lands, a protected area with over 400,000 hectares of rainforests – one of the most biodiverse regions on the planet.

Griselda and the other women aim to bring back ancestral knowledge and combine it with new percolation and extraction technologies to create unique Amazonian essential oils and handmade soaps. However, SHAN's lack of access to electricity and cooking energy was one of the main impediments to business development and growth. The severe environmental conditions, particularly high temperatures and high humidity caused SHAN's products to deteriorate. The aromas volatilized, the soaps melted and lost their shape.

To overcome this issue, EnDev's Women's Energy Fund (FEM) supported the women's cooperative and the Wildlife Conservation Society (WCS) to establish a new business plan for 2021. The FEM is one of EnDev's main instruments to empower women economically, providing support to women-led businesses to foster the Productive Use of Energy. Through the Fund, SHAN was able to purchase photovoltaic systems for lighting and cold chain storage. In addition, EnDev provided technical support to the cooperatives' members on the use, maintenance, and governance of the technology, thereby allowing the community to operate autonomously. Now, not only appliances for lighting and cooling are available, but also heating mantles for essential oil extractors and press machines for soaps. This means SHAN can utilize energy to diversify their products on offer, improve their incomes, and pursue further economic opportunities.

5. Report and accounts

In 2022, EnDev secured additional funds of EUR 63.23 million. This includes funding contributions from the core donors BMZ and DGIS, as well as earmarked funds from several other donors.

EnDev is looking back at a very successful year in 2022 in terms of securing additional funds. In 2022, EnDev has received additional funds in the amount of EUR 63,23 million (core funding of EUR 19.5 million (BMZ) and earmarked funding of EUR 43.73 million). The earmarked funding includes contributions by BMZ (EUR 10.0 million), by DGIS (EUR 19.0 million), by RVO (EUR 7.75 million) as well as by the EU-Delegations in Benin (EUR 4.0 million) and Senegal (EUR 3.0 million). Due to exchange rate fluctuations of payments received by DEZA, Norad and USAid and an underspending of the co-financing with KOFIH, the commission value was reduced in total by EUR 0.02 million.

EnDev's total available funds sum up to EUR 512.02 million of which EUR 502.64 million have been allocated. Expenditures in 2022 reached EUR 40.03 million which represents a slight increase compared to the annual average of the three previous years of EUR 38.35 million (2019-2021).

Total expenditures until the end of 2022 reached EUR 422.71 million. Thus, an allocated amount of EUR 79.93 million remains available, thereof EUR 26.83 million for planned core activities until 12/2023 and EUR 53.1 million for planned co-financing activities until the end of the respective co-financing contracts.

In addition, EnDev has signed further co-financing contracts amounting to EUR 11.46 million in December 2022. These earmarked funds are contributions by RVO (EUR 3.7 million), the EU-Delegation in Malawi (EUR 3.0 million), the Islandic Embassy in Malawi (EUR 1.0 million) and GEAPP Malawi (EUR 3.76 million). As only funding commissioned by BMZ until December 2022 is included in this report, the aforementioned funding arrangements are not yet included in the tables/figures of this chapter, because the corresponding commission for these funding arrangements was not yet issued by BMZ.

Table 5-1
Global budget and funding (in EUR)

Allocation of Total Budget	
Allocated to country projects based on Annual Operational Programming 2023	450,721,500
Allocated to programme management level	51,918,400
Total budget	502,639,900
Total available funds incl. BMZ commission from Dec 2022	512,020,733
Remaining funds	**9,380,833**

5.1 Funds

As of end 2022, BMZ had commissioned an amount of EUR 515 million. Figure 5-1 shows shares of funds by donor, including earmarked funds.

Table 5-2
Funds by donor (in EUR)

Donors	2020	2021	2022
Consultative Group			
BMZ	104,870,220	123,595,220	153,095,220
DEZA	13,530,000	21,930,000	22,379,190
DFAT	15,858,077	15,858,077	15,858,077
DGIS	131,879,138	131,879,138	150,879,138
FCDO RBF	50,216,000	50,216,000	50,216,000
Norad (MFA)	52,455,404	52,455,404	52,199,307
SIDA	12,774,794	12,774,794	12,774,794
Additional donors			
EU	23,020,014	23,020,014	30,020,014
FCDO Bangladesh	2,049,360	2,049,360	2,049,360
ICEIDA	715,000	715,000	715,000
IKEA Foundation	8,000,000	8,000,000	8,000,000
Irish Aid	3,944,943	3,944,943	3,944,943
KOFIH	908,000	908,000	684,000
RVO	1,531,773	1,531,773	9,281,773
USAID	2,952,000	2,952,000	2,967,140
Total	**424,704,723**	**451,829,723**	**515,063,956**

Figure 5-1
Funds by donor (in million EUR, in % of total funds)

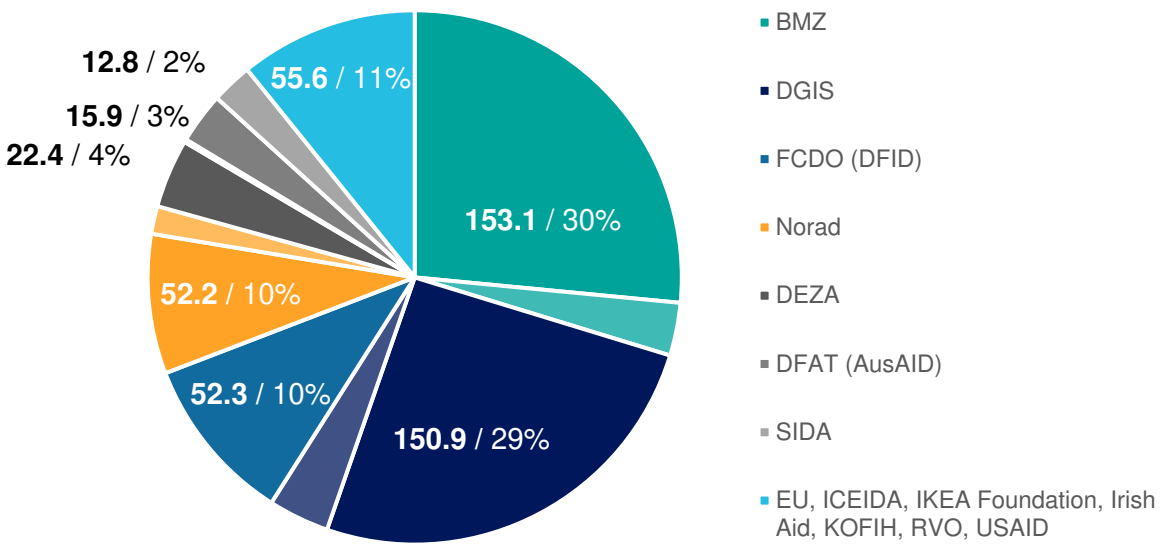


Table 5-3

Funds according to BMZ commissioning, available funds, expenditures, and income (in EUR)

Donors	funds according BMZ commission	Available funds[a)]	Expenditures	Income
Consultative Group				
BMZ	153,095,220	153,095,220	130,386,874	130,386,874
DEZA	22,379,190	22,465,628	16,660,392	18,732,296
DFAT	15,858,077	15,858,077	15,858,077	15,858,077
DGIS	150,879,138	150,879,138	119,408,096	123,658,737
FCDO RBF	50,216,000	47,004,973	42,710,025	42,054,979
Norad (MFA)	52,199,307	52,199,307	52,395,881[b)]	52,199,307
SIDA	12,774,794	12,774,794	12,864,310[b)]	12,774,794
Total Consultative Group funds	**457,401,726**	**454,277,137**	**390,283,655**	**395,665,064**
Additional donors				
EU	30,020,014	30,020,014	16,558,668	20,885,156
FCDO Bangladesh	2,049,360	2,049,360	2,038,672	2,049,360
GEAPP	0	0	0	2,822,467 [c)]
ICEIDA	715,000	715,000	719,417[b)]	715,000
IKEA Foundation	8,000,000	8,000,000	3,423,684	8,000,000
Irish Aid	3,944,943	3,944,943	4,045,658[b)]	3,947,475
KOFIH	684,000	684,000	704,404[b)]	684,000
RVO	9,281,773	9,281,773	2,472,707	4,794,273 [c)]
USAID	2,967,140	3,048,505	2,464,507	2,963,705
Total additional funds	**57,662,230**	**57,743,595**	**32,427,717**	**46,861,436**
Total [d)]	**515,063,956**	**512,020,733**	**422,711,371**	**442,526,500**

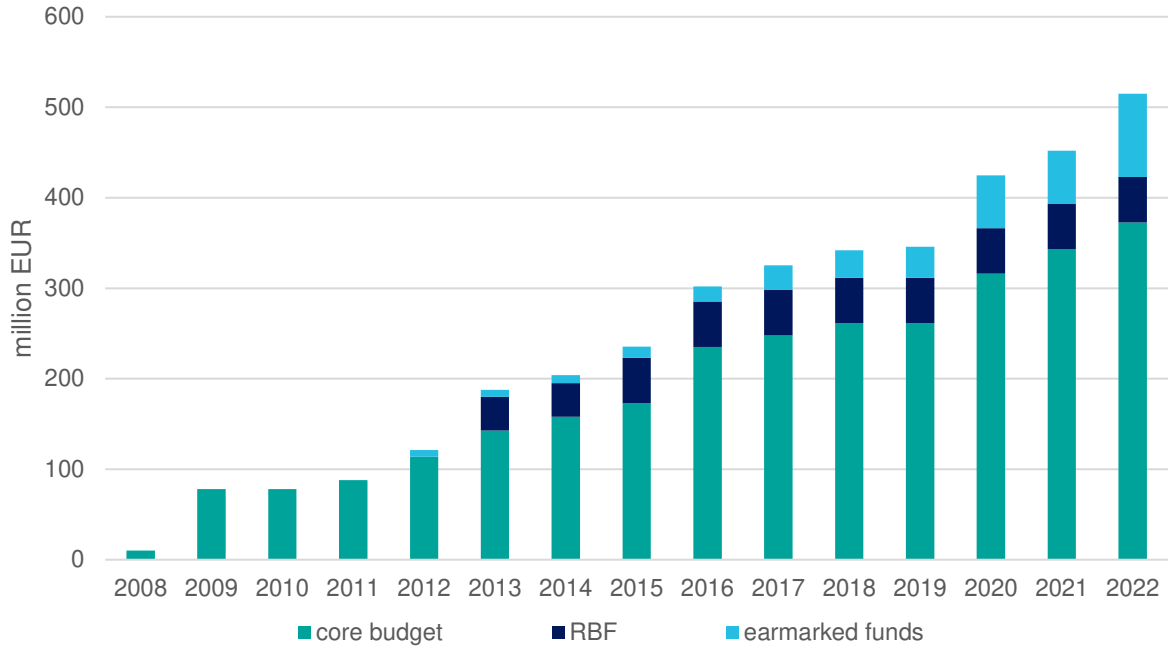
a) Due to contributions in foreign currencies (CHF, GBP, NOK, USD), an amount of EUR 3.04 million is reserved for the exposure to exchange rate fluctuations resulting in available funds of EUR 512.02 million in comparison to commissioned funds of EUR 515.06 million.

b) Expenditures to be corrected at the end of the project. Possible overspendings will be levelled and charged to the commissioning party.

c) Income includes prefinancing for the new earmarked contributions.

d) Differences due to rounding are possible.

Figure 5-2
Funds by type



During the last years earmarked funds from bilateral co-financing (e.g. ICEIDA, Irish Aid, KOFIH, RVO, USAID, EU, IKEA Foundation) became a significant part of the EnDev budget. Even donors of core funding increasingly earmark parts of their contributions (BMZ, DEZA, DGIS, Norad). In 2022, 70% of funds did not show an earmarking while 30% of funds were earmarked (10% RBF, 20% bilateral co-financings and soft earmarking for technologies and/or countries).

5.2 Expenditures and income by donor

Table 5-4
Expenditures by donor (in EUR)

	2009-2019	2020	2021	2022	Total [a]
BMZ	74,748,043	24,025,204	12,298,570	19,315,056	**130,386,874**
DEZA	10,621,931	768,917	5,049,968	219,577	**16,660,392**
DFAT	15,858,077	0	0	0	**15,858,077**
DGIS	100,915,271	28,851	11,431,022	7,032,951	**119,408,096**
FCDO RBF	34,110,107	9,035,868	400,849	-836,798	**42,710,025**
Norad (MFA)	34,251,686	9,392,573	2,470,041	6,281,581	**52,395,881**
SIDA	12,869,085	0	0	-4,775	**12,864,310**
EU	9,569,715	-131,384	2,967,150	4,153,186	**16,558,668**
FCDO Bangladesh	2,090,784	66	-4,588	-47,590	**2,038,672**
ICEIDA	3,716	104,542	387,078	224,080	**719,417**
IKEA Foundation	0	0	994,616	2,429,068	**3,423,684**
Irish Aid	3,841,812	165,663	-8,341	46,524	**4,045,658**
KOFIH	697,214	11,738	-4,834	286	**704,404**
RVO	1,456,745	84,428	-960	932,494	**2,472,707**
USAID	258,792	576,863	1,342,717	286,135	**2,464,507**
Total [a]	301,292,978	44,063,328	37,323,288	40,031,777	**422,711,371**

Table 5-5
Income by donor (in EUR)

	2009-2019	2020	2021	2022	Total [a]
BMZ	74,274,499	23,991,535	12,805,784	19,315,056	**130,386,874**
DEZA	12,122,870	1,856,321	2,776,235	1,976,871	**18,732,296**
DFAT	15,858,077	0	0	0	**15,858,077**
DGIS	100,658,737	7,000,000	7,000,000	9,000,000	**123,658,737**
FCDO RBF	37,561,049	5,464,956	0	-971,025	**42,054,979**
Norad (MFA)	38,684,389	3,678,430	4,970,450	4,866,038	**52,199,307**
SIDA	12,774,794	0	0	0	**12,774,794**
EU	11,360,614	3,020,260	0	6,504,281	**20,885,156**
FCDO Bangladesh	2,049,360	0	0	0	**2,049,360**
GEAPP	**0**	**0**	0	2,822,467	**2,822,467**
ICEIDA	445,000	0	270,000	0	**715,000**
IKEA Foundation	0	2,587,766	2,872,188	2,540,046	**8,000,000**
Irish Aid	3,947,475	0	0	0	**3,947,475**
KOFIH	684,000	0	0	0	**684,000**
RVO	1,700,000	-168,227	2,009,000	1,253,500	**4,794,273**
USAID	1,261,272	1,334,671	367,762	0	**2,963,705**
Total [a]	313,382,135	48,765,712	33,071,420	47,307,234	**442,526,500**

a) Differences due to rounding are possible.

Table 5-6

Funding and expenditure by type or country (in EUR)

EnDev	Funding	Expenditures [a)]
EnDev programme total available funds	**512,020,733**	**422,711,371**
Total funding according to Operational Programming Report 2023	**502,639,900**	
Remaining available funds	**9,380,833**	
Programme management and cross-cutting activities	**Funding**	**Expenditures [a)]**
Total	**51,918,400**	**41,476,146**
Management, monitoring, backstopping, learning, etc.	35,043,000	31,078,920
Globally managed country activities (SCCIF, SIINC, IKEA, etc.)	13,045,000	6,470,227
Globally managed extra activities (refugees, RBF preps, etc.)	3,830,400	3,926,999
Country activities	**Funding**	**Expenditures [a)]**
Total	**368,964,800**	**300,792,878**
Bangladesh	27,952,600	26,452,551
Benin	22,149,500	20,427,225
Bolivia	20,192,000	18,904,807
Burundi (from 01/2021)	666,000	388,994
Cambodia (with Laos)	7,226,900	5,849,751
DRC	1,681,000	1,137,391
Ethiopia	48,130,000	41,947,004
Kenya	35,149,900	27,057,839
Madagascar	1,968,000	1,588,654
Malawi	16,356,400	10,786,657
Mali	16,394,000	12,944,023
Mozambique	38,399,800	31,044,897
Nepal	11,299,100	9,799,081
Niger	4,581,500	50,350
Rwanda (incl. Burundi until 12/2020)	31,075,600	26,263,143
Senegal	30,171,000	23,810,959
Sierra Leone (with Liberia and Guinea)	18,402,000	12,567,982
Tanzania	13,380,500	12,387,432
Uganda	23,789,000	17,384,136
Completed activities	**Funding**	**Expenditures [a)]**
Total	**81,756,700**	**80,442,346**
Burkina Faso	6,970,000	7,016,450
Cambodia (until 11/2019)	3,150,000	3,058,838
Central America (Guatemala, Honduras, Nicaragua)	17,640,000	17,755,838
Ghana	3,845,000	3,678,908
Indonesia	16,231,000	16,414,925
Mongolia	495,000	495,046
Peru	17,188,900	17,120,723
Vietnam	4,427,000	4,186,412
RBF 3: Mozambique, Rwanda, Uganda	2,906,400	1,833,224
RBF 3: Bangladesh, Kenya, Rwanda, Tanzania, Uganda	5,528,700	5,506,020
RBF 3: Kenya, Tanzania, Uganda	1,574,700	1,575,947
ProCEAO (EU West Africa: Burkina Faso, Benin, Senegal)	1,800,000	1,800,014

[a)] 2009-2022: Differences due to rounding are possible

Mali

Meeting energy needs in N’Tjiba

N’Tjiba is a rural commune in the Koulikoro region of south-western Mali. Most of the 23,617 inhabitants live from agriculture, livestock and trade. As far as rural electrification in Mali is concerned, there are numerous challenges and difficulties: this was no different in N’Tjiba.

Things changed in 2015 when the municipality built a 50 KWp hybrid power plant with the support of EnDev. While the operation is delegated to a private operator, the municipality ensures the management via a monitoring committee composed of different stakeholders. For more than seven years now, the power plant continues to be the main source of sustainable access to modern energy in the municipality: for 12 hours a day, electricity is available for more than 1400 people, 15 social institutions and 30 companies at an affordable price. This has a considerable impact on the daily life of the municipality: new jobs could reduce the rural exodus of young people and the quality of services in the town hall or health centres could be improved.

The mayor of the commune of N’Tjiba, Mr. Sékou Diallo, explains: “Electricity is the engine of development. Our power plant is proof of that. We note with joy that the current level of development in the municipality is not the same as before the power plant was established.”

Annexes

A. Country overview

Table A-1
Ongoing country and regional projects

Country	Lead political partner	Project duration		Funding (in EUR 1,000)	Planned outcomes on HH level in persons[1]
		start	end		
Bangladesh	Bangladesh Ministry of Power, Energy and Mineral Resources	06/09	**12/23**	**27,953**	3,514,000
Benin	Ministry of Energy	10/09	**12/23**	**22,150**	795,000
Bolivia	Vice-Ministry of Electricity and Alternative Energy (VMEEA) of the Ministry of Energy	10/09	**12/23**	**20,192**	608,000
Burundi	Suspended; focus on local private sector	01/21	**12/23**	**0,666**	79,000
Cambodia (with Laos)	Cambodia: to be determined Laos: Ministry of Science and Technology (MoST)	03/15	**12/23**	**7,227**	176,000
DRC	Ministère de la Coopération Internationale, Intégration Régionale et Francophonie	12/19	**12/23**	**1,681**	99,000
Ethiopia	Ministry of Water and Energy (MoWE)	01/10	**12/23**	**48,130**	2,549,000
Kenya	Ministry of Energy	04/09	**12/23**	**35,150**	4,297,000

[1] Indicative target forecasts are not adjusted to the extended project duration. Indicative targets span a time horizon until end of 2023 and 2024 depending on the former categorization as medium-/long-term involvement countries and are not broken down to mid-term (12/2023) targets.

Country	Lead political partner	Project duration		Funding (in EUR 1,000)	Planned outcomes on HH level in persons[2]
		start	end		
Madagascar	Ministère de l'Energie et des Hydrocarbures	12/12	**12/23**	**1,968**	174,000
Malawi	Ministry of Energy	12/12	**12/23**	**16,356**	1,764,000
Mali	Ministère des Mines, de l'Energie et de l'Eau du Mali	04/09	**12/23**	**16,394**	310,000
Mozambique	Ministry of Mineral Resources and Energy	10/09	**12/23**	**38,400**	454,000
Nepal	Ministry of Energy, Water Resources and Irrigation	05/09	**12/23**	**11,299**	531,000
Niger[3]	To be determined	07/22	**12/23**	**4,582**	tbd
Rwanda	Ministry of Infrastructure (MININFRA)	10/09	**12/23**	**31,076**	460,000
Senegal	Ministry of Petroleum and Energy	04/09	**12/23**	**30,171**	1,404,000
Sierra Leone (with LR and GN)	Sierra Leone: Ministry of Energy; Liberia: Ministry of Mines and Energy; Guinea: Ministère de l´Energie, de l´Hydraulyque et des Hydrocarbures	05/12	**12/23**	**18,402**	140,000
Tanzania	Ministry of Energy	12/12	**12/23**	**13,381**	1,471,000
Uganda	Ministry of Energy and Mineral Development (MEMD)	04/09	**12/23**	**23,789**	1,372,000

[2] Indicative target forecasts are not adjusted to the extended project duration. Indicative targets span a time horizon until end of 2023 and 2024 depending on the former categorization as medium-/long-term involvement countries and are not broken down to mid-term (12/2023) targets.
[3] Interventions in Niger are under preparation and consultations with potential partners are ongoing. Indicative future targets will be included in the upcoming programming cycle.

Table A-2
Management and thematic activities

Topic and/or country		Duration		Funding (in EUR 1,000)
		start	end	
Global level	Management, monitoring, backstopping, learning, etc.	01/09	**12/23**	35,044
Global level	Globally managed country activities (SCCIF, SIINC, IKEA[4], DSS-management at HQ-level, etc.)	08/18	**12/23**	13,045

4 Lead political partners for IKEA-funded activities at country are: Ethiopia: Ministry of Water and Energy (MoWE); Kenya: Ministry of Energy; Uganda: Ministry of Energy and Mineral Development (MEMD). The lead political partners for SCCIF and SIINC in Kenya and Uganda are the same ministries as listed for IKEA-Foundation in Kenya and Uganda.

B. Overview of results

Table B-1 and Table B-2 provide an overview of the main quantitative results presented in this report and the results achieved at the end of 2021.

Table B-1
Overview of results

		Target achievement in 2021	Additional in 2022	Total in 2022
People with access [mio]	People with access	25.8	2.8	28.7
	People with access to thermal energy	19.0	2.5	21.5
	People with access to electrical energy	6.8	316,000	7.1
	Women with reduced exposure to IAP	2.0		
	Children with reduced exposure to IAP	4.0		
Social Institutions	SI with access	30,900	648	31,500
	Schools	18,660	310	18,970
	Health centres	2,135	45	2,180
MSMEs	MSMEs with access	81,700	8,100	89,800
Value for money	Cost efficiency thermal energy	9.3	-	9.3
	Cost efficiency electrical energy	32.9	-	34.3
	Cost efficiency combined	15.8	-	16.1

Table B-2
Climate and employment results

		only 2021	only 2022
Employment Effects[7]	People with jobs in cooking energy technologies production	8,617	8,670
	People with jobs in cooking energy technology distribution	2,254	1,832
	People with jobs in solar system distribution	1,523	1,576
	People with jobs in mini-grid operation	5,544	5,864
	People with jobs in SME	13,960	15,578
	Total people with jobs	31,899	33,520
Climate [in mio t]	Annual t CO_2 savings all technologies	2.55	2.75
	t CO_2 saved total	19.5	22.3
	Annual t CO_2 savings ongoing projects	2.37	2.57

[7] Employment effects are reported as „people with employment". Until 2019 full-time-equivalents were used. For details please see chapter 2.3.

C. Measuring results: EnDev's monitoring and evaluation (M&E) system

EnDev aims at developing local markets in over 20 countries and reaching millions of people by tackling energy poverty with a market-based approach putting the focus on consumers' needs, empowering MSMEs in their capacities and businesses, and supporting national governments to create an enabling environment for demand and supply in sustainable energy. To measure respective quantifiable and increasingly also qualitative results, EnDev performs standardised annual monitoring procedures and frequent evaluations following ambitious, elaborated, yet rigid methodologies.

Approach and ambition

EnDev's stringent focus on results is supported by a robust and reliable monitoring and evaluation (M&E) system based on but not limited to energy access data on individual beneficiary group level.

Data collections encompass several aspects of market development (demand and supply side): e.g., sales figures, technical features of sold products or installed systems including CO_2-emission-saving relevant data, employment effects in the energy provision value chain, information on selected energy companies as well as data on specific target groups (e.g., vulnerable groups, women), business plans, innovation, and framework conditions.

EnDev's ambition on measuring results has always been to quantify results, improve methodologies aligned to international debates and to further increase efficiency and transparency whilst ensuring robustness and accuracy. For example, methodologies are aligned to international standards and new developments as in the case of CO_2-emission-saving calculations (e.g., UNFCCC). In addition, in 2022, EnDev initiated a thorough digitalisation process preparing the ground for a fully web-based Online Data Management (ODM) platform covering the whole monitoring system to further improve efficiency of processes, increase transparency of methodologies and flexibility of data analysis.

Monitoring

Detailed results data is collected annually in the field (EnDev projects) via the new online platform, compiled and aggregated on EnDev programme level and reported according to donor requirements. In essence, EnDev's monitoring encompasses four elements:

(1) Data collection

With the energy access finding its way to the target groups, diligent documentation of data starts. Each technology, product or service is captured (i.e., solar systems, cookstoves or mini-grid connections) and complemented with key data such as geographic location, target group and implementing partner.

(2) Data verification

As a first level of quality assurance, paper trail data sets are assessed for completeness, accuracy, and plausibility; phone and field verification ensure that the new or improved energy access exists, corresponds to the reported data sets and is being used by the beneficiaries.

(3) Data aggregation

All data sets from country projects are submitted to the centralized annual monitoring process and undergo a second-level assessment focussing on completeness and consistency. Only now data sets are fit to be accepted for global reporting.

(4) Data analysis

EnDev stands for a robust and conservative monitoring approach. Global data undergoes a final step that takes into account three monitoring factors: attribution, additionality, and sustainability. This ensures that reported achievements can be directly linked to the activities implemented, would not have happened without EnDev's support and are long-lasting.

Monitoring factors

EnDev's monitoring rationale has, from the beginning, been based on reporting outcomes that aim to reflect the reality on the ground by looking at the number of beneficiaries provided with sustainable energy access rather than artificially accumulating gross sales data. The idea is to consider contextual settings and development trends in a systematic and quantifiable manner which are usually addressed in a narrative manner in development cooperation.

Following the programme's long-standing experience, reflecting on international literature and in line with the above-mentioned continuous improvement of methodologies, EnDev has further streamlined the so-called monitoring factors. These form the basis to translate the reality on the ground into robust results data and cover three key aspects: attribution, additionality, and sustainability. Building on official development statistics for partner countries default values have been defined for specific technology / access-level and have been externally validated – these can be challenged by project teams with high-quality studies. Thereby, a flexible and ever learning system can be ensured.

(1) Attribution

Attribution represents an agreement on how different donors share the ownership of the results amongst them. It is defined as the ratio of end users who gained access to energy due to EnDev's and / or other programme's direct and in some cases also indirect support. This factor entails, for example, an assessment of the share of final beneficiaries provided with access to energy that can be directly attributed to EnDev (in relation to other donor-funded support).

(2) Additionality

Additionality represents a prerequisite for EnDev's action: the effects of EnDev's support to energy access markets must be additional. It is defined as the ratio of end users that would not have gained a similar or better access to energy five years after first use of their energy product / connection. This factor entails, for example, an assessment of the share of final beneficiaries who already had access to energy or would have accessed energy as well in the absence of the programme.

(3) Sustainability

Sustainability represents the objective to support sustainable energy access. The factor is defined as the ratio of end users that still have the same or better access to energy five years after first use of their energy access product or connection gained with support

from EnDev. This factor entails, for example, an assessment of the share of final beneficiaries likely to maintain access to energy.

Evaluation

As a part of its standard procedure and for learning and accountability purposes, EnDev has engaged an independent evaluation consortium consisting of PWC, Vrije Universiteit Amsterdam, and SEO Economics to conduct a *real-time evaluation* of the EnDev programme. One of the objectives is to evaluate the EnDev programme during implementation from 2021 until 2023 according to the OECD-DAC criteria and additionality. Furthermore, the evaluation includes a reflection on the programme's fitness for purpose in relation to its ambitions. Finally, the findings and recommendations aim at strategic reflections and possible refinements of the programme's strategy and implementation. In 2022, four country case studies were undertaken to provide insights in performance, impact, and sustainability of selected EnDev interventions across technologies and geographies. In Uganda and Tanzania, the improved cookstove component was the subject of evaluation, in Mozambique the off grid solar component and in Nepal the eCooking component. Insights and recommendations were shared in two learning sessions with the project teams and will be continued in 2023 with the other case studies.

Furthermore, EnDev conducts external evaluations for the *phase out countries* (POC). This assignment includes five exit-studies (assessments undertaken within six months of closing the project) and six ex-post studies (assessments undertaken within two years after closure of the project). In 2022, four studies were completed: exit studies in Vietnam and Cambodia, and ex-post studies in Peru and Central America. Ex-post studies in Burkina Faso and Ghana were started. To strengthen cross learning within the EnDev community on similar technologies and approaches, a *cross-country meta-analysis study* based on the POC studies is being conducted, looking at the overarching insights and providing recommendations towards further improving the sustainability of impact of EnDev interventions on market development.

D. Country project status

D.1 Ongoing projects

- Bangladesh
- Benin
- Bolivia
- Burundi
- Cambodia (with Laos)
- DRC
- Ethiopia
- Kenya
- Madagascar
- Malawi
- Mali
- Mozambique
- Nepal
- Rwanda
- Senegal
- Sierra Leone (with Guinea and Liberia)
- Tanzania
- Uganda

Country sheet legend

Kindly note, that the project targets presented within the country sheets reflect the target of EnDev core (cf. Annual Planning 2021 Update), while project results may include results of co-financing projects within a country.

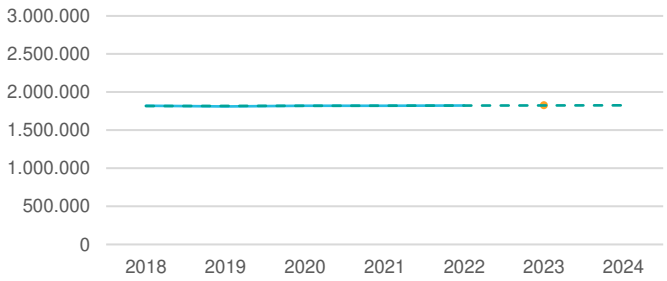
Bangladesh

Country facts	
Population	169.4 million
Human Development Index	129 / Total (0.661)
UN Classification	LDC
Access clean cooking	25%
Access electricity	96 %

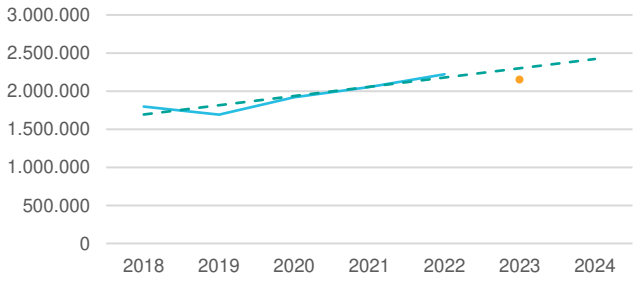
Project facts	
Project period	06.2009-12.2023
Budget	EUR 27,953,000
Core funding incl. RBF	EUR 25,903,241
Earmarked	EUR 2,049,360
Average annual turnover	EUR 583,249
Implementing Organisation	GIZ, CLASP, PA
Lead political partner	Bangladesh Ministry of Power, Energy and Mineral Resources

Target achievement	Targets	Achieved
HH Access Electricity	1,823,553	1,823,585
HH Access Cooking	2,146,367	2,221,343
SI Access	969	970
PUE Access	26,271	22,237

HH Access Electricity



HH Access Cooking



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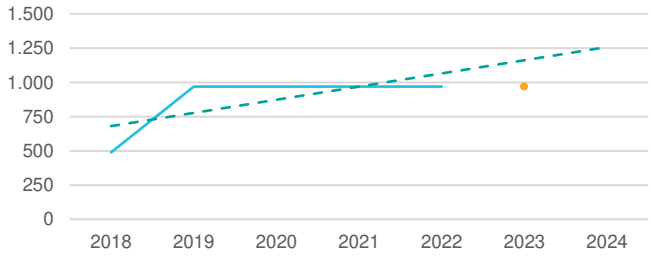

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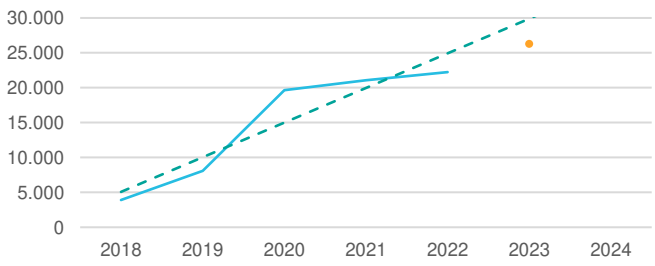


Bangladesh: eCooking – the real change

Background information
EnDev Bangladesh supports the provision of efficient and clean cooking technology as well as the productive use of solar energy. The programme currently focuses on three main areas: 1) market development for electric cooking ("e-cooking") appliances, 2) support for biomass-based improved cookstoves (ICS), including policy support for the sector, and 3) demonstration of business cases for solar battery charging stations for electric rickshaws. The year 2022 was marked by a gradual return to "normality" after the Covid-19 pandemic and improved implementation of activities planned for the current programming cycle.

Project progress during monitoring period
The dissemination of ICS with chimneys – known locally as "Bondhu Chula" – was continued in cooperation with the Bangladesh Bondhu Foundation. Following the COVID-19 pandemic, the number of installed stoves has substantially increased. During the monitoring period over 6,600 productive use ICS were installed. In addition, EnDev supported the **"Bondhu Chula Doctor" program**, which trained over 1,000 women to become qualified maintenance and service providers, thereby creating job opportunities and improved livelihoods for impoverished rural women.

With the objective to develop the **e-cooking** appliance market in Bangladesh, EnDev initiated an RBF scheme to incentivize manufacturers and importers to sell over 30,000 units. EnDev partnered with Walton and ATEC, two major manufacturers and importers in Bangladesh, to promote sales of rice cookers, induction stoves, and infrared stoves.

In collaboration with Practical Action, a **behaviour change campaign** has been launched to create consumer awareness and demand for e-cooking appliances, with the goal to reach 25,000 households. EnDev also partnered with CLASP to develop **standard & labelling** guidelines for e-cooking appliances in coordination with the relevant government authorities.

In 2022, EnDev formulated business models for solar battery charging. Now the project is preparing to launch a pilot of a **solar-powered E-rickshaw charging** station that will incorporate best practices for charging and comply with national guidelines for electric vehicle charging.

E-cooking makes life easier for a peri urban family

Murshida Begum lives in Lokpur, a small peri urban area of Khulna city. Murshida and her family had always cooked meals over a traditional wood-burning stove. One day, her daughter brought her a brand-new e-cooker from WALTON plaza. At first Murshida was hesitant to use the new appliance, as she had never seen anything like it before and was unaware of how it worked. But her daughter, who had recently married in the city and is more familiar with modern technologies, assured her that it is easy to use and much safer than her old stove. With her daughter's encouragement, Murshida Begum decided to give the e-cooker a try. To her surprise, she found that it was incredibly easy to use and much more convenient than her old stove. She could cook her meals in a fraction of the time, and the more evenly distributed heat improved the quality of her cooking. Murshida was so pleased with her new e-cooker that she began to recommend it to her friends and neighbors, many of whom were amazed at how quickly, cleanly, and efficiently it cooks and decided to purchase one for themselves. Thanks to the e-cooker, Murshida can spend less time cooking and less effort procuring the fuel supply. She is grateful to her daughter for the introduction and is happy to share the benefits of it with her community. She added, "The e-cooker has made cooking and my life much easier".

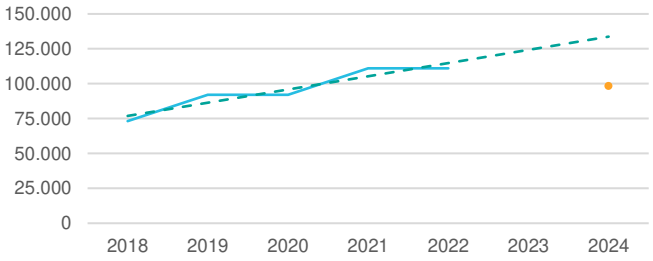
Benin

Country facts	
Population	13 million
Human Development Index	166 / Total (0.525)
UN Classification	LDC
Access clean cooking	4 %
Access electricity	41 %

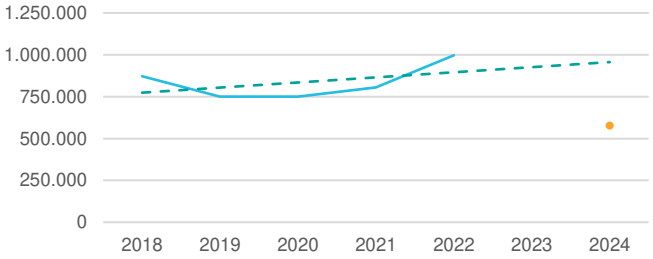
Project facts	
Project period	10.2009-12.2023
Budget	EUR 22,150,000
Core funding incl. RBF	EUR 22,149,500
Earmarked	-
Average annual turnover	EUR 1,710,128
Implementing Organisation	GIZ
Lead political partner	Ministry of Energy

Target achievement	Targets	Achieved
H Access Electricity	98,142	111,010
HH Access Cooking	574,665	997,071
SI Access	257	268
PU Access	1471	1,408

HH Access Electricity



HH Access Cooking



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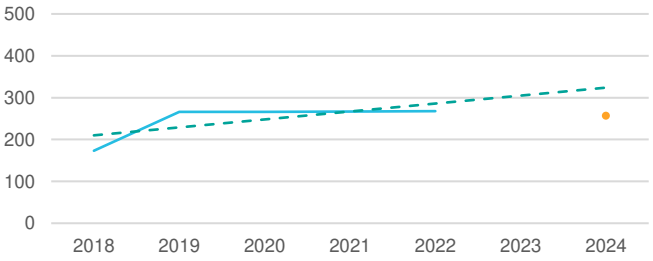

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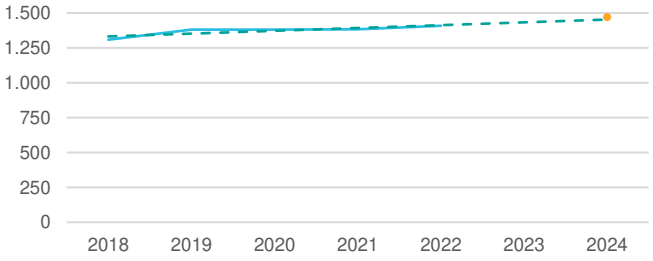


Benin: "Thanks to my solar lamp, I can now keep my shop open at night without worrying about additional costs"

Background information
EnDev Benin has been supporting the improved cookstove (ICS) market since 2009 through technical assistance for producers and distributors. The current approach (which started in 2021) focuses on professionalisation, larger production and wider distribution networks for the cooking sector to support a faster sustainable market growth.

In 2014, EnDev Benin started its activities in the solar sector and facilitated the development of the market through result-based financing (RBF) incentives and capacity building for market actors which are continued by the programme to this day. Since 2021, the support to the solar PV sector focuses on quality assurance and strengthening supply chains in rural areas in order to reinforce consumer trust in the quality of products and expand to new niches.

Thanks to additional co-financing from the European Union for the period 2022 to 2025, EnDev Benin can expand its support for household stoves and solar products, focusing on clean cooking innovations and the certification of solar companies.

"Upon request of the Ministry of Energy, the programme is supporting the development of a national strategy for solar PV e-waste management"

Project progress during monitoring period
Solar Energy Component: In 2022, the solar component focused on accelerating the consolidation of the sector to improve efficiency and effectiveness. Notably, EnDev Benin initiated a financial collaboration with the Beninese Agency for Rural Electrification and Energy Efficiency (ABERME) with the objective of transferring the RBF mechanism and awareness raising activities currently implemented by EnDev to this agency. In parallel, a diagnostic study was carried out to determine the key support needs of solar companies in preparation of targeted trainings.
Upon request of the Ministry of Energy, the programme is also supporting the development of a national strategy for solar PV e-waste management. Studies conducted with the support from the Öko-Institut revealed the dominance of improper e-waste treatment in the informal sector despite growing volumes of PV imports and great need for e-waste management. Next, EnDev will coordinate the design of the national strategy of solar PV e-waste and implement pilot activities to test and improve the practicability of the strategy.

Cooking Component: On the supply side EnDev Benin is focusing on the introduction of private sector companies from adjacent sectors (i.e. metal works and brick manufacturing) to accelerate the increase in production capacity and the professionalisation of the ICS sector. Further EnDev Benin has provided continued support to stove producing cooperatives, including monitoring and capacity building, to support them in managing their organisations more effectively. Financial incentives were provided to enterprises to promote stoves across all tiers. A grant was made available to a local association active in the central region to expand the production and commercialisation of quality ICS to the underserved in the area. On the demand side EnDev also organised communication and marketing activities to stimulate demand, which supported increased sales.

A bright future for rural shop owners
Mrs Aklassa Judith, a shop owner in a village of Savalou, central Benin, faced many difficulties trying to electrify her shop. She first used a generator resulting in high fuel costs and later an informal and unreliable grid connection leading to elevated electricity bills. However, since December 2021, these challenges have been resolved with the installation of a solar lamp by a solar company that benefits from technical and financial support from EnDev Benin. "Thanks to my solar lamp, I can now keep my shop open at night without worrying about additional costs." Mrs. Aklassa Judith affirms. She was able to reinvest these savings into her business, increase her income and improve her standard of living

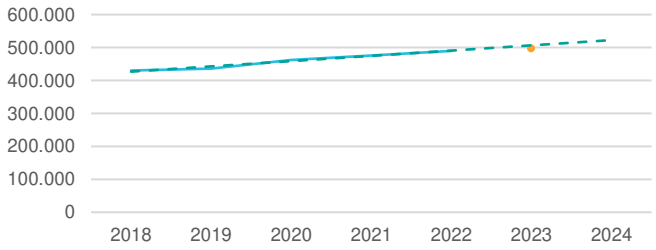
Bolivia

Country facts	
Population	11.7 million
Human Development Index	158 / Total (0.72)
UN Classification	-
Access clean cooking	86%
Access electricity	98%

Project facts	
Project period	06.2009-12.2023
Budget	EUR 20,192,000
Core funding incl. RBF	EUR 20,192,000
Earmarked	-
Average annual turnover	EUR 941,459
Implementing Organisation	GIZ
Lead political partner	Vice-Ministry of Electricity and Alternative Energy (VMEEA) of the Ministry of Energy

Target achievement		
	Targets	Achieved
HH Access Electricity	497,059	489,747
HH Access Cooking	289,680	289,837
SI Access	7,637	7,644
PU Access	20,123	17,605

HH Access Electricity



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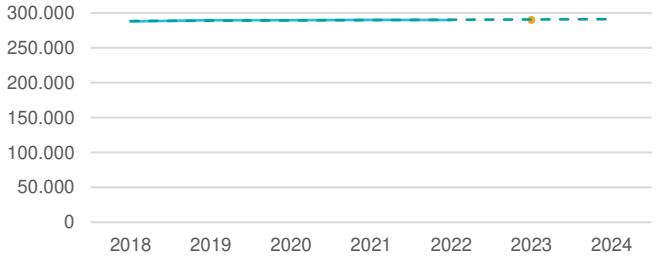

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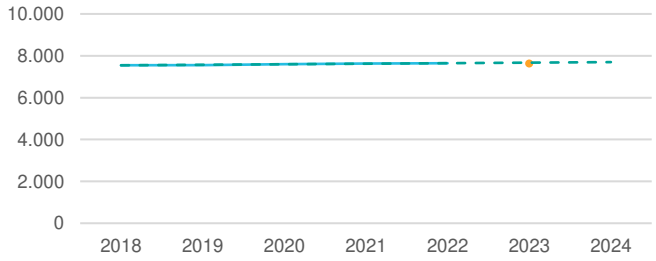

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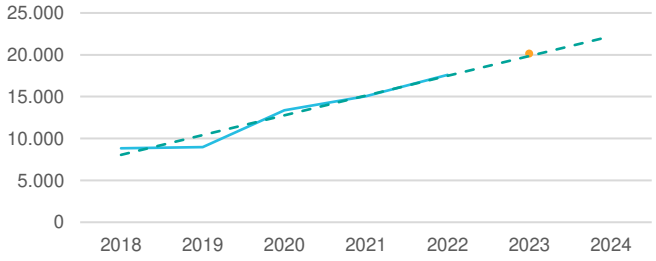


Bolivia: “Financial sector needs to design new loan mechanisms for renewables”.

Background information
Bolivia’s tense socio-political environment is intensifying: frequent road blockades and strikes in important regions, growing disputes within the governing political party (MAS), and an economic context that is showing signs of instability, provide an overall delicate Country outlook.
Despite this context, EnDev Bolivia achieved planned targets on its three main components: (1) grid densification, (2) market development for solar products, and (3) promoting Productive Use of Energy (PUE) by strengthening rural productive organizations in production, harvesting, efficiency and income generation.

Collaboration with Practical Action (PA) as an implementing partner for PUE, expanded EnDev’s geographical reach (additional areas in the Amazon and Altiplano regions) and support for specific value chains (cacao, coffee, quinoa, cassava, apiculture, among others). It benefited over 1,700 producers in 2022, amounting to more than 4,200 producers since 2020. EnDev’s Women Energy Fund (FEM) will be handed over to PA during 2023.

Project progress during monitoring period
In the PUE component, special emphasis was put on supporting women and female producers to improve their income generating capacities. Particularly relevant results were achieved within FEM, which kickstarted in 2021 but delivered most of its results in 2022. So far, 25 women-led productive organizations accessed PUE technologies and specialized advisement, benefiting 1,600 producers.

As part of the FEM, a two-day training workshop was initiated for women from four productive associations, providing tailor-made trainings to develop and strengthen their capacities on business management (marketing, sales, cost accounting, technology maintenance, among other topics).

Manuals for trainers and the trainees were developed after this first experience and will be used for workshops in 2023.

EnDev is also collaborating with the Inter-American Development Bank (IDB) and the Vice-Ministry of Electricity and Alternative Energies, to advance in rural electrification goals. Data on new connections achieved through EnDev support in their target areas are being shared with IDB to help improve their mapping and planning for subsequent years.

EnDev Solar national Event
In September, EnDev organized Bolivia’s first national thematic solar event: a workshop-fair named «EnDev Solar». Aiming to activate and promote the solar market in rural areas, the workshop-fair provided a formal space where the demand side (community leaders, NGOs, public sector representatives, and interested individuals), private suppliers (medium, small and micro) and the financial sector could exchange knowledge and information on needs, barriers and potentials of solar solutions. During the workshop session, the participants were able to interact and exchange knowledge and experiences, as this was the first event of its kind in Bolivia.

In the fair section, suppliers presented the variety of solar solutions available, and fair visitors could see, touch, and ask about prices, benefits, characteristics, and other aspects of interest. Financial institutions were also able to present their loan products to the supply and demand side, as well as to reduce doubts about conditionalities to access them.

EnDev received great feedback from participants and was requested to replicate this event in future. As a result, it will be replicated in 2023, with an expanded focus also on PUE technologies and suppliers.

Burundi

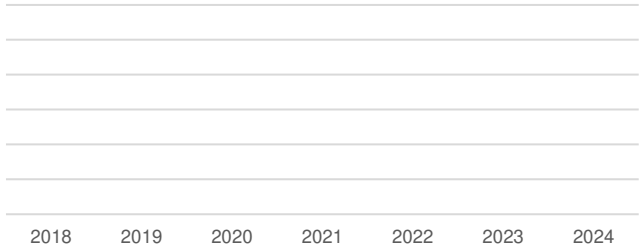
Country facts	
Population	12.55 million
Human Development Index	187 / Total (0.426)
UN Classification	LDC/ LLDC
Access clean cooking	0%
Access electricity	12%

Project facts	
Project period	01.2021-06.2023
Budget	EUR 666,000
Core funding incl. RBF	EUR 666,000
Earmarked	-
Average annual turnover	EUR 129,665
Implementing Organisation	AVSI
Lead political partner	focus on local private sector

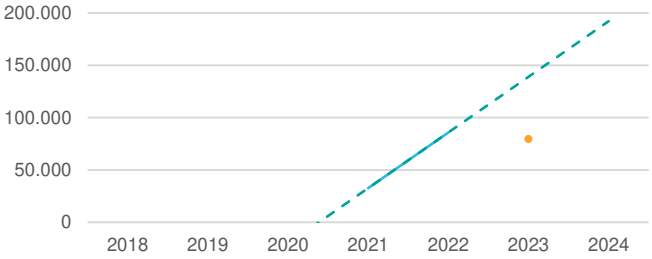
Target achievement*

	Targets	Achieved
HH Access Electricity	-	-
HH Access Cooking	79,131	85,733
SI Access	-	-
PU Access	-	-

HH Access Electricity



HH Access Cooking



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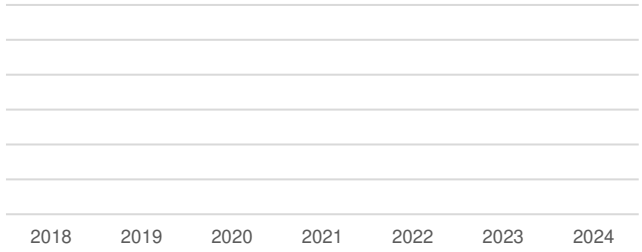
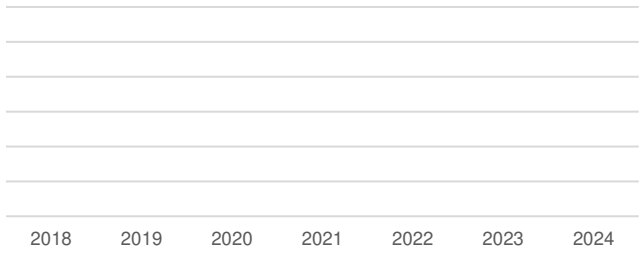


PUE Access



*Up until 12/2020 the results achieved in Rwanda were reported as per regional project *EnDev Rwanda (with Burundi and DRC)* with a target achievement of 343,625 people with access to electricity, 121,061 people with access to clean cooking as well as 34 social institutions and 240 MSMEs. (see EnDev Progress Report 2020 (p.79))

Burundi: Greater social Welfare through improved cookstove promotion

Capacity building on the improved cookstove manufacturing process in Kirundo. AVSI/Ntaraka Gustave 2022

Background information

Since 2017, EnDev Burundi has been providing technical assistance to local cookstove producers. The main objective is to support producers in developing their businesses in order to develop sustainable distribution networks and expand the local market for improved cookstoves. EnDev Burundi has been providing trainings for producers on entrepreneurship, marketing, and financial education as well as supporting the creation of sales point and workshops. These activities increased producers' technical capacities and expanded their vision of the market. EnDev also established partnerships with local media to increase awareness on clean cooking through advertising and radio broadcasts. This has had a positive impact on sales, as Prudencienne, a female cookstove promoter in Rumonge, testifies:

"My first broadcast on radio made me famous in our village and caused a massive increase in purchases of improved cookstoves. The partnership with the radio has given credibility to my activity as a seller of improved cookstoves"

Despite this success, there are still provinces in Burundi that do not have a local production of improved cookstoves. This increases the cost of transportation and the availability of cookstoves in these areas.

Project progress during the monitoring period

In 2022, EnDev continued its strategy of setting up new workshops to facilitate access to improved cookstoves. National coverage was improved through the creation of eight new production sites. This led to shorter supply chains, thus reducing the final price for customers, and job creation. Some of these jobs were taken up by formerly unemployed youths, mostly girls, that EnDev trained on the production of improved cookstoves. This training also encourages some of the young participants to create their own workshop. The expansion of supply chains as well as the partnerships with national TV and local radios helped to increase awareness regarding clean cooking.

Additionally, EnDev opened two new project bases to guarantee close monitoring of production workshops.

Today, EnDev works with 36 active workshops and 395 sellers in Burundi.

Empowering discriminated communities

Dutegure kazoza, is a cooperative of cookstove producers in the province of Kirundo, composed of 15 women and seven men. The members of the cooperative come from the Batwa community, a very poor and often discriminated minority that traditionally make a living by manufacturing small clay pots. As metal pots are gaining popularity and displacing clay pots for cooking, the Batwa's income source is threatened. Given their declining income, the cooperative members were barely able to afford one meal a day, lived without medical insurance, and could not afford to send their children to school.

In 2020, EnDev started to train and support the cooperative in the production and marketing of improved cookstoves. Thanks to their previous pottery experience, they quickly learned and adopted the new product. With EnDev's technical support, the cooperative was able to consistently produce good quality stoves, create points of sale in surrounding villages, and set up a basic accounting system for the cooperative. Through this, the members of the cooperative significantly improved their standard of living. "*Currently, all members have health insurance cards. We eat enough. We easily pay our children's school fees and are able to invest in other things.*", said Joël, the president of the cooperative.

Currently, EnDev is sensitizing members of other Batwa groups to the opportunity that the production and sale of improved cookstove provides to the Batwa community in terms of socio-economic development.

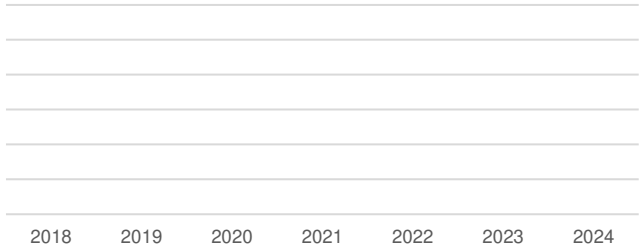
Cambodia with Laos

Country facts	
Population	KHM: 16.6 Million LAO. 7.43 Million
Human Development Index	KHM: 146 / Total (0.593) LAO: 140 / Total (0.607)
UN Classification	LDC (both)
Access clean cooking	KHM: 22% LAO: 9%
Access electricity	KHM: 86% LAO: 100%

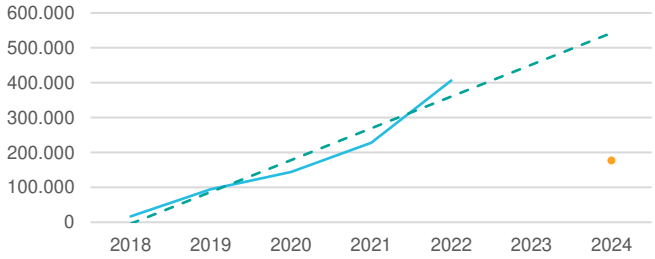
Project facts	
Project period	03.2015-12.2023
Budget	EUR 7,227,000
Core funding incl. RBF	EUR 7,226,900
Earmarked	-
Average annual turnover	EUR 1,267,504
Implementing Organisation	SNV
Lead political partner	KHM: Ministry of Mines and Energy (MME) LAO: Ministry of Science and Technology (MoST)

Target achievement	Targets	Achieved
HH Access Electricity	-	-
HH Access Cooking	175,935	406,365
SI Access	-	-
PU Access	1,120	0

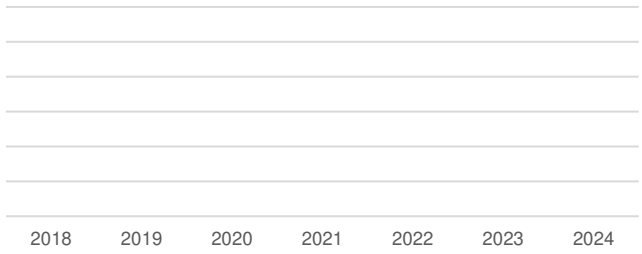
HH Access Electricity



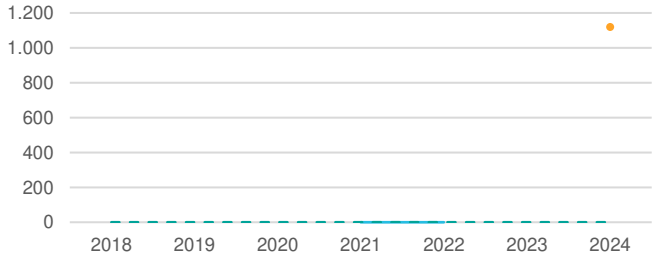
HH Access Cooking



SI Access



PUE Access



Mekong: Women's Empowerment through ICS Entrepreneurship

Background information
Since 2016, EnDev has supported the growth of the biomass cookstove market in the Mekong region, including Cambodia, Laos, and formerly Vietnam.

In Cambodia, EnDev shifted away from the focus on supply-side approach (such as RBF) due to low awareness of clean cooking and respective uptake of advanced biomass cookstoves (ABCs), towards prioritizing the functionality of clean cookstoves. 'Smoke-Free Village' (SFV) initiatives increase awareness, enhance the usage of clean cooking fuels, and boost sales for suppliers of electric cooking appliances and ABC. Aside from markets, the SFV also involves local governments, the Commune Councils for Women and Children, and 200 schools, health centres, temples, and women's groups.

In Laos, SNV has gradually mainstreamed higher-tier cookstoves into the existing ecosystem for ICS and expanded supply chains to underserved areas, including a 'leave no one behind' focus on impoverished/remote areas. The project is now intensifying activities in isolated remote locations, emphasizing local production (quality assurance, testing, research, and development), and strengthening the supply chain network.

Project progress during the monitoring period
In 2022, SFV in Cambodia was implemented in 196 villages. 1,150 events focused on behaviour change communication, ranging from door-to-door visits to village meetings. These events reached 21,633 people, of which approximately 70% were female. Data provided by local authorities showed significant changes, with an increase of 4,619 electric stoves among households. In addition, the use of clean cookstoves as the primary stove increased from 43% to 60% between January and December, accompanied by the reduction of traditional biomass stove usage from 31% to 15%. Furthermore, 25 communes (one commune consists of about ten villages) set up Working Groups for Clean Cooking to address cooking energy challenges and one district (15 communes) established a similar working group.

In Laos, EnDev worked with 34 producers, 11 distributors, and more than 2,700 retailers to reach 150,730 households with improved cookstoves in 2022. A total of 18 producers expanded their production capacity by mobilizing loans from a revolving fund established using finance gained from the sales of Gold Standard carbon credits. In addition, the project is piloting a new institutional ICS to cater to the needs of schools and hospital canteens, roadside noodle shops, and monasteries. Beyond that, a preliminary study has been conducted to assess the possibility of climbing the energy ladder by replacing biomass with e-cookstoves. The working relationship with LWU has also been strengthened, and they are now taking the lead role in cooking demonstrations and awareness-raising activities.

Women's Empowerment through Entrepreneurship

In Laos, over 50% of ICS production centres and 80% of retail shops are owned and managed by women. Ms. Khanphone is one of the six ICS producers in Champasak Province who joined the EnDev ICS project at its onset. Since then, she has become one of many successful female entrepreneurs due to the project's support. In 2017 when she started, her production capacity averaged 100 stoves per month, and relied on help from only a few family members. Now she produces 4,000 stoves a month with 14 labourers, 95% of which are women. She expressed her gratitude: "I could not be more thankful to the project that has significantly upgraded my living conditions and helped my neighbours improve their lives too. We have learned so much and, at the same time, are living a better life."

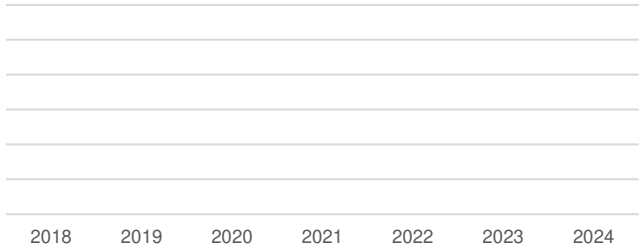
Democratic Republic of the Congo

Country facts	
Population	95.89 million
Human Development Index	179 / Total (0.479)
UN Classification	LDC/ LLDC
Access clean cooking	4%
Access electricity	19%

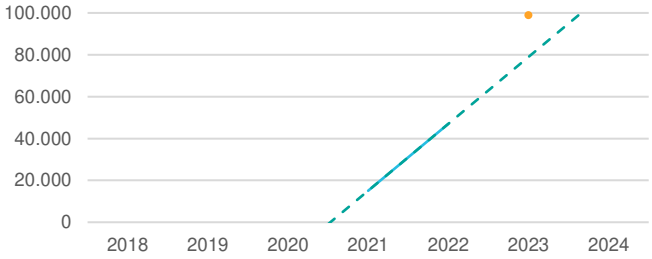
Project facts	
Project period	12.2019-12.2023
Budget	EUR 1,861,000
Core funding incl. RBF	EUR 1,681,000
Earmarked	-
Average annual turnover	EUR 379,130
Implementing Organisation	AVSI
Lead political partner	Ministère des Affaires Etrangères

Target achievement*	Targets	Achieved
HH Access Electricity	-	-
HH Access Cooking	98,812	46,997
SI Access	-	-
PU Access	-	-

HH Access Electricity



HH Access Cooking



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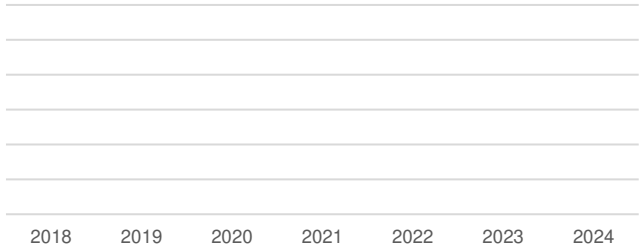
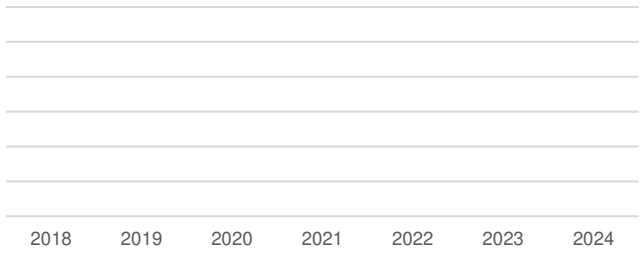


PUE Access



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DRC: Protecting Congo's natural resources and fostering development through clean cooking and PUE

Technical training on improved cook stove production, Idjwi. AVSI/ Michele Pontonio 2022

Background information

EnDev is being implemented by AVSI in Eastern DRC with a focus on Idjwi island (Province of Sud Kivu) and the cities of Bunia (Province of Ituri) and Kalemie (Province of Tanganyika) since 2019. Eastern DRC is a low-income region with one of the lowest electricity access rates in the world (1% in rural areas) and is chronically affected by political crises and armed conflict. EnDev's intervention areas are home to approx. 178,000 households, which consists of seven persons on average and have an average monthly income of USD 90 - 195. Families spend around USD 30 per month on firewood and charcoal, a significant share of which is produced by armed groups hidden in Virunga National Park. The resulting depletion of protected forests – home to unparalleled biodiversity – for charcoal production is an increasingly critical issue. At the same time, interventions for reforestation and conservation are very hard to implement, due to the activity of armed groups.

EnDev promotes sustainable development and access to energy in Eastern Congo through the promotion of clean cooking and the promotion of the productive use of energy (PUE) in newly installed mini-grids on Idjwi Island.

ICS producers training in partnership with UNHCR. AVSI/ Ottavia Magenes 2022

Project progress during monitoring period

In 2022, ICS sales doubled compared to 2021 despite the volatile security situation and the resurgence of the M23 militant group. Four new producers were trained, bringing the total to 13 since the project's inception. All producers were supported though results-based incentives, which consist of technical, business management, and marketing trainings, individual coaching, guided marketing campaigns as well as production and distribution support. Additionally, 100 new sales points were established, reaching a total of 180. Through the distribution network established by EnDev, the 13 producers now sell their ICS not only in the main implementation areas, but also on the main axes that branch out from the cities of Bunia and Kalemie, in the city of Goma, and in the Sud Kivu mainland across the lake from Idjwi island. Monthly behaviour change activities were executed to promote the adoption of improved cookstoves. At least 145 jobs were created in the cooking value chain, and 22,822 stoves were distributed during the monitoring period.

EnDev also launched its PUE activities on Idjwi island in 2022. Following the identification of profitable value chains, local small businesses were selected and receiving training and coaching on the use of electric appliances for productive use and business management.

Intersectoral synergies

In 2022, EnDev DRC explored synergies with the humanitarian sector. One of the new cookstove production sites was for example established in a camp for internally displaced people in collaboration with an UNHCR protection project. This has helped to reduce pressure on local resources, created employment, and facilitate peaceful cohabitation between displaced peoples and host communities. New sales points were opened in coordination with AVSI's Distance Support Program on education. These points of sale are owned and managed by the parents of the children supported by the program, which gives them the means of contributing to their children's schooling

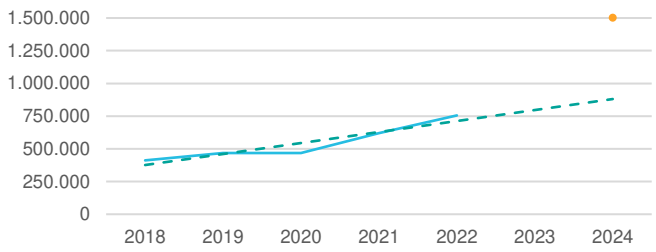
Ethiopia

Country facts	
Population	120 million
Human Development Index	175 / Total (0.498)
UN Classification	LDC/ LLDC
Access clean cooking	7%
Access electricity	51%

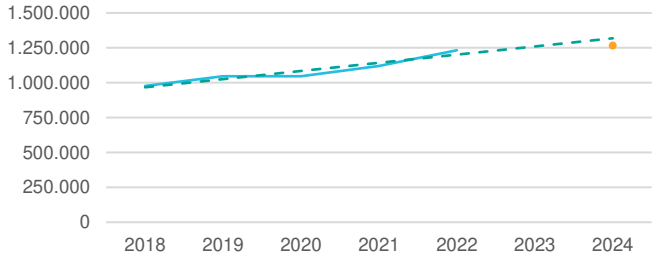
Project facts	
Project period	01.2010-12.2023
Budget	EUR 48,130,000
Core funding incl. RBF	EUR 31,758,099
Earmarked	EUR 16,371,901
Average annual turnover	EUR 4,717,307
Implementing Organisation	GIZ, SNV
Lead political partner	Ministry of Water and Energy (MoWE)

Target achievement	Targets	Achieved
HH Access Electricity	1,501,501	755,212
HH Access Cooking	1,263,784	1,232,575
SI Access	2,624	2,821
PU Access	5,861	6,335

HH Access Electricity



HH Access Cooking



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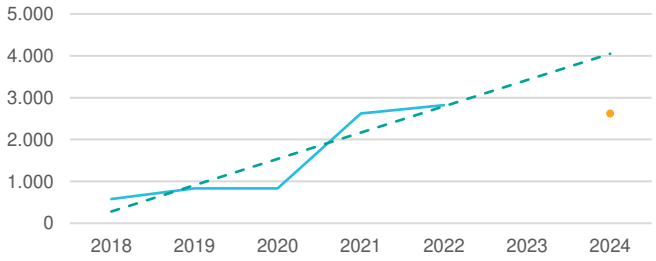
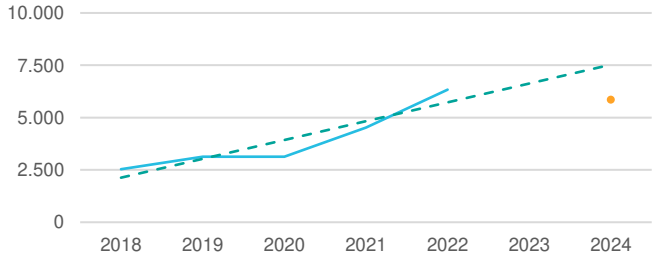


PUE Access



Ethiopia: Solar cooling saves lives

Background information
EnDev Ethiopia, forging strategic partnerships, supports the private sector and the government in creating sustainable energy access for households, institutions and small businesses. With additional co-financing from the EU (European Union), EnDev Ethiopia aims to establish self-sustaining markets for modern energy supply based on improved and modern cooking solutions, off-grid solar and mini-grid electrification.

Project progress during monitoring period
Ethiopia is endowed with abundant renewable energy resources and has an enormous potential for electricity generation. Nevertheless, it remains one of the countries with the lowest energy consumption in the world. The National Electrification Program (NEP 2.0) off-grid access component aims to provide all primary and secondary schools and health facilities with access to adequate and reliable electricity services, whether on or off-grid, by 2025.

Although access to electricity for these institutions is relatively higher than for households, it still falls very short with over 26,000 primary schools and 15,000 health posts currently lacking electricity. Furthermore, about 90 hospitals are still not powered. In total, there are over 45,000 institutions in the country in need of access to electricity services.

With more than 300 social institutions being supplied with reliable access to electricity, over five million people now benefit from improved health, educational and other community services.

Impacts achieved include:

- Improved medical care and maternal health stemming from reliable energy supply for lighting and basic medical services;
- Promotion of PV technology as a viable renewable energy source for rural electrification through training courses and installation demonstrations;
- Facilitation of access to information and communication technologies, which also contributes to improved education;
- Replacement of kerosene and dry-cell batteries in social institutions, leading to reduced CO2 emissions and lower consumption of fossil fuels.

Solar cooling can save lives

Lalise is a nurse working in Leenca, a small village 60km northeast of Addis Ababa, where no electricity poles from the main grid exist to provide electricity to the rural households in this remote area. In Leenca, a social health center was established to provide treatment for the surrounding population, including minor surgery and birth care. To provide the much-needed vaccinations and treatments in early childcare, EnDev, with co-financing from the EU, has built a Solar Standalone System with four photovoltaic modules (1200W or 1.2kWpeak) that - in combination with a battery system - provides the health centre with sufficient energy to power lights and a fridge. The fridge can cool and store vaccines constantly at a temperature of as low as 5°C. Lalise is happy that Covid-19 vaccines and other medicine can be preserved at low temperatures and by immunizing patients,saves many lives. EnDev has been engaging in electrification of off-grid social health posts and social health centres in a country of 120 million inhabitants where some 90 hospitals and 15,000 health posts lack full electricity access

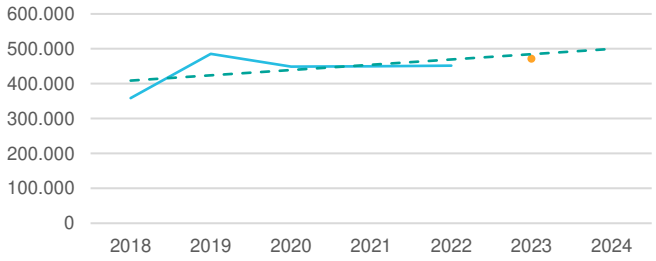
Kenya

Country facts	
Population	53.0 million
Human Development Index	152 / Total (0.575)
UN Classification	-
Access clean cooking	20%
Access electricity	71%

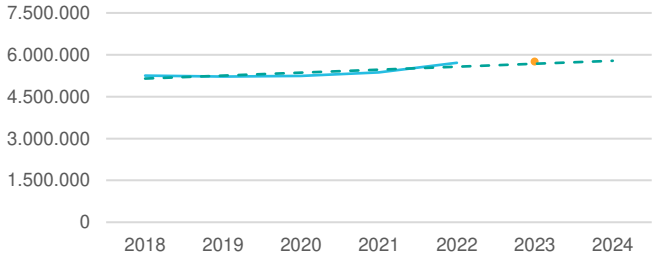
Project facts	
Project period	04.2009 - 12.2023
Budget	EUR 35,150,000
Core funding incl. RBF	EUR 28,604,900
Earmarked	EUR 6,545,000
Average annual turnover	EUR 1,915,617
Implementing Organisation	GIZ, CLASP, SNV
Lead political partner	Ministry of Energy

Target achievement	Targets	Achieved
HH Access Electricity	470,800	452,027
HH Access Cooking	5,747,602	5,713,313
SI Access	3,072	1,193
PU Access	10,565	5,344

HH Access Electricity



HH Access Cooking



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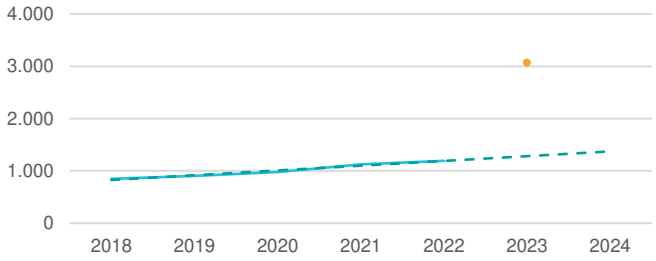
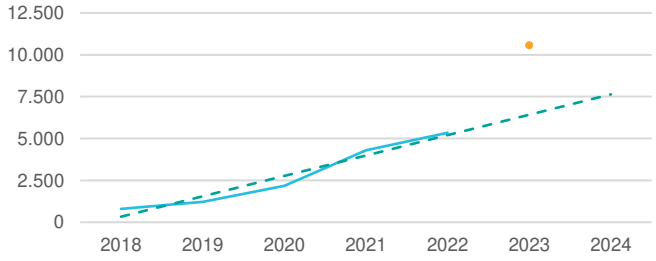


PUE Access



Kenya: Leaving no on behind by accelerating access to sustainable energy for the refugee and host communities

Background information

Since 2009 EnDev Kenya promotes access to sustainable energy for households, social institutions and small businesses. EnDev supports the Kenyan government's ambitious goals for 2030 on electricity access, stimulation of off-grid economic activities and clean cooking adoption. Additionally, EnDev Kenya implements a USAID-funded Smart Community Coalition Innovation Fund project for solar e-cycles in the humanitarian context, and also the IKEA Foundation funded Sustainable Energy for Smallholder Farmers (SEFFA) project which promotes energy solutions for productive use among smallholder farmers in dairy and horticultural value chains.

In addition, the associated project funded by DGIS and DANIDA, the Africa Biogas Component Kenya was launched, which supports a sustainable and growing market for biodigesters for climate and energy access targets.

Project progress during monitoring period

In 2022, the EnDev supported RBF project implemented by CLASP continued to promote uptake of eCooking technologies in the Kenyan market. The RBF project onboarded 5 companies and sold more than 2,700 EPCs, 90% of which were sold through micro-credit.

More improved stoves for social institutions (SIs) were also sold. EnDev formalised a cooperation with the Kenya Secondary Schools Heads Association which led to an increased awareness of available improved cookstove (ICS) technologies in schools. Furthermore, EnDev supported a skill development initiative in prisons which resulted in increased installations of ICS in prison facilities across the country.

Through the Innovation Fund pilot, 6 manufacturers and ICS producers were linked with Savings and Credit Cooperatives (SACCOs) to strengthen last mile distribution networks and enable affordability of improved cooking and solar technologies for productive use. 60 Last Mile Entrepreneurs (LMEs), mainly youth, were supported. Within SEFFA, EnDev supported 5 financial intermediaries to pilot innovative financing models through an RBF and technical assistance mechanism to increase affordability of solar irrigation, solar drying and solar cooling technologies for 1,000 small farm businesses.

In addition, EnDev Kenya continued to give support to the development of strategies of the Kenyan government such as the Clean Cooking and eCooking strategies. Financial and technical support was provided to the planning and coordination of the Clean Cooking Week hosted by the Clean Cooking Association of Kenya.

Under the Humanitarian Energy component implemented by SNV, EnDev promoted the adoption of ICS (artisanal and industrially made stoves), solar lighting systems (lanterns, home systems, and productive use appliances) and electric cooking (EPCs) to off-grid and mini-grid connected HH, MSMEs and SIs in Kakuma refugee Camp, Kalobeyei Integrated Settlement and host communities. This was achieved through support to suppliers and local stove producers to stimulate demand and upscale local distribution. In addition, the project contributed to job creation.

Empowering female stove producers

Kakuma town, Kakuma refugee camp and Kalobeyei Integrated Settlement in Northern Kenya are home to over 280,000 people, including refugees and the host Turkana community. On the outskirts of the camp, under a rack of wood and metal, Margaret Akeno is standing with clay in her hand. Margaret is in her early twenties and part of the host community in Turkana. She works for the Usafi Green Energy Stove Production unit, which is supported by EnDev. The local cookstove production unit in the camp, serving the market with improved cookstoves, ensures, that women and children are exposed to less smoke and need less firewood.

Margaret enjoys working as a stove producer in a group of women: "I am very grateful that I can take my son to work, that he is at a safe space while I am working." Margaret has not only acquired technical skills; Her job also earns her a stable income and gives her access to a social network through her colleagues – recruited from both the host and refugee community.

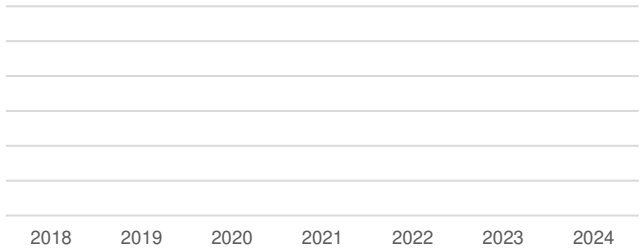
Madagascar

Country facts	
Population	28.92 million
Human Development Index	173 / Total (0.501)
UN Classification	LDC
Access clean cooking	1%
Access electricity	34%

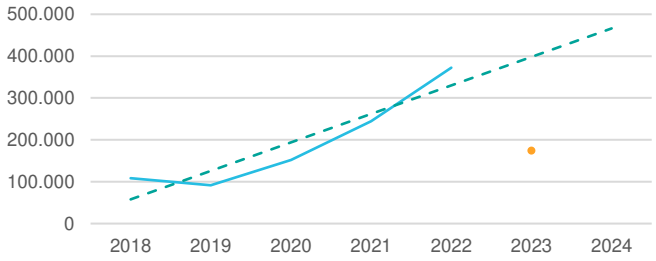
Project facts	
Project period	12.2012-12.2023
Budget	EUR 1,968,000
Core funding incl. RBF	EUR 1,968,000
Earmarked	-
Average annual turnover	EUR 172,333
Implementing Organisation	ADES
Lead political partner	Ministère de l'Energie et des Hydrocarbures

Target achievement	Targets	Achieved
HH Access Electricity	-	-
HH Access Cooking	174,380	372,343
SI Access	563	396
PU Access	934	1,766

HH Access Electricity



HH Access Cooking



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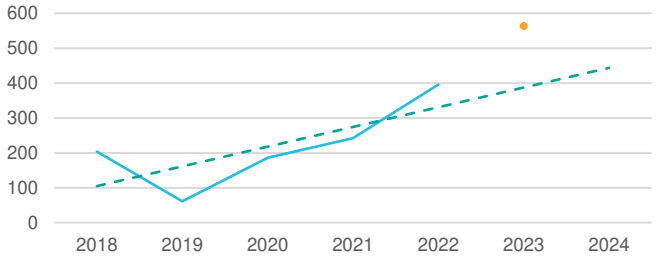
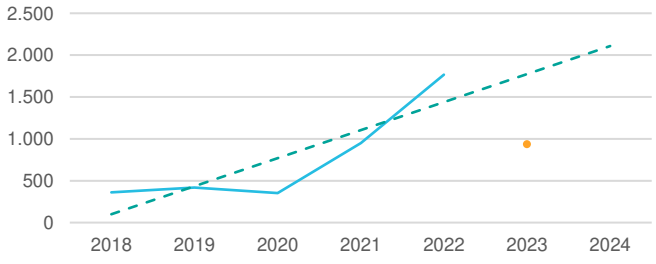


PUE Access



Madagascar: A new pricing system based on a vulnerability index to leave no one behind


© ADES solaire

Background information
In Madagascar, EnDev works with the Swiss NGO ADES, which advocates for the preservation of natural resources through energy-efficient cooking solutions, reforestation and educational projects. Over 90 percent of the forests in Madagascar have already been lost, threatening its unique biodiversity as well as its people. ADES has been active for 20 years, producing Solar cookers and Improved Cookstoves (ICS) resulting in 50-70 % fuel savings. With its own production factories, fifteen sales and distribution centres and three mobile branches, ADES reaches a large part of the population in all regions of the island.

In Madagascar, the poverty situation has been further exacerbated by the global COVID-19 pandemic. 91 percent of the population lives below the poverty line and 77 percent in extreme poverty. In the worst-affected regions, more than one in four children is affected by malnutrition.

Project progress during monitoring period
ADES operated highly successfully in 2022, achieving several milestones at once. With more than 85.000 solar cookers and ICS sold, sales reached a new all-time high. By the end of the first quarter of 2023, the five hundred thousandth ADES stove will reach a Malagasy family.

The number of employees was increased by 37 to 250 permanent employees in 2022. In addition, 235 resellers earned an income at the end of 2022. The resellers are responsible for the majority of all ADES products sold. They are closely supervised, receive further training every year and are also supported in other matters such as drawing up a business plan.

ADES was also able to put its project of modular costumized kitchens for schools into regular operation. In 2022, eight new modular school kitchens were realized. In the process, not only the kitchen infrastructure gets improved with ADES ICS but the modular commercial kitchens include electrification, running hot water supply and training of the kitchen staff. Not only thousands of school children benefit from this project, but also the school staff and especially the cooks.

Leave no one behind

More than 90 percent of Madagascar's population lives below the poverty line. They often lack the financial means to purchase an ICS. Therefore, ADES has developed a special pro-poor target that is directly aligned with the promise of the Sustainable Development Goals (leave no one behind). A new pricing system based on a vulnerability index was introduced to provide access to modern cooking solutions for the poorest of the poor (LNOB+).

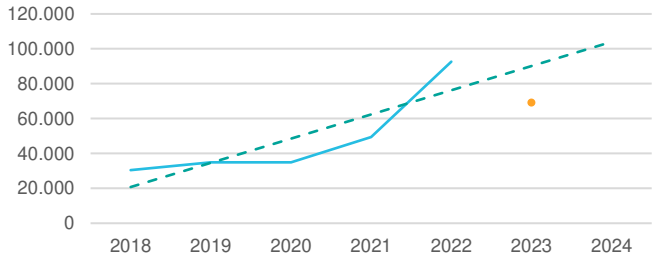
Malawi

Country facts	
Population	19.89 million
Human Development Index	169 / Total (0.512)
UN Classification	LDC/ LLDC
Access clean cooking	1%
Access electricity	15%

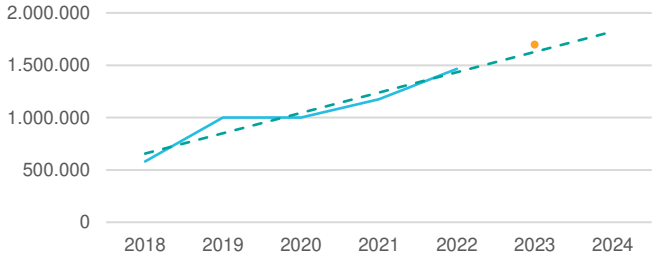
Project facts	
Project period	12.2012-12.2023
Budget	EUR 16,356,000
Core funding incl. RBF	EUR 10,775,400
Earmarked	EUR 5,581,000
Average annual turnover	EUR 2,115,898
Implementing Organisation	GIZ, MEAVE, United Purpose
Lead political partner	Ministry of Energy

Target achievement	Targets	Achieved
HH Access Electricity	69,034	92,622
HH Access Cooking	1,695,439	1,456,830
SI Access	27	26
PU Access	425	214

HH Access Electricity



HH Access Cooking



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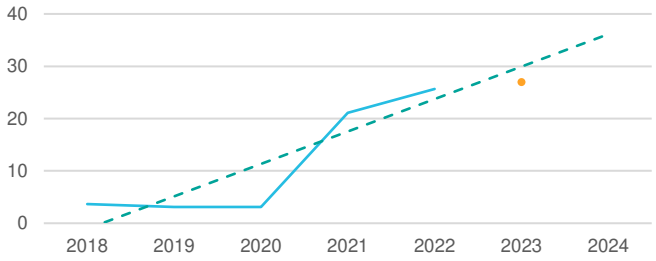
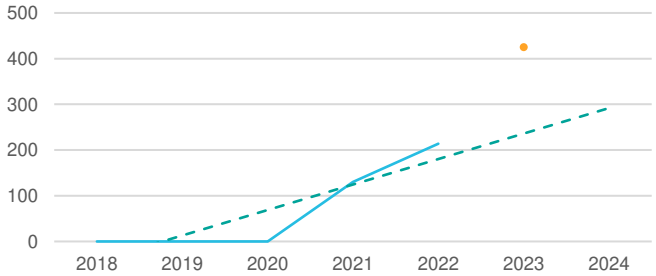


PUE Access



Malawi:
"Thanks to solar power, babies are no longer born with light of a cell phone torch during the frequent power outages."

Background information

Since 2012, EnDev Malawi facilitates sustainable energy access for households, social institutions (SI), and micro, small and medium enterprises (MSMEs). With core-funding, EnDev is implementing market and business development support (BDS) for improved cookstoves (ICS), solar PicoPV, and solar home systems (SHS). The programme focuses on private sector development and supports sector networks, such as the National Cookstoves Steering Committee (NCSC) and the Renewable Energy Industries Association of Malawi (REIAMA). Through the BMZ-funded Energising Health project, EnDev has procured Solar Direct Drive refrigerators for the COVID-19 vaccine cold-chain and will install solar systems to electrify health facilities. EnDev is also supporting the implementation of the RVO Innovation Fund project "Pumpreneurs" that supports entrepreneurs to market solar water pumps. In 2022/2023, the programme embarked on the following new co-financing projects: AgEnergy in selected PUE value chains, financed by Global Energy Alliance for People and Planet (GEAPP); Putting (electric) Energy to Work!, financed by the European Union (EU); and EnergICE Mangochi & Nkhotakota, financed by the Embassy of Iceland in Lilongwe. These projects focus on, respectively, promoting PUE technologies, supporting job creation, and energising social institutions.

Projects' progress during monitoring period

To support ICS, EnDev offered gender sensitive BDS and financial literacy trainings for stove production groups (SPGs), as well as marketing support for stove retailers. It piloted additional incentives for last-mile ICS agents, vertical integration along the ICS value chain, and adoption of quality standards and a unified numbering system for each ICS. EnDev also commissioned the study of the HTC pellet stove "Zipolopolo," with promising adoption levels among users, and assisted entrepreneurs in setting up a formal businesses. EnDev co-convened the annual Cleaner Cooking Camp in March 2022, which brought together companies, academia, NGOs, Government, and civil society.

For solar electrification, EnDev transitioned from providing marketing support to offering tailor-made BDS to solar companies with the aim to strengthen their business capacity and adaptability. To improve the enabling environment, EnDev continued to develop REIAMA's capacity through organisational assistance and strategy development. With EnDev support, REIAMA organized a first ever National Energy Conference in Malawi.

EnDev supports SIs by 1) consciously supporting producers of local ICS solutions for SIs, and 2) advocating among donors and government agencies to promote clean cooking for SIs in their programming. To achieve this, EnDev organised a showcasing event for SI ICS to donors. Additionally, EnDev supported the Minister of Energy (MoE) and the Ministry of Health's National Cold Chain Manager to attend COP27. This resulted in a demonstration of how the Energising Health project supports MoE's climate finance efforts and the inclusion of vaccine cold chains in national electrification planning.

EnDev also provided extensive technical support to SEforALL in the development of the Integrated Energy Planning (IEP) tool, which analyses the least-cost solution to achieve 100% electrification by 2030 and accelerate achievement of the clean-cooking targets set out in Malawi's Energy Compact, as well as assesses the medical cold-chain in the context of vaccines and routine immunization rollout.

Energising Social Institutions in Mangochi

EnDev successfully handed over solar photovoltaic systems with combined 40 kWp to power 4 schools and 4 health institutions in the Mangochi District. Operation and maintenance will be done through a state-of-the-art remote monitoring system and the District Solar Coordination Unit, which was set-up and trained for this purpose. This project was supported with funding from the Embassy of Iceland in Malawi.

Demand Side Subsidy Component

Project Facts	
Project Period	08.2022 - 09.2025
Approved Budget	EUR 4,866,00.00
Spent until 12.2022	n/a
Lead Political Partner(s)	Ministry of Energy

Progress of the DSS component in 2022

EnDev Malawi kicked-off its Demand Side Subsidy (DSS) component in September 2022 during the DSS Workshop at the EnDev Knowledge Exchange in Benin. At the workshop, EnDev HQ and Malawi country team formulated the methodological foundation for the design of Malawi's DSS concept.

Since the workshop, Malawi has focused on two processes: 1) development of the DSS concept note, and 2) partner coordination. Malawi completed a draft concept note in November, which focused on off-grid solar (OGS) and was shared with the Shell Foundation and GOGLA. EnDev has since continued to develop a more comprehensive concept note that includes ICS and finalize subsidy designs.

The DSS component in Malawi has two main objectives: 1) addressing the affordability barrier to accessing OGS products and ICS for people in ultra-poor and vulnerable settings who would otherwise not be reached by the commercial market or existing public initiatives, and 2) identifying and piloting scalable DSS models in different districts and contexts, and developing a concrete scale-up strategy with support from the World Bank's Energy Sector Management Assistance Program (ESMAP).

The pilot will utilize Malawi's social protection system – recently reformed and transferred into a Unified Beneficiary Registry (UBR) – to identify and reach beneficiaries. This will include recipients of the government's Social Cash Transfer Programme (SCTP) as well as, potentially, households in refugee settings and the surrounding host communities. Implementation is foreseen to begin in Q3 of 2023.

Alignment and collaboration with World Bank

EnDev Malawi intensified engagements with the World Bank country team through a series of meetings to identify areas of collaboration with their electrification project, the Malawi Electricity Access Program (MEAP). ESMAP also provided technical support to the EnDev country team in the creation of the draft concept note that was submitted to the End-User Subsidy Labl, including GOGLA. Coordination with the World Bank team has led to successful engagements at the conceptual phase, and the integration of areas for collaboration into the project design.

DSS lessons learned

The pilot will utilize the Malawi Government's UBR, collected by the Ministry of Gender, Children and Social Welfare (MoGCSW), which provides an institutionalised mechanism for targeting beneficiaries. The subsidy reduce the cost for the respective OGS and ICS product, thereby improving affordability while ensuring beneficiary ownership and encouraging sustained use.

Furthermore, the pilot is expected to generate significant spill-over effects. Based on previous experiences and studies, customers are encouraged by the positive experiences their neighbours have with the OGS and/or ICS, which in turn creates demand for commercial sales at market rates.

The pilot will also look to incorporate other milestones for incentive disbursements beyond sales figures alone, thereby encouraging the reliable supply of products in previously underserved areas.

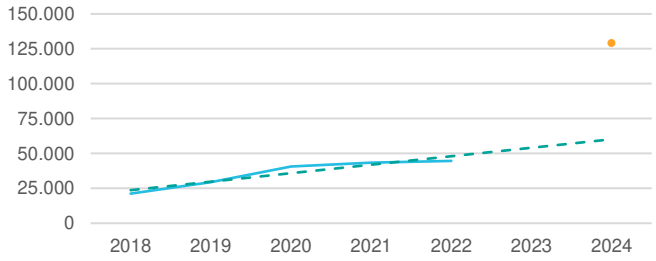
Mali

Country facts	
Population	21.9 million
Human Development Index	186 / Total (0.428)
UN Classification	LDC/ LLDC
Access clean cooking	1%
Access electricity	51%

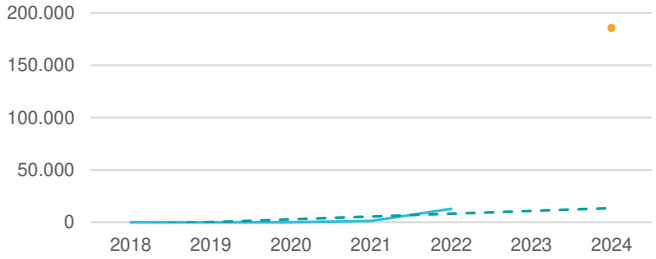
Project facts	
Project period	04.2009-12.2023
Budget	EUR 16,394,000
Core funding incl. RBF	EUR 16,394,000
Earmarked	-
Average annual turnover	EUR 2,245,374
Implementing Organisation	GIZ, SNV, NIS
Lead political partner	Ministère des Mines, de l'Energie et de l'Eau du Mali

Target achievement	Targets	Achieved
HH Access Electricity	129,066	44,658
HH Access Cooking	185,535	12,812
SI Access	598	390
PU Access	725	219

HH Access Electricity



HH Access Cooking



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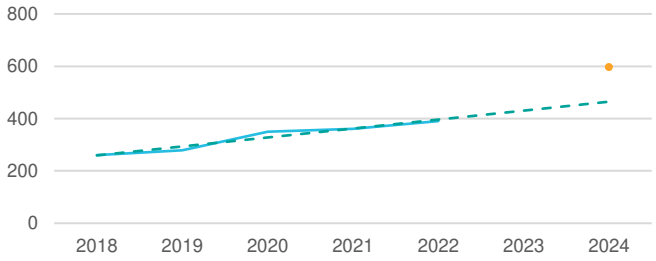

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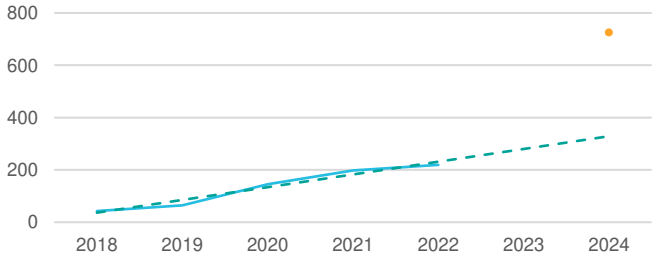


Energising Stability in **Mali**: Energy access in fragile contexts

Training on Solar Systems in Koulikoro
©GIZ/Ibrahim Diarra 2022

Background information
After the most recent coup d'état in 2021, the political and security situation in Mali remains volatile. High political instability and a dynamic conflict lead to constantly changing conditions for implementation. These conditions had a negative impact on market development as international investments especially for mini grids decreased over the last year due to increasing risks and declining ability to pay in some regions.

In 2022 EnDev Mali continued to support the development of the solar market with a comprehensive portfolio of technologies (incl. pico PV, solar home systems (SHS), energy kiosks, and mini-grids), and the improved cook stoves market, while also strengthening its electrification activities in conflict areas and displacements settings to ensure no one is left behind. To mitigate security and political risks, EnDev cooperated closely with local (traditional) authorities and diversified partnerships with the private sector and development partners.

Project progress during monitoring period
Despite difficult conditions, the demand-based integral approach with a focus on the circle of Barouéli is evolving positively. Two more mini-grids were realized in cooperation with the private sector and the demand for different types of productive use of energy systems for income generating activities and the agricultural sector increased. Additionally, 29 entrepreneurs (incl. 6 women) received access to electricity thanks to the communal lease purchase facilities for SHS that are based on revolving funds and EnDev helped to establish.
EnDev trained 32 technicians (4 of which in conflict zones) and supported 65 health posts and maternities in installing and repairing solar systems. The support of pico PV companies to enter rural markets continued and two pilots for cooperation between companies and micro credit institutions have been facilitated.

As access to energy can be a stabilizing factor in fragile context, the implementation of activities in vulnerable settings continued, allowing for the installation of additional streetlights in Gao city and the first SHS for households in Forgho. The construction of energy kiosks in the target villages has started and EnDev launched a PUE pilot to support income generating activities based on solar energy in camps for internally displaced peoples.

With the establishment of the GWA+ quality label for cookstoves by the Malian Alliance for Clean Cooking (M-ACC) with the support of EnDev, a solid foundation for its results-based-financing activities (RBF) and sustainable market development was built. The RBF and ongoing communication on the quality label attracted new companies (total: 9) and increased the number of labelled stoves to 35 (additional: 19). At the same time, continuous awareness raising campaigns improve the ability of potential customers to make informed purchasing decisions.

Ensuring technical support in fragile contexts

In 2022 EnDev expanded its support for the electrification of health posts into the region of Koulikoro. The highly volatile security situation as well as a general lack of companies/technicians able to repair and install solar systems or provide trainings in rural areas are key barriers to sustainable electrification within the health sector in Koulikoro.

To address these challenges, EnDev organized a 10-day training for 32 local technicians from Koulikoro. As the availability of technical support in conflict zones is especially critical, EnDev ensured that local technicians from the most volatile zones could participate. The availability of local technicians now creates a basis for a continuous electrification of the health sector in Koulikoro.

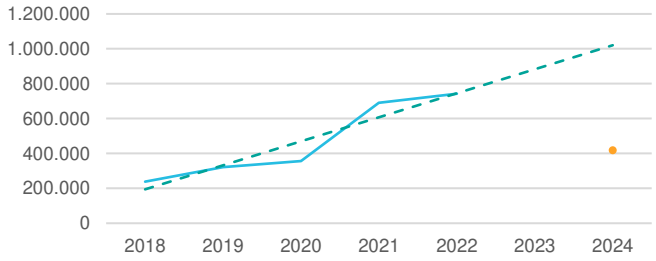
Mozambique

Country facts	
Population	32.08 million
Human Development Index	185 / Total (0.446)
UN Classification	LDC
Access clean cooking	5%
Access electricity	31%

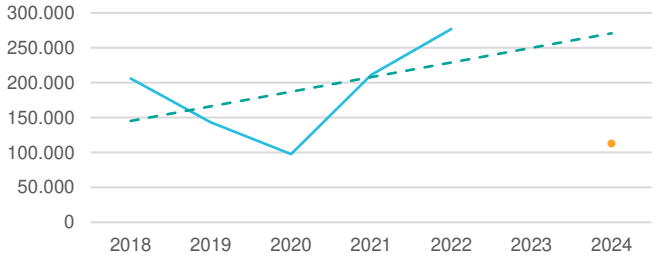
Project facts	
Project period	10.2009-12.2023
Budget	EUR 38,400,000
Core funding incl. RBF	EUR 24,044,000
Earmarked	EUR 14,355,800
Average annual turnover	EUR 4,849,892
Implementing Organisation	GIZ
Lead political partner	Ministry of Mineral Resources and Energy

Target achievement	Targets	Achieved
HH Access Electricity	417,273	742,469
HH Access Cooking	112,320	276,972
SI Access	23	7
PU Access	82	74

HH Access Electricity



HH Access Cooking



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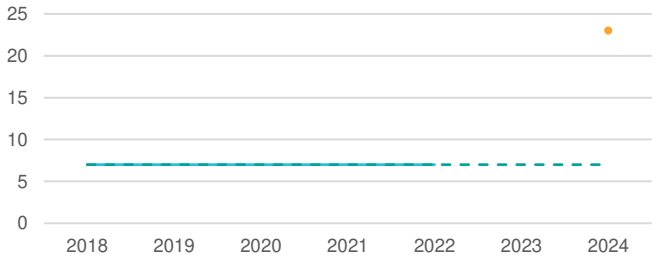

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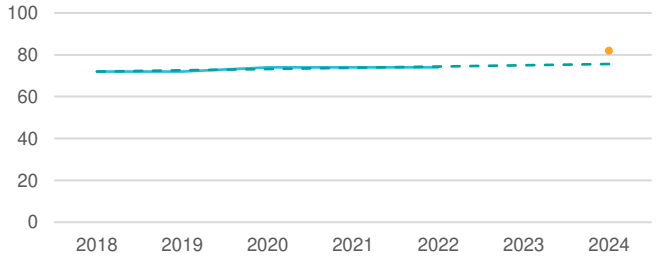


Mozambique: Supporting local business distributing off-grid technologies

Woman installs a PV-solar panel on her home.
©GIZ_Mariano_Silva_2022

Background information

EnDev Mozambique continues to follow a holistic and multi-tiered approach with off-grid electrification and clean cooking technologies to provide demand-based access to households and SMEs. EnDev supports the Government of Mozambique in monitoring universal energy access by advising and developing capacity to digitise the access progress through an online platform. This platform contributes as an important tool for government planning to **achieve universal energy access by 2030**. EnDev Mozambique also supports increased energy access through business development services, learning transfer, innovation and policy advice, to ensure that the resources available to the energy access market are used in a more efficient and sustainable way.

Project progress during monitoring period

The focus of the EnDev country component in 2022 remained on accelerating access to energy. Through the RBF FASER fund (Results-based-Financing Fund for Sustainable Access to Renewable Energy), EnDev has reached more than 840,000 beneficiaries through several different funding windows focused on promoting energy access for households including households in humanitarian context.

The RBF fund served as the main source of access to finance for the private sector in 2022.

In 2022, EnDev closed the successful COVID-PAY window, which helped prevent companies from going bankrupt and households from losing access to energy due to repercussions of the Covid-19 pandemic. Fortunately, the impacts of the pandemic in Mozambique have lessened, which has enabled EnDev to focus on other windows promoting access to energy for even more households. After years of successful implementation, the programme has also closed the grid densification intervention implemented by Electricidade de Mozambique (EDM) as the approach has been replicated and scaled by other donors.

In the clean cooking sector, EnDev Mozambique supports the Biomass and Energy Certification and Test Center (BECT). The BECT offers services in designing, testing, standardization and quality assurance of improved cookstoves. BECT also focused on access to clean cooking for social infrastructure through the construction and installation of improved institutional cookstoves in public schools in 2022.

EnDev also delivered and supported the official launch of the **"Universal Access To Energy In Mozambique" platform** (http://sdg7mozambique.org/) together with the Government of Mozambique. EnDev continues to support the capacity development process of the Ministry of Mineral Resources and Energy in the operationalization and use of the developed platform.

Improved institutional firewood cookstoves

The Biomass Energy Certification & Testing Center (BECT) supported by EnDev designed, installed, and evaluated the use of institutional cookstoves in a pilot project at a public school. The goal was to to reduce wood consumption, improve cooking safety and reduce exposure to harmful emissions from traditional 3 stone fires. The activity aimed to define the most suitable institutional stove using only local materials, which allows its easy replication in surrounding communities. The improved cookstoves were well embraced by the school cooks mainly because of the-upright cooking position, less exposure to smoke, and the faster cooking process. Notably, the considerable savings on firewood were not the main interest of the cooks since they don't pay for it.
Since the pilot had very promising results, a scaling-up in collaboration with the World Food Programme (WFP) is in discussion.

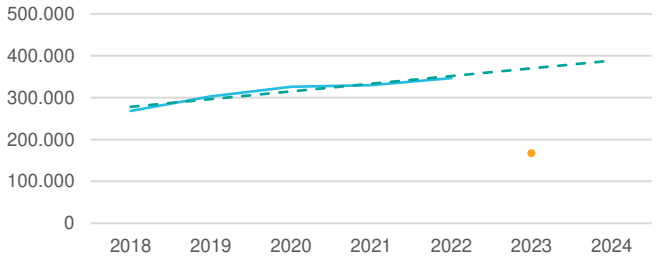
Nepal

Country facts	
Population	30.03 million
Human Development Index	143 / Total (0.602)
UN Classification	LDC/ LLDC
Access clean cooking	35%
Access electricity	90%

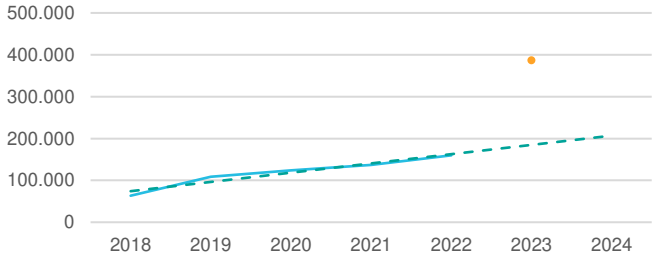
Project facts	
Project period	05.2009-12.2023
Budget	EUR 11,299,000
Core funding incl. RBF	EUR 11,299,100
Earmarked	-
Average annual turnover	EUR 949,502
Implementing Organisation	GIZ, PA, SNV
Lead political partner	Ministry of Energy, Water Resources and Irrigation

Target achievement	Targets	Achieved
HH Access Electricity	385,991	346,602
HH Access Cooking	167,201	159,801
SI Access	1,769	1,704
PU Access	6,146	4,176

HH Access Electricity



HH Access Cooking



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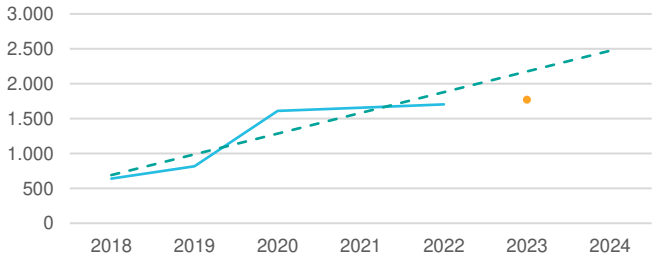
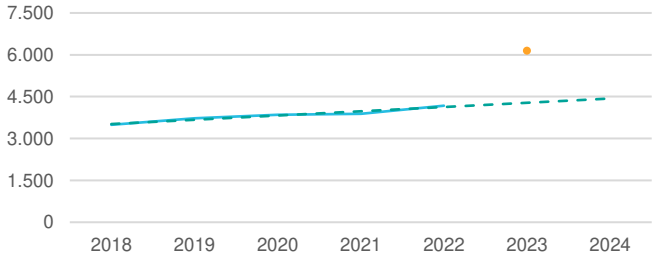


PUE Access



Nepal: "With access to electricity, I can extend my working hours and generate additional income to support my children in their education"

Background information

EnDev Nepal supports sustainable access to energy for rural communities through multiple interventions. The project has set up (1) a Revolving Fund for Community Rural Electrification Entities (CREEs) to enable these entities to pay their required share of the total project cost for extending national grid's reach within their area and supports (2) grid extensions through grants to Local Government Units and (3) grid densification by covering initial connection costs for poor, marginalized, and natural disaster affected households and enterprises ("leave no one behind" approach). EnDev also has a long track record in hydropower development through e.g., the establishment of the (4) Micro Hydro Debt Fund. The fund aims to reduce the perceived risk of commercial banks and encourage the investment into off-grid hydro power projects. Aside from this, EnDev supported the installation of (5) pico-hydro systems in the high hills of Nepal where micro hydro pants and grid electrification are impractical for providing electricity to remote communities. Beyond the electricity sector, EnDev continues to support access to clean cooking by (6) creating a sustainable improved cookstove/ electric cookstove market in rural areas of Nepal.

Project progress during monitoring period

In 2022, the Revolving fund has been expanded to upgrading of transmission & distribution system, enterprise development and e-cooking promotion. Till date, seven CREEs have taken loan for system upgrading, three for enterprise promotion and one for e-cooking promotion.

In the off-grid component, redesigning of the micro hydro debt fund is under way to capitalize the fund for other renewable off-grid electrification projects and to foster rural enterprises. In addition, a technical and socio-economic evaluation of smart-prepaid meters in Solukhumbu and Okhaldhunga districts were carried out to assess its impacts. The result indicated potential for effective tariff collection. The pre-paid system has allowed the user committee to have upfront cash and savings and encouraged a timely collection of tarifs. Additionally, technical support was also provided to Alternative Energy Promotion Center for rehabilitation of old micro hydro systems and grid interconnection.

The business planning workshop and improved knowledge on the benefits of e-cooking helped CREEs to accelerate the process of upgrading electricity distribution systems. Six CREEs have already started this process to upgrade their electricity distribution infrastructures. Agency and leadership training is in progress in the project sites for gender empowerment. An impact review and adaptation of existing tools and methodologies is planned for 2023.

Enabling 'work from home' with electricity access

The art of weaving is a traditional practice in Nepal, especially in hilly and mountainous regions. The two women Patali Tamang (45 years) and Saili Tamang (37 years) started carpet weaving at young age. However, due to the unfavorable economic situation in their home towns they were compelled to work in the cities 60 kms away in small rented homes. After the earthquake of 2015, both of their families returned back to their village in Temal, 90km south-east of Kathmandu. Although the village was connected to the national grid, the families were not and deprived due to their weak financial situation. With no access to electricity, they were only engaged in agriculture activities to meet their basic needs. Through EnDev's grid densification program and in coordination with the CREE of Temal nine MSMEs were supported to get access to the grid. With lighting generated through the electricity access, Patali and Saili are able to invest their time in weaving carpets even in the early mornings or evenings which enabled them to them to complete one carpet in 20 days which otherwise would take around twice the time. With an additional income of NPR 35,000 (Euro 248) both of them happily remarked "Now we are financially capable to support our children in their education."

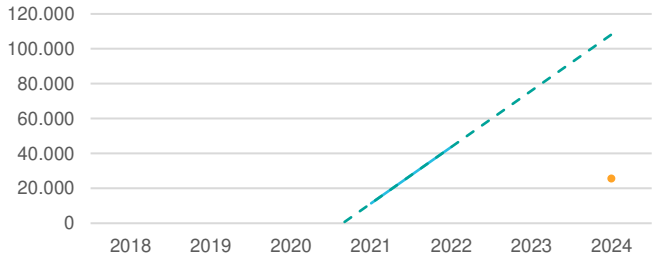
Rwanda

Country facts	
Population	13.46 million
Human Development Index	165 / Total (0.534)
UN Classification	LDC / LLDC
Access clean cooking	2%
Access electricity	47%

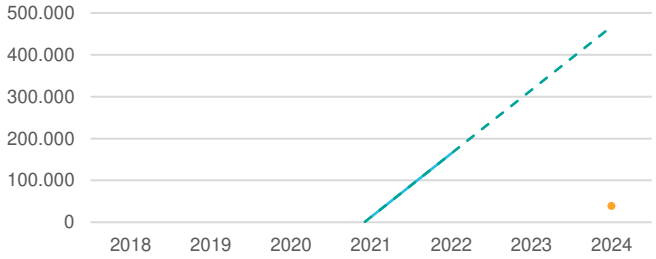
Project facts	
Project period	10.2009-12.2023
Budget	EUR 31,076,000
Core funding incl. RBF	EUR 23,700,900
Earmarked	EUR 7,374,700
Average annual turnover	EUR 3,312,492
Implementing Organisation	GIZ, AVSI, SNV
Lead political partner	Ministry of Infrastructure

Target achievement*	Targets	Achieved
HH Access Electricity	25,445	43,717
HH Access Cooking	38,413	164,356
SI Access	16	10
PU Access	128	71

HH Access Electricity



HH Access Cooking



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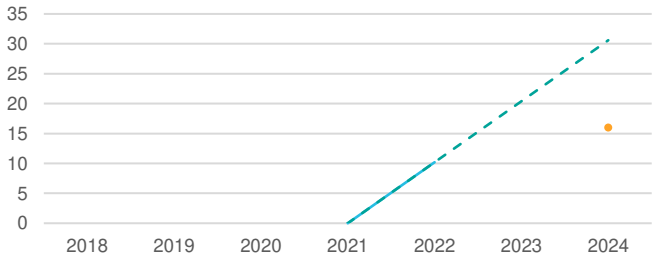

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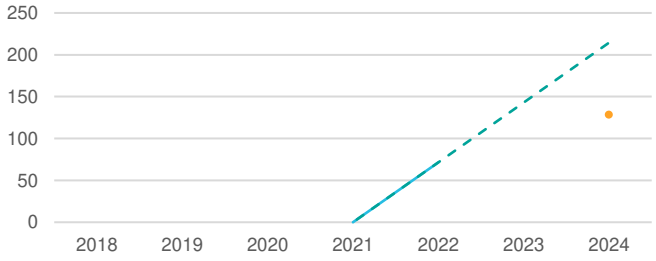

*Up until 12/2020 the results achieved in Rwanda were reported as per regional project *EnDev Rwanda (with Burundi and DRC)* with a target achievement of 343,625 people with access to electricity, 121,061 people with access to clean cooking as well as 34 social institutions and 240 MSMEs. (see EnDev Progress Report 2020 (p.79))

Rwanda:
"My income is growing day by day"

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Background information
The Government of Rwanda (GoR) aims to achieve universal access to electricity by 2024. As of February 2023, 77% of households are connected to the grid, with 25.8% of those connections using off-grid technologies. In 2021, the GoR drastically changed its electrification targets to 89.9% on-grid (instead of 52%) and 10.1% off-grid (instead of 48%). About 80% of Rwandan households use biomass for their cooking fuel and 70% cook on three-stone fires. The GoR seeks to reduce biomass usage from 83.3% (2014) to 42% by 2024.

Project progress during monitoring period
Mini-grid & PUE: A newly designed mini-grid results-based-financing (RBF) program was launched in January 2022, integrating lessons learned from its previous Village-Grid program funded by UK Aid. After delays due to changes to national planning and dismissal of the fund manager, an alternate procurement process is underway. Due to COVID-19 delays, one solar mini-grid financed through the previous RBF was commissioned in June 2022. Simultaneously, the AVSI-implemented productive use of energy (PUE) program for minigrids ended in July 2022. It trained 97 entrepreneurs, of which 58 received equipment through a matching grant at 6 mini-grid sites in Rwanda. With funding from the RVO Innovation Window, another PUE project on 'Cold Storage as a Service' was implemented with the private sector. As part of this, two solar-powered cold rooms were installed at market sites and final activities will conclude by March 2023.
Private sector participation in hydropower (PSP Hydro): In 2022, no new projects were commissioned. Four hydro power plants are still under construction, with one commissioning expected in 2023. A total of 2 MW will be added to the national grid, which translates to approx. 33,850 beneficiaries.
PicoPV: The Pro Poor RBF project was handed over to the GoR and the World Bank in 2021 and scaled up to a 30 million USD nation-wide program.

Cooking: In November 2020, EnDev began implementing the EU co-financed project, '*Reducing climate impact of cooking in Rwanda through improved cooking energy systems (*ReCIC) Action' along with SNV. ReCIC seeks to create a sustainable market in the cooking sector by addressing supply and demand side barriers for improved cookstoves and improved or alternative fuels. In 2022, EnDev witnessed a 400% increase in supported clean cookstove sales from the first year, reaching 151,638 people. EnDev provided trainings and equipment to five producers. In addition, 14 companies were selected for support through a business growth fund, and 35 community mobilisation and cooking demonstrating events were conducted. Moreover, EnDev supports the GoR in strengthening the regulatory framework, the testing capacities, including support to its national laboratory, and overall sector coordination to improve the policy and framework conditions.

Modern technology for modern clothing

Claudine UWIMANA is a tailor in the village of Remera, Nyaruguru District in the Southern Province of Rwanda. Through the support of the PUE program, Claudine was able to afford two electrical sewing machines to grow her business. Modern tailoring services are rare in her area. In the past, when she needed modern designs, she had to travel far. Now, she is producing the clothes and designs herself and is also providing services to other tailors in the village.

In addition to a matching grant to purchase the equipment, Claudine received a training on business skills and regular coaching to learn how to better manage her business. This has increased her income and in her own words, "My income also is growing day by day compared to the period I used only a manual tailoring machine.

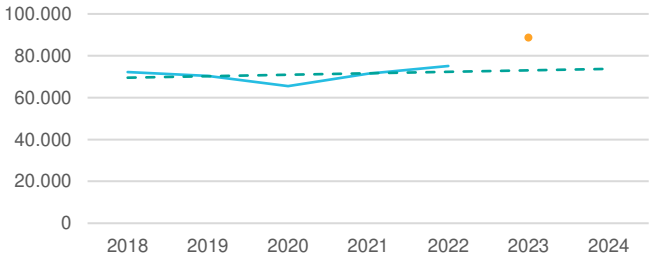
Senegal

Country facts	
Population	16.88 million
Human Development Index	170 / Total (0.511)
UN Classification	LDC
Access clean cooking	24%
Access electricity	70%

Project facts	
Project period	04.2009-12.2023
Budget	EUR 30,171,000
Core funding incl. RBF	EUR 23,801,000
Earmarked	EUR 6,370,000
Average annual turnover	EUR 2,252,922
Implementing Organisation	GIZ
Lead political partner	Ministry of Petroleum and Energy

Target achievement	Targets	Achieved
HH Access Electricity	75,117	88,601
HH Access Cooking	1,364,589	2,001,766
SI Access	1,344	1,275
PU Access	1,572	919

HH Access Electricity



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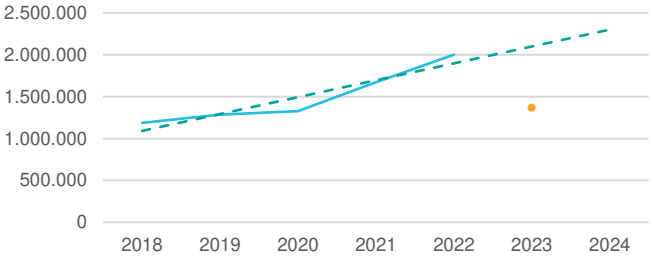

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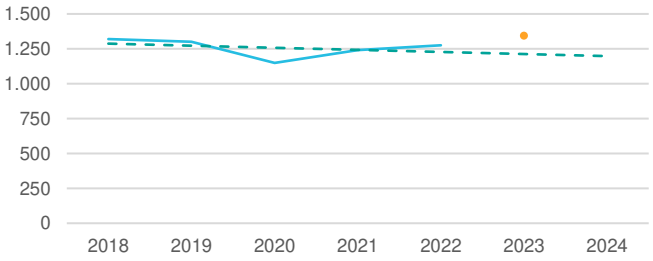

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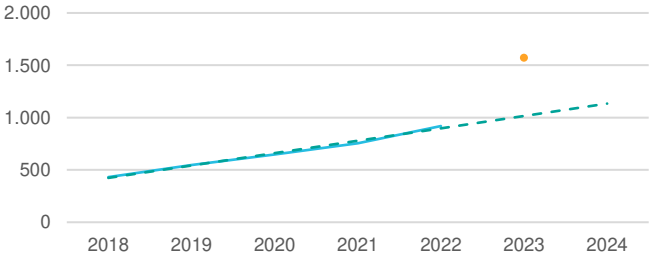


Le Quotidien: "Rural electrification in northern **Senegal**: 120 health centres soon emerging from darkness."


© GIZ / Michel Bakhoum

Background information

After 14 years of developing the household cookstove market, EnDev handed over these interventions to the EnDev/GCF associated program in 2020. EnDev's focus in the cooking sector now lies in the promotion of 1) the productive use of biomass energy in the sectors of fish processing and traditional bakeries and 2) the sustainable production of solid biomass fuels. In rural electrification, EnDev Senegal supports 1) operator-based off-grid installations (SHS and mini-grids), access to 2) pico PV products and 3) productive use equipment, and 4) sector coordination. In addition, EnDev acquired a new EU co-financing ("ProAccess") that promotes energy access via improved mini-grids and standalone solar systems. ProAccess started in July 2022 and complements the off-grid electrification activities of EnDev and the BMZ's Green Peoples Energy Program, with which EnDev cooperates closely. In addition, EnDev Senegal is part of the global EnDev Health intervention, which equips health centres with solar appliances.

Project progress during monitoring period

Using the lessons learned from over 10 years in Senegal's mini-grid sector, EnDev developed an improved mini-grid concept ("mini-grid 2.0") and will promote mainstreaming of tested innovations into the mini-grid sector. EnDev also continued to develop digital solutions for improved rural electrification planning, monitoring, and operation of off-grid systems (e.g. a geospatial tool, a mini-grid monitoring platform, smart energy meters, and a mobile application for mini-grid maintenance). To promote access to pico-solar products in remote regions, EnDev initiated collaborations between technology suppliers and women groups as retailers. The project's PUE promotion activities further continued support for several standalone and mini-grid connected productive appliances, e.g. (solar) mills, freezers, and sewing machines.

EnDev SN's biomass component has developed an innovative fish smoker ("Nopalé" = to relax) that is reducing specific fuel use by more than 80%. The technology was successfully tested by women fish processors in 5 cooperatives, confirming fuel use reduction, convenience of operation, and high user acceptance. A study was further conducted on the state of Senegal's traditional bakery sub-sector. The results confirm the importance of introducing a more efficient technology in the future to reduce the significant fuel use of the baking sector in 2023-25.

Finally, in collaboration with the NGO *Jeunesse et Développement* (JED) and the public entity in charge of Waters and Forests, the project verified in a field trial of 50,000 seedlings that pigeon pea plants grow well in Senegal and produce energy dense stems that can be used as sustainable source of fuel to substitute firewood from the forests.

First mini-grid 2.0 installed

The village of Saré Koubé in Senegal's south celebrates the installation of the first mini-grid 2.0 pilot unit. The improved concept integrates a range of technical advances to address several sustainability challenges of mini-grid electrification. The containerized 60 kWp installation offers a 24/7 energy service for 1,100 villagers' domestic, social and productive energy needs and enables easy relocation in case of grid arrival. Digital tools support operation and maintenance and allow the testing of smart management strategies. The improved concept is being tested in Saré Koubé (as well as in additional pilot units to be installed in 2023) in close collaboration with the Senegalese Agency for Rural Electrification (ASER) and the operating companies. Successfully field-tested solutions will be actively shared with the sector to promote mainstreaming of the mini-grid 2.0 concept into Senegal's mini-grid portfolio and thereby provide access to reliable, sustainable and modern energy in localities far from the grid

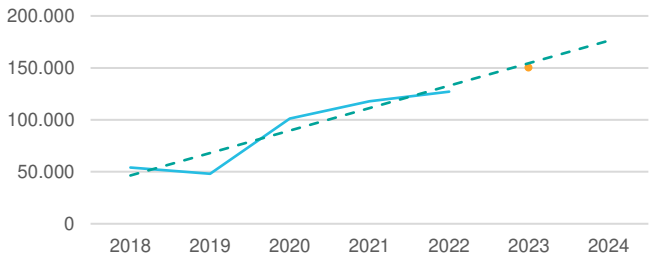
Sierra Leone with Liberia & Guinea

Country facts	
Population	GIN: 13.53 million LBR: 5.2 million SLE: 8.4 million
Human Development Index	GIN: 182 / Total (0.465) LBR: 178 / Total (0.481) SLE: 181 / Total (0.477)
UN Classification	LDC (all)
Access clean cooking	GIN: 2% LBR: 0% SLE: 1%
Access electricity	GIN: 45% LBR: 28% SLE: 26%

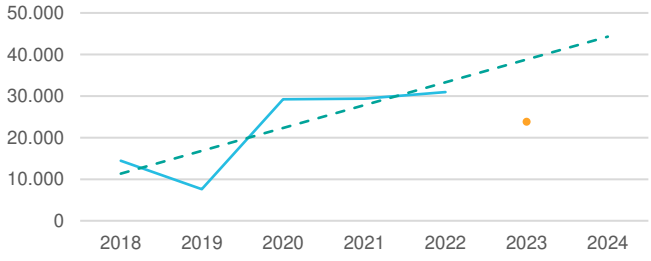
Project facts	
Project period	05.2012-12.2023
Budget	EUR 18,402,000
Core funding incl. RBF	EUR 14,586,000
Earmarked	EUR 3,816,000
Average annual turnover	EUR 2,191,601
Implementing Organisation	GIZ
Lead political partner	SLE: Ministry of Energy; LBR: Ministry of Mines and Energy; GIN: Ministère de l´Energie, de l´Hydraulyque et des Hydrocarbures

Target achievement		
	Targets	Achieved
HH Access Electricity	150,121	127,107
HH Access Cooking	23,780	30,961
SI Access	1,613	688
PU Access	1,767	1,679

HH Access Electricity



HH Access Cooking



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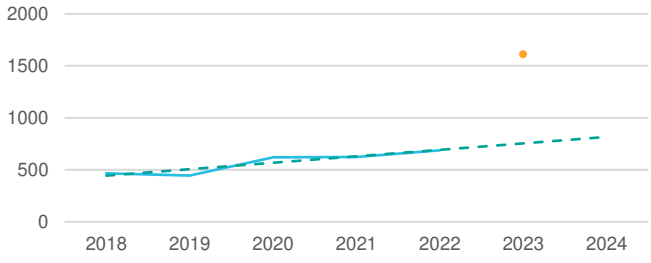

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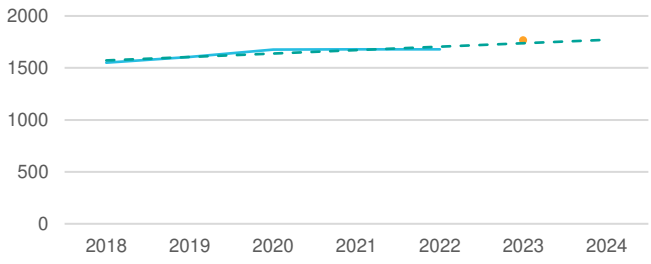


Mano River Region: Digitalisation for Energy Access

Background information

Few people have access to electricity in Sierra Leone, Liberia, and Guinea, with access rates of 26%, 28%, and 45%, respectively. Subsequently, many households rely on the use of petrol or diesel generators, kerosene, battery lamps, or candles to provide for their energy needs. Access to clean fuel and cooking remains low, with official rates between 0 and 2% in all countries. EnDev works with government partners to create reliable energy access solutions by improving stakeholder engagement, supporting private sector development and digitalisation, and directly increasing access to renewable energy and clean cooking in all three countries.

Project progress during monitoring period

In Sierra Leone, EnDev conducted trainings for the Renewable Energy Association of Sierra Leone (REASL) on the collection of installation data through the Renewable Energy Collect application tool. It was determined that EnDev and REASL will subsequently collaborate with the Ministry of Energy (MoE) and Ministry of Health to establish a database of solar installations. Additionally, EnDev engaged with the Kenema and Kono district councils to establish a strategy for solar installations and maintenance, leading to an agreement for the council to dedicate funds to this purpose.

In Liberia, EnDev conducted technical trainings (with over 90% of attendees being women) on solar installation and maintenance for members of the Hill Top School and Support Cities Alliance, as well as trainings for more than forty fishmongers at two sites within Montserrado county. EnDev also conducted trainings for actors across the renewable sector on how to use the application RE-Marketplace and other related EnDev applications (e.g. IT4Renewables, RE Collect). These platforms allow individuals, businesses, and experts to showcase their products and services, use the renewable learning education management portal for trainings, and otherwise manage their business operations.

In both Liberia and Sierra Leone, EnDev facilitated access to clean and sustainable cooking by supporting local producers to improve their production processes and expand their market reach. To this end, EnDev supported the development, construction, and marketing of ICS and briquettes as well as conducted product testing and trained metal workers to boost local production capacities.

To support social institutions (SIs), EnDev worked with partners to conduct studies and develop projects providing solar hybrid systems and institutional stoves for schools, health centres, and community kitchens in Liberia, Sierra Leone, and Guinea.

Energising School Facilities and Health Centres

EnDev provided solar lighting systems to the Manusumana Community Health Centre in Sierra Leone and the JFK Mental Health Center in Liberia, enabling health workers to effectively perform their duties and serve two rural communities.

In Guinea, EnDev partnered with Plan International to install solar hybrid systems and institutional stoves at a local school. EnDev also worked with Medicos Del Mundo to provide a Niwa Computer – a fully solar-powered computer – and a solar home system for the Koinadugu District Center and three other health centres across the district.

Demand Side Subsidy Component Liberia

Project Facts	
Project Period	07.2022-09.2025
Approved Budget	EUR 3,800,00.00
Spent until 12.2022:	n/a
Lead Political Partner(s)	Rural and Renewable Energy Agency of Liberia (RREA)

Progress of the DSS component in 2022

More than 44% of Liberia's 5.2 million inhabitants live below the income poverty line,[1] and most are affected by inadequate access to healthcare, education, and basic utilities such as energy. To date, only 28% of households have access to electricity, the majority of which through off-grid solar (OGS) solutions.[2] While EnDev has been supporting the nascent OGS sector to overcome early market barriers, the poorest and most vulnerable communities lack the financial means to purchase OGS products. The component in Liberia thus aims to pilot Demand Side Subsidies (DSS) to facilitate access to electricity – in particular: off-grid solar – for low-income and vulnerable communities who are currently not reached by commercial markets.

In 2022, EnDev started with the set-up and design of the DSS component in Liberia. Several online meetings and a multi-day design workshop between EnDev, Liberia's Rural and Renewable Energy Agency (RREA), and the World Bank conceptualised cooperation for jointly implemented RBF. Essential design activities have centred around the collection of socio-economic data for targeting and the calculation of subsidy levels, surveys of OGS companies to understand market barriers, and the kick-off for developing a joint operation's manual with RREA and the World Bank. These activities set the foundation for the DSS pilot and will continue into 2023.

Alignment and collaboration with World Bank

The World Bank aims to pilot and scale-up DSS, among other activities, under its Liberia Electricity Sector Strengthening and Access Project (LESSAP). Thus, since the start of the component, EnDev and the World Bank have engaged closely, collaborating on the design of the foreseen DSS scheme and the implementation of a joint pilot in Liberia. RREA acts as implementation partner for both parties.

Bi-weekly meetings and regular design workshops between the World Bank, EnDev, and the RREA create synergies and enable a joint DSS approach.

DSS lessons learned

DSS primarily help to bridge the affordability gap for the poorest consumer groups. However, while affordability remains a major issue in Liberia, surveys of OGS companies showed that poor road conditions and inadequate infrastructure in large parts of the country pose a considerable challenge for business expansion. Thus, additional financial support, e.g., to help OGS companies set-up distribution centres in remote areas, could provide a meaningful addition to DSS.

While EnDev's funding is strictly earmarked for a direct reduction of end-consumer prices, the World Bank's funding allows for various forms of support, such as supply-side subsidies for business expansion. In combination, a complementary approach promises to both increase affordability for the poorest and most vulnerable communities, while at the same time supporting OGS companies to sustainably expand their business and develop new markets.

[1] United Nations Development Programme, 2021: Human Development Reports. https://hdr.undp.org/data-center/country-insights

[2] World Bank Group, 2021: Liberia Electricity Sector Strengthening and Access Project – Project Appraisal Document. https://documents1.worldbank.org/curated/en/127771615860080105/pdf/Liberia-Electricity-Sector-Strengthening-and-Access-Project.pdf

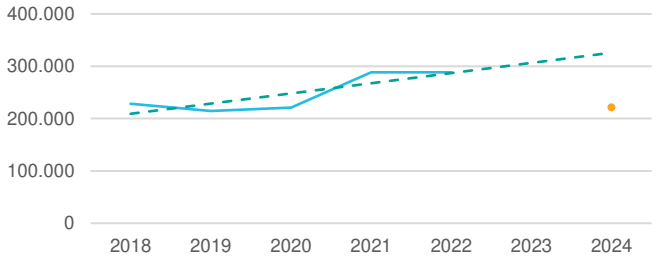
Tanzania

Country facts	
Population	63.6 million
Human Development Index	160 / Total (0.549)
UN Classification	LDC
Access clean cooking	5%
Access electricity	40%

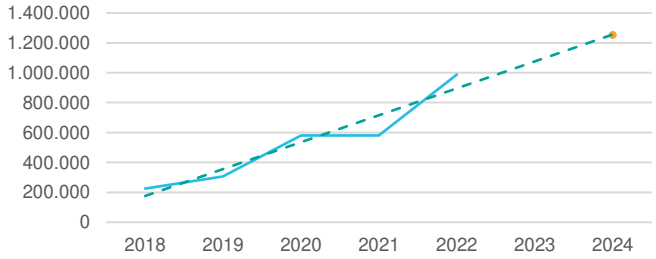
Project facts	
Project period	05.2012-12.2023
Budget	EUR 13,381,000
Core funding incl. RBF	EUR 13,380,500
Earmarked	-
Average annual turnover	EUR 1,956,276
Implementing Organisation	SNV
Lead political partner	Ministry of Energy

Target achievement	Targets	Achieved
HH Access Electricity	221,001	288,377
HH Access Cooking	1,250,229	987,967
SI Access	-	-
PU Access	200	220

HH Access Electricity



HH Access Cooking



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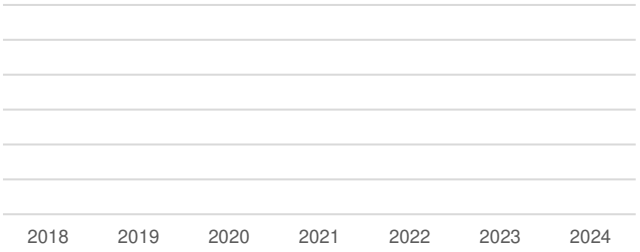

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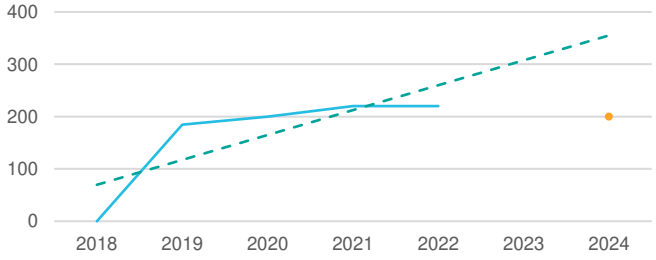


Tanzania: Deepening efforts to address Gender in Clean Cooking and Solar

Background information
EnDev Tanzania is implemented by SNV and supports Improved Cookstove (ICS) and pico-PV markets. From the programme onset in 2013, EnDev Tanzania mainly focused ICS efforts on supply-side activities, building ICS producer capacity in technical production and business development skills. In 2020 the BCC work stream was initiated and has expanded to one new geographical area each year.

In 2021, the Women's Employment Stimulus RBF Fund for the Off-grid Solar Sector (WES RBF) set out to test if, by providing financial RBF incentives and Gender Equality Technical Assistance (GETA) to solar companies, the share of female employees will increase and if this impacts total sales growth and share of female customers.

Project progress during monitoring period
EnDev Tanzania has increased its reach in supply-side activities to two more clean cooking regional markets (for a total of 20 active regions) and continued to implement a business support component paired with awards of performance based non-monetary incentives such as manufacturing equipment and business-use electronics. In 2022 the BCC workstream, now in its third year of implementation, expanded efforts to a third market where activities were honed and recommendations from the Gender Action Plan developed in 2021 were further integrated including recruiting not only women to act as BCC change agents, but men as well.

The benefits of this approach have been greater engagement by men in the community to address improved cooking solutions and systems, especially as it relates to kitchen enhancements for a healthier cooking settin
Explorations into catalysing the market for e-Cooking technologies began in 2022. By training Clean Cooking Advocates already engaged in the BCC programme, the e-Cooking workstream capacitated five promoters to effectively demonstrate and sell electric pressure cookers (EPC). Sales channels including door-to-door, women's group meetings and live demonstrations were used. The most popular selling tactic was a live cooking demonstration with read out of the number of electric meter units used to cook the specific dish and comparison to the cost of fuel to cook the dish on baseline technology. However, despite many benefits of using EPC affordability remains the major constraint for many households in rural and peri-urban areas, thus efforts are on-going to test various financing strategies including merry-go-round savings groups and partnering with Savings and Credit Co-Operative Societies (SACCOS).

Gender Equality Technical Assistance

Through the RVO-funded EnDev Innovation Window, EnDev Tanzania was supported to launch the Women's Employment Stimulus RBF Fund for the Off-grid Solar Sector. The fund incentivizes solar firms for recruiting and retaining female staff and agents. In 2022, the fund supported recruitment of 260 females to the sector and the execution of Gender Equality Technical Assistance to the seven participating solar firms to enable the development of company-wide Gender Action Plans that are now under implementatio

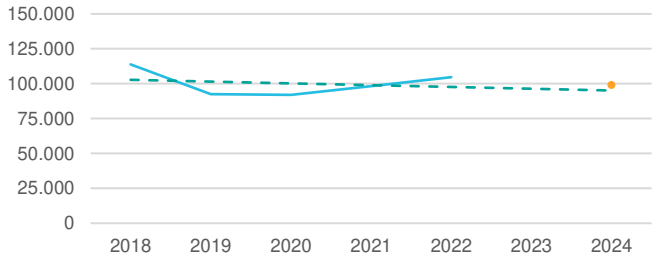
Uganda

Country facts	
Population	45.8 million
Human Development Index	166 / Total (0.525)
UN Classification	LDC / LLDC
Access clean cooking	1%
Access electricity	42%

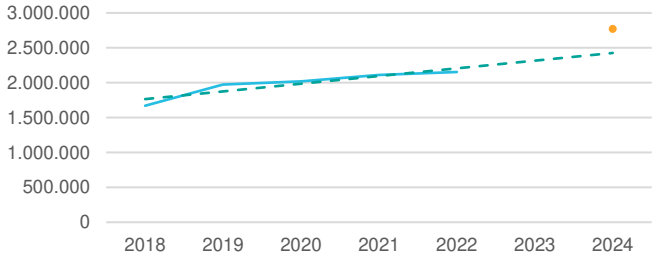
Project facts	
Project period	05.2012-12.2023
Budget	EUR 23,789,000
Core funding incl. RBF	EUR 17,973,000
Earmarked	EUR 5,816,000
Average annual turnover	EUR 1,983,895
Implementing Organisation	GIZ
Lead political partner	Ministry of Energy and Mineral Development (MEMD)

Target achievement		
	Targets	Achieved
HH Access Electricity	98,979	104,566
HH Access Cooking	2,766,063	2,153,399
SI Access	1,490	1,223
PU Access	3,276	2,038

HH Access Electricity



HH Access Cooking



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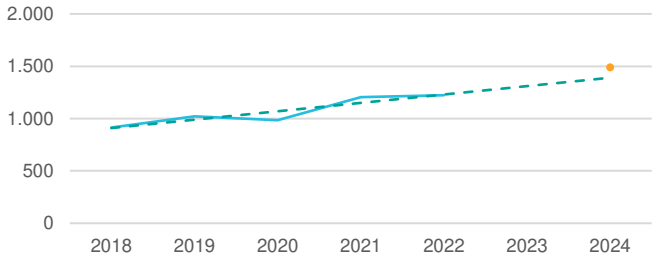
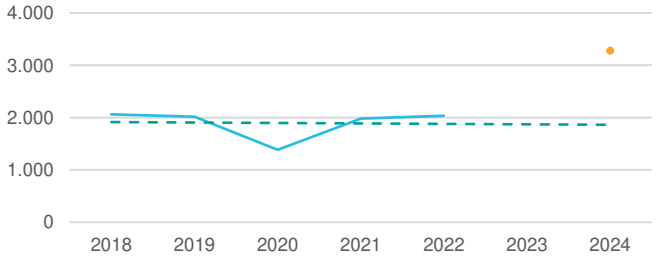


PUE Access



Uganda: Promoting higher-tier energy access

Background information
In Uganda, EnDev is working with partners on market-based energy access & overall market development in three key intervention areas: Solar Energy, Cooking Energy, and Energy Access for Refugees and Host Communities. Across the intervention areas EnDev has promoted access to innovative technologies and higher tier energy access through several approaches and partnerships.

Project progress during monitoring period
EnDev has continued to promote access to electricity with a focus on higher-tier access (Tier 2 and above solar systems) for household electrification, productive use (PUE) and social institutions (SIs). Under the USAID/SDC co-financed Last Mile Results Based Financing Project, EnDev focused on supporting access to Tier 2 SHS for households. EnDev conducted further interventions focusing on increasing access to solar PV solutions for enterprises and schools. In addition, EnDev offered business development support to renewable energy companies. With co-funding from the IKEA Foundation (in collaboration with SNV & RVO), EnDev is implementing the Sustainable Energy for Smallholder Farmers (SEFFA) project which has utilized an RBF approach to provide access to solar powered irrigation to farmers. Under SEFFA, two demonstration sites were also established with a focus of demonstrating business cases for solar cold chain and solar irrigation for vegetables.

The EnDev refugee component extended the geographical scope by adding two additional settlements (4 in total) with the aim of supporting clean cooking and solar companies to strengthen their supply chains in refugee settlements and linking them to nearby energy kiosks. With co-financing from USAID and Power Africa,

EnDev has awarded grants to five private companies with innovative off grid projects in Uganda under the Smart Communities Coalition Innovation Fund (SCCIF), with the aim to improve energy access and digitalization within various refugee settlements.

The EnDev Cooking Energy Component launched a new RBF round for increasing access to improved cookstoves for households and food vending SMEs. With additional RVO funding, EnDev launched an electric cooking pilot project in cooperation with MECS and the Ugandan Ministry of Energy and Mineral Development (MEMD) to build market intelligence on e-cooking, establish supply chains, and improve the enabling environment for modern energy technologies. Under the RVO-funded Strengthening the Entrepreneurial Ecosystem for Clean Cooking Facility (SEE-CC) – the Africa Biodigester Component (ABC) Uganda was also initiated. This is jointly implemented with SNV Uganda and aims to increase household access to biodigesters, increase bio-slurry value proposition, and improve framework conditions. EnDev will also implement the Higher Tier Cooking Component (HTCC) with CLASP in 2023 to build a pipeline of companies offering Tier 3+ clean and efficient cookstove technologies.

The First Higher-Tier Cooking Production Facility

With EnDev support, the first state-of-the-art higher-tier manufacturing facility was built by Africa Clean Energy (ACE), who subsequently received certification for their now locally produced ACE One stove from the Uganda Bureau of Statistics under the Biomass Cookstove Standard. This will drastically reduce the production and end-user cost of the efficient cookstove, boost in-country sales and distribution outreach, and improve livelihoods. Two other companies were also supported to construct hygiene facilities for female staff, conduct health and safety trainings, and upgrade production facilities – all with the aim to streamline operations, increase capacity, and improve access to high quality efficient cooking technology

Demand Side Subsidy Component

Project Facts	
Project Period	July 2022 – September 2025
Approved Budget	EUR 4,900,00.00
Spent until 12.2022	n/a
Lead Political Partner(s)	Ministry of Energy and Mineral Development (MEMD)

Progress of the DSS component in 2022

In 2022, EnDev made significant progress towards finalising the Demand Side Subsidy (DSS) component design outlined in the project concept note.

The pilot in Uganda will focus primarily on refugees and host communities as well as other vulnerable rural areas that are currently not reached by commercial markets. DSS will lower consumer prices for a range of quality-certified products including solar lanterns, solar home systems (SHS), improved cookstoves (ICS), and higher-tier clean cooking (HTCC) technologies. EnDev will utilize a results-based financing (RBF) modality to incentivise private sector expansion into these markets. Subsidies will be delivered through direct payments to participating companies, dependent upon consumer price reduction and verification of eligible sales or other milestones. With DSS, EnDev aims to close the affordability gap for an estimated 260,000 households within these underserved regions and improve the reach of commercially viable markets.

In addition, EnDev continues to collaborate with the World Bank and the Uganda Credit Capitalization Company (UECCC) to harmonize the design and operations across EnDev's DSS pilot and the World Bank-funded Energy Access Scale-up Project (EASP). This strategic collaboration is aimed at minimizing the risk of unhealthy private-sector competition or distortion within the market, as well as aligning activities to maximize impact. Through sector networks, EnDev Uganda continues to actively participate in platforms (i.e., End-User Subsidy Lab, the WFP & UNHCR Cash Working Group) and engage various partners (i.e., the Clean Cooking Alliance, Mercy Corps, and private sector actors) on the topic of demand-side subsidies implemented in displacement settings

Alignment and collaboration with World Bank

Leveraging past experience, EnDev Uganda has engaged with the MEMD, the World Bank, and the UECCC to identify areas of collaboration and cooperation on the new Energy Access Scale-up Project (EASP). This includes sharing technical insights on demand-side subsidy design and coordinating between result-based financing facilities within refugee and host community markets. The World Bank's Energy Sector Management Assistance Program (ESMAP) provided technical support to the EnDev country team in the creation of the draft concept note that was shared and discussed with the End-User Subsidy Lab, including GOGLA. Through the collaboration, EnDev Uganda has also contributed insights on DSS to the End-User Subsidy Lab.

DSS lessons learned

Demand-side subsidies in off grid markets are relatively new in Uganda. However, there have been positive experiences with DSS in projects such as EnDev's successful, one-year blended-subsidy (supply and demand-side incentive) test pilot, as well as partner projects such as Mercy Corps' AMPERE project and GIZ's Energy Solutions for Displacement Settings (ESDS) co-financed RBF. With this, EnDev has drawn valuable lessons on targeting mechanisms. Given the lack of a centralized socio-economic database that would identify beneficiaries and indicate household income status in Uganda, a combined approach of geographic and demographic targeting is the most effective for beneficiary identification.

Abbreviations

ACE	Africa Clean Energy
ADES	Association pour le Développement de l'Energie Solaire, Switzerland
AVSI	Association of Volunteers in International Services
BMZ	German Federal Ministry of Economic Cooperation and Development
CG	Consultative Group
CLASP	Collaborative Labelling and Appliance Standard Program
DFAT / AUSAid	Australian Department of Foreign Affairs and Trade
DGIS	Netherlands Ministry of Foreign Affairs and Trade
DSS	Demand-side subsidy
EAMD	Energy Access Market Development
EnDev	Energising Development programme
ELIA	EnDev's Learning and Innovation Agenda
ESMAP	Energy Sector Management Assistance Program
FCDO	UK Foreign, Commonwealth & Development Office
GCF	Green Climate Fund
GEAPP	Global Energy Alliance for People and Planet
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
GOGLA	Global Off-Grid Lighting Association
GS	Gold Standard
HH	Households
HTC	Higher-Tier Cooking
ICS	Improved Cookstoves
ITAC	Independent Technical Advisory Committee
KOFIH	Korea Foundation for International Healthcare
LDC	Least developed countries
LNOB	Leave no one behind
MTF	Multi-Tier Framework
NDC	Nationally Determined Contributions

NIS	Nordic International Support Foundation
RBF	Results-based financing
RE	Renewable energy
RVO	Rijksdienst voor Ondernemend Nederland
SDC / DEZA	Swiss Agency for Development and Cooperation
SEE-CC	Strengthening the Entrepreneurial Ecosystem for Clean Cooking
SHS	Solar home systems
SI	Social institutions
SIINC	Social impact incentives
SME	Small and medium enterprise
SNV	Stichting Nederlandse Vrijwilligers / Netherlands Development Organisation
TREEP	Tanzania Rural Electrification Expansion Program
USAID	United States Agency for International Development
IDP	Internally displaced persons
UNHCR	United Nations High Commissioner for Refugees
EWiEN	Ethiopian Women in Energy association

References

Country facts in the portfolio analysis sheets were taken from the following sources:

Population: The World Bank (2020): Population, https://data.worldbank.org/indicator/SP.POP.TOTL

HDI: UNDP (2020): Human Development Report, https://hdr.undp.org/data-center/human-development-index#/indicies/HDI

UN Classification: UNCTAD (2022): UN list of least developed countries, https://unctad.org/topic/least-developed-countries/list

Access Clean Cooking: The World Bank (2022), The Energy Progress Report 2021, p.185: https://trackingsdg7.esmap.org/data/files/download-documents/sdg7-report2022-full_report.pdf

Access Electricity: The World Bank (2022), The Energy Progress Report 2021, p.194: https://trackingsdg7.esmap.org/data/files/download-documents/sdg7-report2022-full_report.pdf

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Registered offices Bonn and Eschborn,
Germany

Dag-Hammarskjöld-Weg 1-5
65760 Eschborn, Germany
T +49 61 96 79-0
F +49 61 96 79-11 15
E info@giz.de
I www.giz.de

Contact
Energising Development
Alexander Haack

T +49 6196 796179
E endev@giz.de
I www.endev.info

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Responsible: