Progress Report 2018

Energising Development – Phase 2

Final version

energising development

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Eschborn, Germany, March 2019

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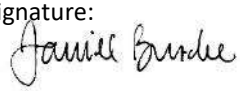

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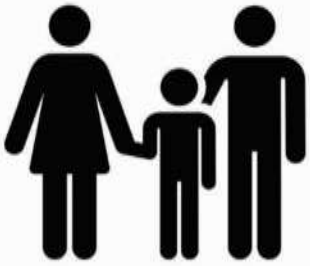


Energy access for

21.3 million

people accomplished

15.8

million
household members
with improved
cooking solutions

5.5

million
household members
with electricity

Broader Impact

Indirectly, EnDev supported – together with others – access to sustainable energy for at least

86

million people

2.3 million t of CO_2 saved per year – equivalent to planting of more than 5.5 billion trees

8.4

million women, children and men with drastically reduced exposure to indoor air pollution

46,200

small and medium enterprises with a modern form of energy for productive uses

A total installed power with renewable energies of MW

63.4

40,500

trained technicians, stove producers, sales agents

21,150

social institutions with a modern form of energy: among them 13,577 schools and 1,247 health centres

A. Overview

The Energising Development (EnDev) programme is a coordinated and harmonized effort of several donors to improve energy access on global scale as main target. The donor partnership consisted in 2018 of:

- the Netherlands Ministry of Foreign Affairs Directorate-General for International Cooperation (MFA / DGIS),
- the German Federal Ministry for Economic Cooperation and Development (BMZ),
- the Norwegian Ministry of Foreign Affairs (MFA-NOR),
- the UK Department for International Development (DFID),
- the Swiss Agency for Development and Cooperation (DEZA / SDC) and
- the Swedish International Development Cooperation Agency (SIDA).

EnDev aims to achieve sustainable access to energy for minimum 22 million people worldwide by 2021 (5 million in phase 1 from 2005 to 2009; additional 17 million in phase 2 from 2010 to 2021) with a currently planned total budget of EUR 339 million. The strategy of EnDev is geared towards developing and promoting sustainable pro-poor markets for energy services and off-grid products, and sustainable social welfare measures ensuring energy access for those people and cases that cannot be reached through market activities.

By December 2018, **EnDev in its second phase** has facilitated sustainable[1] access to modern energy services[2] to 16.27 million people. Households were connected to the national grid or isolated grids, or use electricity through photovoltaic systems. Others benefited from improved and cleaner cooking technologies, such as improved firewood and charcoal stoves or biogas plants (see table A-1). In addition, more than 13,659 schools, health stations and community centres got access to improved cooking energy or electricity, or other modern energy carriers. Furthermore, 34,289 small and medium enterprises gained access to modern forms of energy for productive use.

Table A-1: Adjusted number of people with sustainable access to modern energy services (EnDev 1 + 2)

	lighting / electrical appliances	cooking / thermal energy	total household members
EnDev 1	0.82 million	4.19 million	5.01 million
EnDev 2	4.65 million	11.62 million	16.27 million

Facilitating access to modern energy service is a key requirement to reduce poverty, to improve the standard of living, and is a means to inclusive social, economic and low carbon development. Consequently, the success of the programme does not only depend on the number of people reached but also on the impact of the modern energy service provided on income, health, education and well-being.

EnDev continuously analyses the impacts of its country activities to verify the assumptions regarding the relation of energy access and sustainable development. In addition, the sustainability of the EnDev results and impacts are regularly investigated. Since 2009, EnDev has carried out 251 baseline, impact and sustainability studies. Major results of the studies are presented in the impact report "Empowering people" of EnDev, which is annually updated (http://endev.info/content/Downloads).

The expenditures for EnDev 2 activities in 2018 reached EUR 31 million.

[1] Sustainable access here refers to long-lasting access.

[2] The term modern energy service refers to electricity as well as to natural gas, LPG, and biogas as cooking fuels and to cleaner and advanced cookstoves for solid fuels that have higher combustion efficiency (at least 40% in comparison to traditionally used stoves).

Malawi

Successful and respected: women's stove production groups

When driving through the Machinga district in the southern part of Malawi in early March, all is green – acacia trees carry their yellow blooms and Baobabs their leaves. In the early morning hours, women cook breakfast in front of the huts and houses that are spread across the countryside. You can spot them from afar due to the smoke the three-stone fireplaces emit.

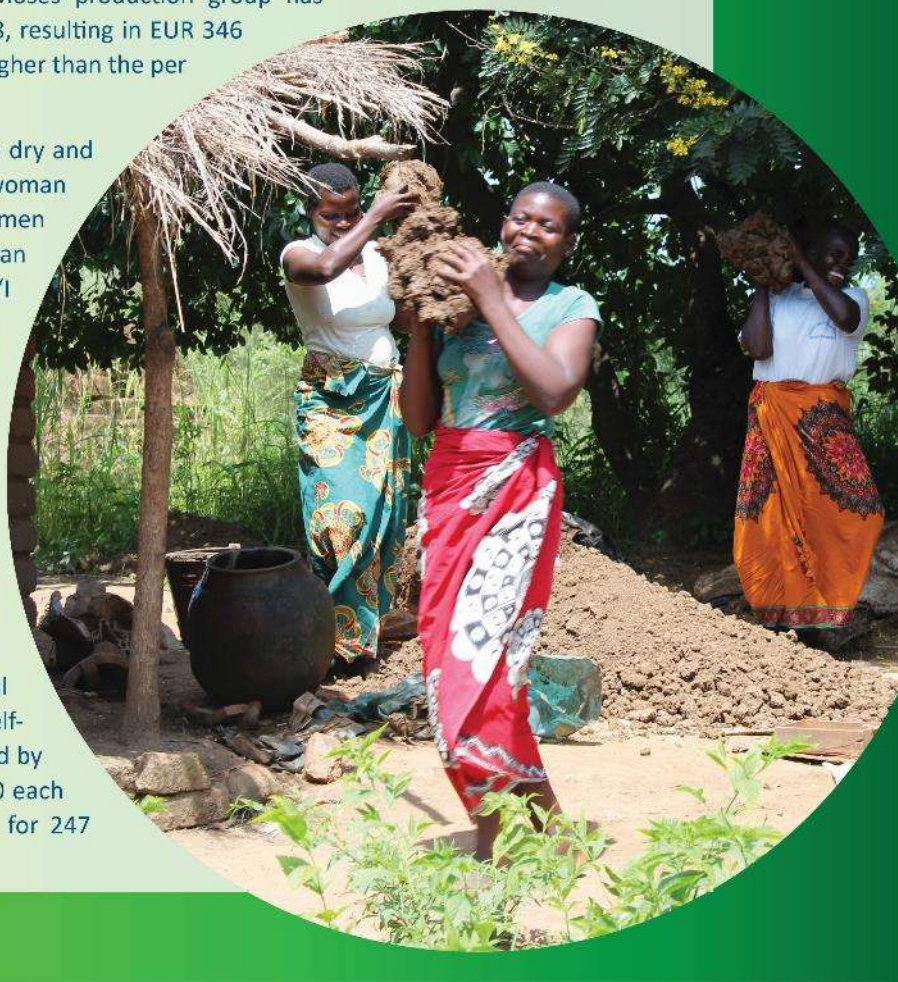
More than 90% of the country's total demand for energy is met with firewood and charcoal, causing more and more stress on biomass resources as the population increases. However, in Machinga district, a group of women is producing clay stoves for cooking that help to solve the problem. They call them "Chitetezo Mbaula", which means "protective stove" in their local language, as it protects the environment.

The project started with one woman from the village, Dassao, a potter who used to produce clay pots. She was approached by the EnDev implementing partner United Purpose to participate in a stove training together with two other women from her village. They founded the "Moses production group" – named after the elder heading the village – that has eight members today. Since 2016, they have produced about 11,000 stoves.

The "Moses production group" is just one of 22 production groups cooperating with EnDev today. When the team first approached the local people in Malawi with the stove project, women who started with the Chitetezo Mbaula production were looked down upon by the majority of their peers in local communities for doing a physical work that is quite dirty due to the clay. At the same time, men were not interested in the stove production, as they did not consider it a "men's task" and they did not see it as a business.

This, however, has changed drastically during the past four years. According to EnDev's implementing partner United Purpose, today women are respected entrepreneurs, and it is equally men and women who approach them to enquire how they can become stove producers.

Men and women alike have understood that the stove production stabilises their families' financial situation. Usually people in rural areas earn income only twice a year after harvesting. The stoves enable most producers to invest in their homes and their children's education. Some women's groups are able to send their children to secondary school or even university. The Moses production group has earned 2,280,850 Malawi Kwacha (EUR 2,773) in 2018, resulting in EUR 346 per woman. This yearly income is about one quarter higher than the per capita gross national income in Malawi.



The Moses group has now built a brick-warehouse, to dry and store the Chitetezo Mbaula. In that house, the chairwoman of the group proudly talks about their success: All women have been able to buy maize and other flour for lean season, when they would have suffered from hunger. "I bought fertiliser. And, you know, I am an old woman and cannot do the heavy physical work in the field anymore. I employ a young man to do it for me," she says. "I also bought bricks to finish my house and an iron roof."

By December 2018, 191,610 people in Malawi have gained access to improved forms of energy for cooking as a result of the DFID-funded RBF component. This component focuses on the concept of "leave no one behind", subsidising stoves in a very early market development phase, thereby supporting the initial market opening and subsequent development of a self-sustaining market. The number of stoves manufactured by EnDev-supported groups has risen to more than 2,000 each month. The stove-making business has created jobs for 247 women and 108 men.

B. Overview of current status of the EnDev 2 programme

B.1 Outcomes in the period 2009 – December 2018 (EnDev 2)

This chapter provides information on energy access outcomes, health impacts and CO_2 emission reduction for phase 2 starting in 2009. Since the beginning of 2015, EnDev also reports on specific job creation, leverage and gender indicators. At the end of 2018, the EnDev partnership comprised 29 projects in 25 different countries, with side activities in additional 5 countries. EnDev supports access to improved cooking systems in 21 of the 29 projects, to off-grid solar technologies (solar home systems and picoPV) in 17, to mini-grids (solar/hybrid or hydropower) in 10 projects, grid extension in 11 projects and biogas in 5 projects (see table B-1).

Table B-1: Overview of technologies supported in EnDev projects

		stoves	biogas	other cooking/ thermal	SHS	picoPV	solar mini-grid	hydro mini-grid	grid	other lighting/ electricity
country projects	Bangladesh	●				●				
	Benin	●			●	●			●	●
	Bolivia	●				●			●	
	Burkina Faso	●								
	Cambodia		●							
	Ethiopia	●			●	●		●		
	Ghana	●							●	●
	Indonesia						●	●		
	Indonesia biogas		●							
	Kenya	●				●	●			
	Liberia (with Sierra Leone and Guinea)	●		●		●	●			
	Madagascar	●								
	Malawi	●				●				
	Mali				●	●	●			●
	Mozambique	●				●		●	●	
	Nepal	●						●	●	
	Peru	●		●	●	●			●	
	Rwanda (with Burundi and DRC)		●			●		●		
	Senegal	●			●		●		●	
	Tanzania	●				●				
	Uganda	●			●	●		●	●	
	Vietnam		●							
multi-country projects	BD, KE, RW, TZ, UG[3]				●					
	Central America (HN, NI)[4]	●		●	●	●		●	●	
	Kenya, Tanzania, Uganda		●							
	Mekong (KH, LA, VT)	●								
	Sub-Saharan Africa (MOZ, UG, RW)								●	
	Cooking sector support and	●								
	Refugee activities (KE, ML, SO,TZ,UG)	●				●	●		●	

[3] focus is on off-grid appliances

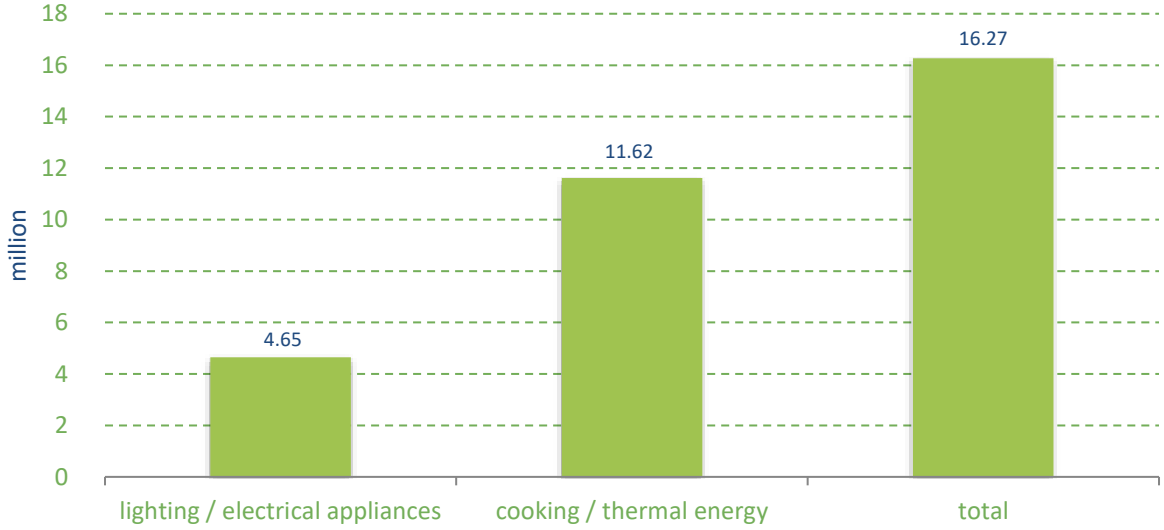
[4] with some activities in Guatemala

In the current reporting cycle detailed information about each project is presented in the Annual Planning 2019 update document. Hence, for this year's Progress Report it was decided not to present more information about each project on a country sheet to avoid redundance.

Outcome figures

By December 2018, **EnDev 2** facilitated sustainable access to modern energy services and technologies for about **16.27 million people**. Of these, 4.65 million people (29%) were connected to the central grid or a mini-grid, or used standalone electric systems. 11.62 million (71%) are now using improved cooking technologies, such as improved firewood and charcoal stoves or biogas plants (Figure B.1). In addition, **13,659 social institutions** gained access to electricity or improved cooking systems and **34,289 small and medium enterprises** now have access to a modern form of energy for productive use.

Figure B.1: Adjusted number of household members provided with modern energy services in a sustainable manner (EnDev 2)



The focus of the EnDev programme is on Sub-Saharan African countries. Around 62 % of the committed EnDev 2 funds are currently allocated to this part of Africa (figure B.2). The share of least developed countries (LDC) supported by EnDev is 63 % (figure B.3).

Figure B.2: Funding by region

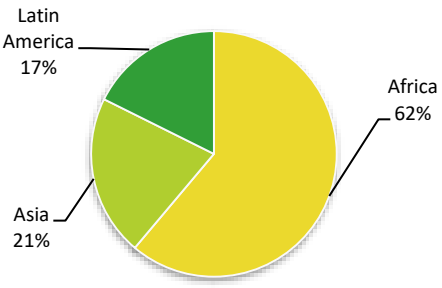
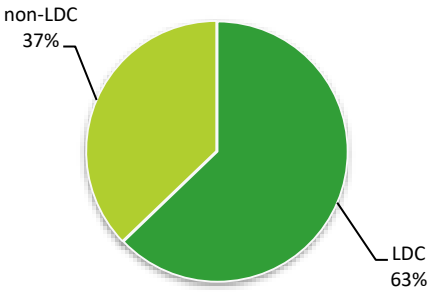


Figure B.3: Funding by countries



The majority of the target achievement on household level comes from access to modern cooking solutions (71%) while households with access to electricity contribute 29% to the overall target achievement (figure B.4). 43% of the country budgets are used for activities to promote modern cooking, 57% to promote access to electricity (figure B.5). Especially the sales of picoPV systems experienced the highest growth rate.

The cost efficiency of cooking technologies (stoves and biogas) is currently 9.0 EUR / person on average and 30.2 EUR / person in the case of electrification (figure B.6).

Figure B.4: Target achievement - People with access to energy - EnDev 2

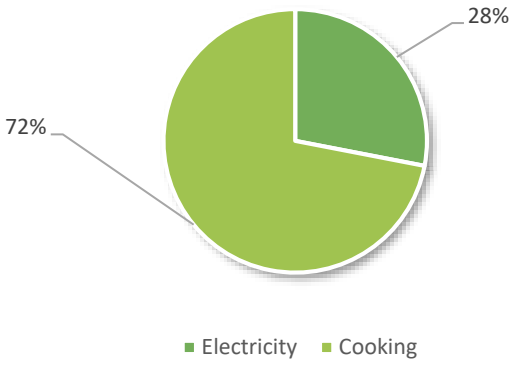


Figure B.5: Expenditures EnDev 2

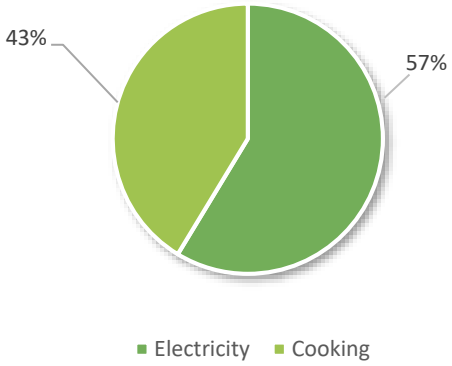
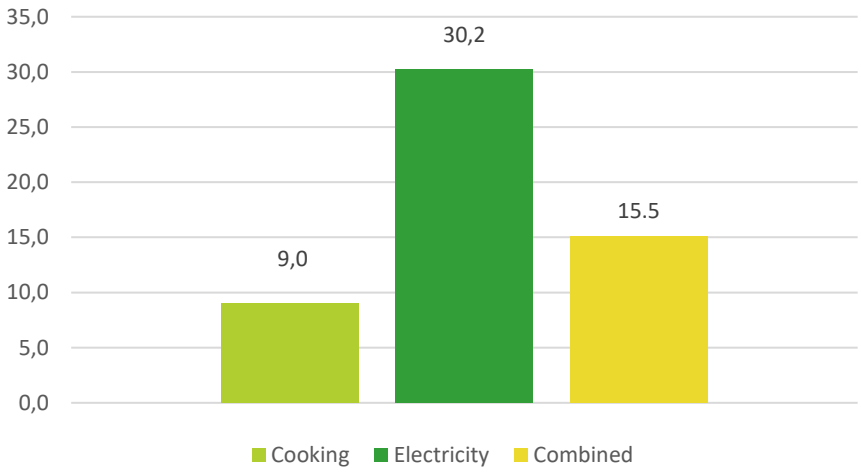
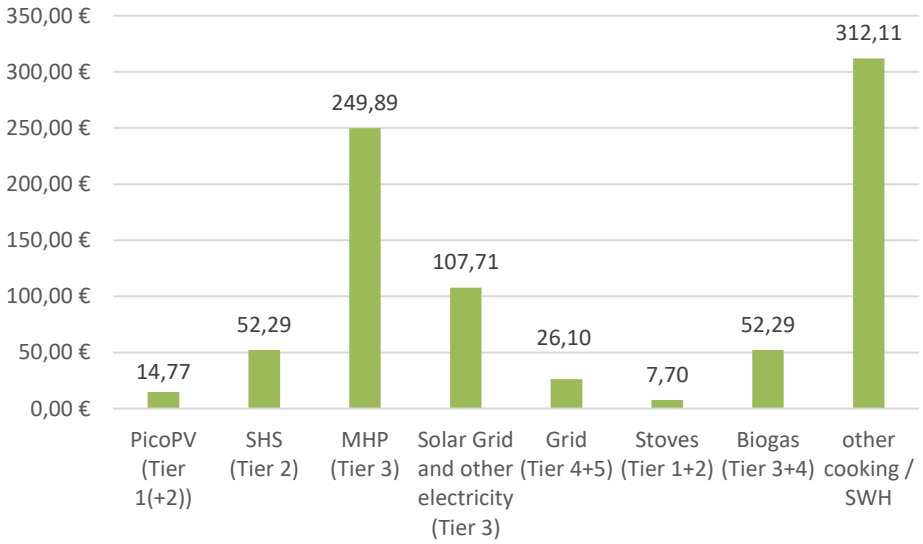


Figure B.6: Cost efficiency in EUR/person reached - EnDev 2



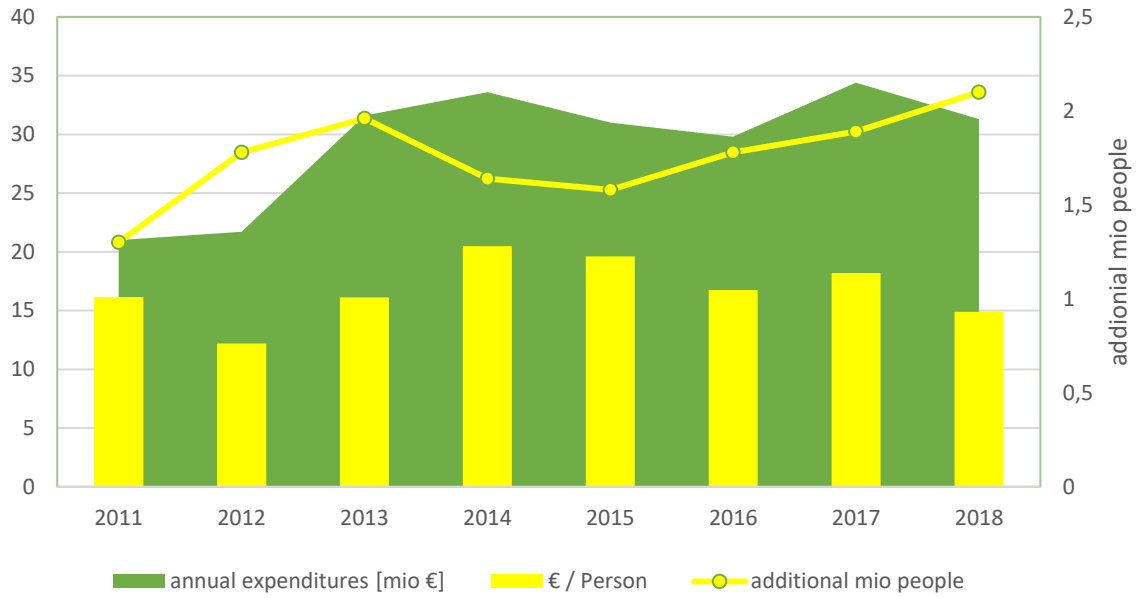
Within EnDev projects, a set of different energy technologies is promoted (figure B.7). Only the cost efficiencies of stove and picoPV activities are below the overall EnDev benchmark of 20 EUR / person.

Figure B.7: Cost efficiency per technology - EnDev 2



Overall, since 2013 there is a slight trend related to the above analysis. While projects expenditures within this period were on average around EUR 32 million per year, the achievement of additional targets show a slightly increasing trend. Related to this a slight decrease of the overall cost efficiency can be observed. This reflects the big increase in the target achievement of tier 1 and tier 2 technologies with a low value regarding cost efficiency as shown above. (Figure B.8).

Figure B.8: Overview development Targets/expenditures in projects/cost efficiency



The outcome figures reported in this report are verified in the field through basic data from customers, who got access to energy services and products, and/or through sales figures of energy companies and retailers. In cases, where other international partners have been involved in addition to EnDev, only a part of the outcomes are counted according to the financial share of EnDev in the total cost of a measure. EnDev does also not simply sum up outcomes achieved in the course of the programme but tries to capture those processes, which **reduce outcomes** through so-called adjustment factors. Thus, figures of six-month reporting periods are adjusted downwards before the total number of beneficiaries is presented to donors and the public. Up to now, EnDev applies **four adjustment factors** concerning sustainability, windfall gain, double energy and double EnDev counting. The background for each factors was described in previous progress reports.

In addition, the EnDev figures already include a discount for **replacement,** which reflects the limited life span of some of the technologies promoted. This typically concerns cookstoves and picoPV devices: in order to continuously benefit from the service, the system may have to be bought more than once over the course of the project period. Some of the later-stage sales will go to beneficiaries reported before. It would therefore be wrong to simply adding up all sales numbers. Only sales beyond replacement generate new access.

The adjustment factors described above were reviewed in 2018. Currently a system with new factors based on some methological improvements is under testing. Application of the new factors is foreseen for the Progress Report 2019. Hereby EnDev aims to keep the high accuracy of its monitoring data while reducing the complexity and the efforts that are required to keep it progressing.

Access to electricity

EnDev uses a tier system to define different levels of **access to electricity**. In this system, access to electricity is defined in terms of services, for which both the supply of energy and a device turning the energy into a useful service are required. As it is often difficult to directly monitor electricity services, access can be claimed by demonstrating access to the respective device and the required energy. Alternatively, access can be claimed on the base of electricity consumption.

The EnDev tier system is aligned with the Multi-Tier Framework (MTF) of SEforALL presented in the Global Tracking Framework (GTF). Based on this, the EnDev electrification outcome figures in the different tiers for the EnDev 2 phase are:

Table B-2: EnDev 2 outcomes according to the tier system for electrification

Tier	Services	Typical system	Number of people	%
5	tier 4 services plus use of devices typically requiring a few kilowatt like air conditioners	grid	821,616	18%
4	tier 3 services plus use of devices typically requiring a kilowatt like water heaters, irons	limited grid	379,838	8%
3	tier 2 services plus use of devices typically requiring a few hundred watt like rice cookers, refrigerators	mini-grid	175,916	4%
2	bright light, radio, telephone plus use of devices typically requiring tens of watts like TV, video, fan	solar home system	1,678,594	36%
1	medium bright light and, if possible, limited radio use and telephone charging	picoPV, battery charging station	1,593,560	34%
		total	4,649,524	

Access to improved cooking devices

The SEforALL tier system for improved cooking systems is still not 100% developed. Especially the health indicator is difficult to define for all levels. EnDev is involved in intense discussion with WHO, World Bank and partner organisations to finalize the matrix. The tier system currently implemented by EnDev is in line with the current state of the multi-tier framework presented in the 2015 tracking framework. EnDev outcomes are attributed to the 5 tiers as follows:

Table B-3: EnDev tier system for improved cookstoves

Tier	Services	Number of people (EnDev methodology)	%
5	Access to needed quantity of energy source: ≥ very good Health protection: ≥ very high Convenience: ≥ very high	0	0%
4	Access to needed quantity of energy source: ≥ good Health protection: ≥ high Convenience: ≥ high	175,308	1.5%
3	Access to needed quantity of energy source: ≥ fair Health protection: ≥ fair Convenience: ≥ fair	16,752	0.1%
2	Access to needed quantity of energy source: ≥ limited Health protection: ≥ sufficient Convenience: ≥ sufficient	6,212,942	53%
1	Access to needed quantity of energy source: ≥ deficient Health protection: ≥ low Convenience: ≥ low	5,194,750	45%
0	Access to needed quantity of energy source: ≥ highly deficient Health protection: ≥ very low Convenience: ≥ very low	17,263	0.1%
		11,617,015	

Nepal

Nepal: Electric services on the doorstep

Khem Raj Khatri is a former teacher and father of two little sons. The family lives in Nepal in a municipality called Khajura. While Khatri worked as a teacher, he only earned around 8,000 Nepalese rupees (EUR 64) per month – not enough to pay the monthly tuition of 15,000 rupees (EUR 120) for his kids. However, Khatri's situation changed completely when he participated in an EnDev professional training.

As Khatri's community was already connected to the national grid five years ago, EnDev chose it for a training programme: Together with the "National Association of Community Electricity Users Nepal" (NACEUN) and HELVETAS (a Swiss NGO), EnDev trains local inhabitants to become entrepreneurs or improve their entrepreneurial skills. The participants learn to use electricity for the production of goods or for offering services. Within one month, they learn how to develop a business plan and acquire technical skills, for example for carpentry or for grinding and milling.

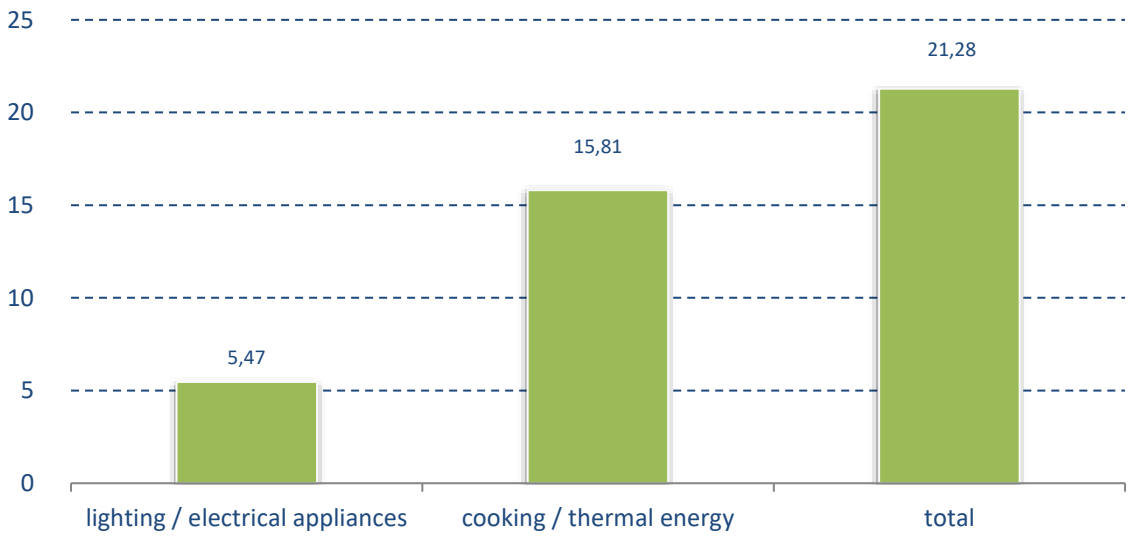
So far, EnDev has trained 240 people in Nepal, 35 of them from Khajura. Khatri learned how to repair electric devices and became part of the Khajura Sainik Multi-Purpose Cooperative. He borrowed 30,000 Nepalese Rupees (EUR 240) and opened his own repair shop – locally offering a service which before was not available within a radius of several kilometres. By this, Khatri is encouraging the use of electricity in nearby firms and safeguarding sustainable electricity access. Also, he can repair and maintain his neighbours' phones, TVs and rice cookers.

With his new Job, Khatri earns 22,000-25,000 Nepalese Rupees (EUR 175 – 200) per month – three times his former salary. The extra income has lifted his living standard, enabling him to buy electric devices such as a rice cooker or a mobile phone himself. Knowing that he will participate in advanced electronic repair trainings in the future, Khatri is already planning to move to a larger shop and even hire an assistant. And, most importantly: Khatri is finally able to pay for his childrens' education.

B.2 Overall outcomes in the period 2005 – June 2017 (EnDev 1 + 2)

Looking at the overall EnDev programme, starting from phase 1 in 2005 up to December 2018 in phase 2, the **total number of people** having gained sustainable access to modern energy services on household level amounts to **21.28 million** (figure B.9). The total number of **social institutions** is around **21,150**; the total number of **small and medium enterprises** is more than **46,200**, respectively.

Figure B.9: Adjusted number of household members provided with modern energy services in a sustainable manner (EnDev 1 and 2 combined).



The absolute numbers of verified beneficiaries (taking into account replacement but not the adjustment factors described above) are 28.8 million for EnDev 2 and 37.8 million for EnDev 1 and EnDev 2 combined.

In addition to the main objective of the partnership to facilitate access to modern energy technologies and services, EnDev has four impact targets: **a)** climate mitigation, **b)** health prevention, **c)** improved gender balance, **d)** job creation, and two outcome targets: **e)** leverage of funds and **f)** increase of power generation with renewable energies.

CO_2 savings

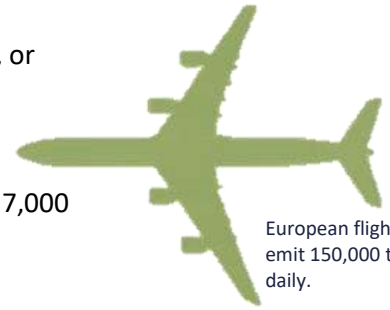
An improved firewood cookstove, which saves 30% of firewood in practice and which is used to prepare 80% of all meals, saves around 0.55 t CO_2 per year (on average, over all EnDev stoves) compared to cooking on open fires. The total savings of all EnDev stoves for one year amount to approximately 2,198,441 t of CO_2. In addition, 214,651 t of CO_2 savings are generated for which emission reduction certificates are sold on carbon markets. Air pollutants as a result of incomplete combustion, including black carbon, are not included in this calculation.

One electric lamp powered by SHS and mini-grid or grid connections replaces minimum two kerosene lamps, thus saving at least 0.18 t CO_2 per year. A solar lantern replaces approximately one kerosene lamp, saving 0.09 t CO_2 per year.

The total CO_2 saving of 3.7 million stoves and access to solar home systems, mini-grid connections or solar lanterns for 1.26 million households supported by EnDev are 2,591,667 t of CO_2.

For comparison: this amount corresponds to

- CO_2 emissions of all intra-European flights during 15 days, or
- Norwegian car traffic during 165 days, or
- the yearly emissions of 480,000 inhabitants of Sweden or 232,00 inhabitants of the Netherlands, or
- planting of more than 5.5 million trees on an area as big as 7,000 soccer fields.



European flights emit 150,000 t CO_2 daily.

Health

As a result of EnDev 2 activities the exposure level of indoor air pollution could be drastically reduced for more than 6.4[5]million household members (particularly women and children). The improvement of the health protection was achieved by:

1. reducing the quantity of emissions of particulate matters and CO through a) improved cookstoves with higher combustion efficiency, and lower heat losses b) improved fuel quality and c) fuel switch;
2. removing pollutants from the cooking site through chimneys, flues, hoods or ventilation;
3. reducing exposure to pollutants through changed cooking practices and placing of the stove and kitchen.

The specific assessment of the health impact of promoted cooking solutions is based on the type of stove and fuel, the use of chimneys, flues or hoods, the degree of ventilation and the cooking place. Only cooking solutions classified as tier 2 or higher are considered as sufficiently safe regarding exposure of household members to indoor air pollution. These include all stoves using electricity or gaseous fuels as well as improved biomass stove (rocket stoves, gasifier stoves) used outdoor or with chimney or hood when installed or placed indoor.

Gender impact

This paragraph presents data and findings on gender impacts in the period of EnDev 2.

The review of EnDev impact studies concerning gender-related effects provide ample evidence that access to modern energy improves:

1. **employment of women and income generation:** Studies from Ethiopia and Kenya, inter alia, demonstrate that women trained by EnDev started successful stove businesses (production/retailing) both as secondary business and even full-time, created employment for assistants, and generated profit. In Kenya, the share of women among active entrepreneurs both in solar and cooking technologies is slightly above 50%. However, women have less income sources, lower sales in both technologies, and work fewer hours on income generation. They eventually earn 25 and 40% less than male solar and stove entrepreneurs, respectively. Further, males are 70% more likely to have customers beyond their county borders. This adds to the evidence from international studies[6] that the success of women entrepreneurs depends very much on the amount of household duties additional to their business endeavours. Nevertheless, even with small additional income, women contribute to the household earnings and spend it for the benefit of the whole family.

[5] All members of households that use a stove fulfilling the level 2 criterion for the health attribute of the multi-tier matrix for cooking solutions.

[6] See, e.g. Bradshaw, Castellino and Diop, 2013, Women's role in economic development: Overcoming the constraints, Background paper for the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda, page 8 ff., retrieved from: http://unsdsn.org/wp-content/uploads/2014/02/130520-Women-Economic-Development-Paper-for-HLP.pdf

2. **medical services especially for women in health centres:** Electrified health centres in Ethiopia, Liberia, Sierra Leone and Guinee now provide service also during night time which is specifically important for women in the final stage of their pregnancy;
3. **indoor air quality in kitchen areas:** 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 household members are women and 2/5 young children it can be concluded that around 1.28 million women and 2.56 million young children benefit from improved health protection;
4. **safety against sexual harassments,** due to electric light that provides safety both inside homes by decreasing the number of burns and house fires and outside homes in public spaces, and the reduction of collection time for firewood;
5. **working conditions and comfort** due to improved cookstoves that are easier to use and the replacement of kerosene lamps with PV-powered lamps (e.g. studies in EnDev Bolivia and Ethiopia).

Gender-disaggregated monitoring data about full time job creation is presented below.

Installed generation capacity with renewable energies

The total power capacity based on renewable sources installed since the start of EnDev 2 is 48.4 MW.

SHSs contribute 23.7 MW to the total result, which is the biggest share amongst the technologies with 49.1%. The share of mini-grids is 20.4 MW (MHP: 12.6 MW, PV: 7.8 MW). PicoPV systems up to now have a total installed capacity of 4.2 MW. It is estimated that an additional 15 MW have been installed in the first phase of EnDev resulting in a totally installed capacity of 63.4 MW.

Job creation

This paragraph presents data on employment effects for the period from January 2018 until December 2018.

EnDev project captures information about the time required for production of stove parts as well as for assembly and for installation. Based on the available data and the assumption of 250 working days per year with 8 working hours per day, it can be calculated that 3,264 full-time equivalent jobs existed in the process steps of the production, assembly and installation of 1,782,760 stoves from January 2018 until December 2018. During the same period, it is calculated that at least 385 full-time equivalent jobs existed in the biogas sector by installation of biogas digesters. Both figures sum up to 3,649 full-time equivalent jobs in the installation and assembly of cooking energy technologies.

Most of these work steps are not done by full-time labour. About 2/3 of the EnDev stove projects captured additional data about the number of people working in the production of stoves. These captured values (which include part-time labour) can be compared to the calculated full-time equivalents. The comparison reveals that on average 3.4 persons are involved for each full-time equivalent. Based on this ratio a total of 11,099 people worked in the production and installation of EnDev stoves during the last 12 months.

EnDev applied the methodology published by UNEP[7] for calculating the number of jobs created along the distribution chain. It resulted in additional 711 full-time equivalent jobs exist in the distribution

[7] Light and Livelihood: A Bright Outlook for Employment in the Transition from Fuel-Based Lighting to Electrical Alternatives; UNEP 2014.

chain for stoves. For picoPV systems, which are mainly produced in China, and for SHS the number of full-time equivalent jobs along the distribution chain was 780.

The mini-grids projects supported by EnDev also create jobs. Temporay jobs that exits during the construction of the mini-grid sites have not yet been considered. During the operational phase there are jobs in operation of the plant, administrative and managerial tasks and security service. It is calculated that by end of 2018 in total 2,748 full-time equivalent jobs existed that were related to these work profiles at the mini-grids.

In addition to direct employment effects described above, EnDev also created indirect employment effects. Within the SMEs that got access to energy through EnDev it is estimated that 3,429 full-time equivalent jobs were created.

Altogether, 11,318 full-time equivalent jobs existed in the supply chain for energy access technologies as well as in companies benefitting from new energy access in our partner countries that can be assigned to EnDev.

Table B-4: Employment effect of EnDev

	Type of employment effects			
	Direct			Indirect
Type of Technology	Production	Distribution/ Sales	Operation	SMEs Application of Technologies
Cooking Energy	3,649	711		3,429
Solar light		780		
Mini-grids			2,748	
Total 11,318				

Leverage

This paragraph describes leverage effects since 2015.

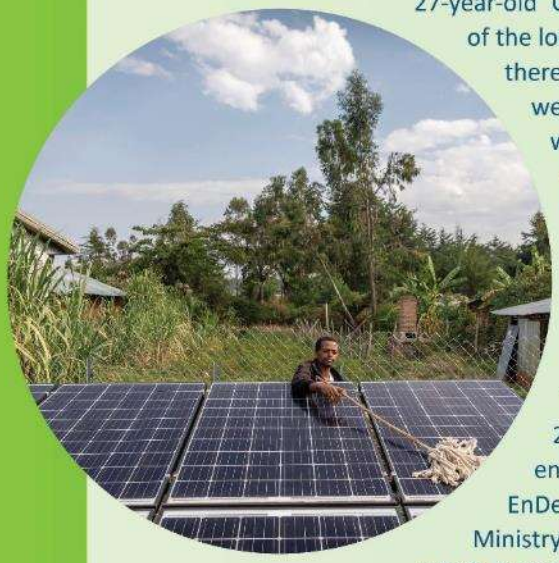
The total value of all stoves and off-grid systems sold or installed by companies cooperating closely with EnDev since 2015 was EUR 264.2 million, which is a ratio of 2.1 in relation to the programme expenditures of EUR 126.6 million.

Since 2015, the total amount of investments along the market chain including intermediary products but excluding expenditures for private consumption is about EUR 625.9 million in the current semester alone, representing a ratio of 4.9 in relation to the EnDev programme expenditures.

A health centre full of light

More than 16,000 people live in the so-called Korjo village, 370 kilometres from the Ethiopian capital Addis Ababa. Its mud-plastered houses with their corrugated iron sheet roofs are scattered on both sides of a narrow dirt road, most of them having farmland in front of the door. Cows, sheep and donkeys are grazing, and colobus monkeys are playing in the trees of the small forests surrounding the place.

For Gutema Berhanu Geleta, this remote location used to be a challenge. Korjo is not connected to the grid. When the 27-year-old Geleta became head of the local health centre in 2016, there was no electricity. When there were accidents at night, Geleta's team would sometimes have to stitch patients' wounds in the weak light of a dry cell torchlight or a mobile phone. For cooling medication and laboratory chemicals, they only had one refrigerator, which ran on kerosene. Thus, they used to need five litres of kerosene per month and spend at least ETB 600 (EUR 19) on it.



This situation improved significantly in October 2018, when EnDev provided solar electric energy for the health centre. Since 2016, EnDev collaborats with the Ethiopian Ministry of Water, Irrigation and Energy, which launched the "National Electrification Program Light to All" in 2017. EnDev also works with Ethiopia's largest regional state Oromia to give health centres access to electricity, being co-funded by the Korea Foundation for International Health (KOFIH). So far, 14 health centres gained electric energy access. Thus, more than 356,000 people benefited from the improved health services.

Since the Korjo health centre has electricity access, the people of Korjo can see the lights of the building from far at night. Every room has its own light bulb and plug sockets now. There are two computers for the staff and three refrigerators to keep the medication cool. Today, the laboratory has an electric meter to analyse blood samples as well as an electric microscope. The lab technician, Anteneh Tsadik, says: "It is now easier for me to detect illnesses such as Tuberculosis and Malaria."

Geleta is happy that now the health centre can also treat patients at night. Also, more women come to the centre at night to give birth. Geleta happily reports that recently, a 23-year-old woman named Seliya Amin gave birth to her daughter in the health centre at night.

In general, the electricity in the health centre is attracting people. While before the electrification, on average 500 people came to the centre per month, today there are over 700 – especially mothers and children. Geleta says: "I am very happy. The electricity improved our work and now I am able to serve my community better. This satisfies me as well as the people."

Ethiopia

C. Cooperation and strategic partnerships

EnDev raises voice in the SDG7 review discussion

In 2017, the preparations for the UN-HLPF review of SDG7 (July 2018) started. An elaborate stakeholder process preparing a series of policy briefs on various SDG7 subtopics and regions took place towards the end of the year. These policy briefs highlighted in total twelve fields of action to achieve the ambitious SDG7 goals. In a series of international events (e.g. Bangkok in Feb., SEforAll Forum and Vienna Energy Forum in May 2018) in the run up the SDG7 review, EnDev gave its partners and beneficiaries a voice with targeted messaging on:

1.) the need to boost decentralised off-grid energy solutions;

2.) the need for increased capacity building;

3.) a clear focus on 'Leave No One Behind' and the need to address vulnerable groups;

4.) the importance to make clean cooking solutions a top priority;

5.) the need to use energy for stimulating economic development in LDC's.

Progress in cooperation with strategic partners

In 2018, EnDev continued to intensify and establish strategic partnerships with key stakeholders from the public, finance and private sector. Highlights of these efforts are:

Worldbank/ESMAP

- EnDev continued the close cooperation with ESMAP on further developing the MTF for cooking energy with a special focus on fine-tuning the structure and the individual attributes of the framework. EnDev brought into the discussion the methodology and experiences from the pilot tests on country level of the Cooking Energy System (CES) approach.
- With the joint development of complementary proposals to the Green Climate Fund (GCF) EnDev and the Worldbank have established a strategic cooperation, which brings the partnership from international level to operationalizing the cooperation on country level (Senegal and Kenya).Furthermore, World Bank / ESMAP, like the Clean Cooking Alliance was invited to a strategic evaluative review of selected EnDev country proposals with regard to a strengthened alignment to interventions in the respective countries.
- Finally, in a recent tripartite meeting between ESMAP, CCA and EnDev it was agreed to explore closer alignment of and cooperation between the organizations in the field of clean cooking, on both the global and the country level. This will be further developed in 2019. These discussions also included a technical exchange on the DFID-funded MECS program related to the future perspectives for electric cooking.

Clean Cooking Alliance (CCA; formerly GACC)

- The exchange with the CCA has been further intensified in 2018 on global and on country level to take advantage of synergies to leverage each other's efforts in the cooking sector.
- EnDev, ESMAP and CCA have established a three-party cooperation to further develop joint messaging and align country activities.
- To strengthen EnDev´s outreach and voice in the international debate, EnDev has joined the Clean Cooking Investment Forum in November 2018 and is assessing the option of acting as co-organizer for the upcoming forum in November 2019. While CCA will focus on larger international companies, EnDev plans to bring in the perspective of local (semi-)industrial producers.

EnDev and Gender

In 2018, EnDev has identified a number of potential strategic partners to strengthen its work on gender. In the course of the year, EnDev has assessed cooperation potential with UN Women, Plan International and ENERGIA. While cooperation potential with UN Women and Plan International is mostly on country level, ENERGIA has been approached to discuss options for a strategic partnership on global level. Bringing in the expertise of ENERGIA will enable EnDev to further embed gender in its planning and implementation.

Acumen Fund

EnDev and Acumen Fund are exploring potential to support partners on country level to grow to an extent, where their projects become bankable investment opportunities, which could be financed with the Pioneer Energy Fund managed by Acumen. The objective of the fund is to foster the off-grid energy sector.

Apart from fund management, Acumen is as well active in developing new methodologies as e.g. the Lean Data Mechanism. EnDev and Acumen offered a webinar in 2018 to spread information about the methodology, its application and lessons learnt. The Lean Data Mechanism is a highly interesting approach towards monitoring, which is taken into account in the development of the future EnDev monitoring.

Rwanda

High quality flour production around-the-clock

Rutenderi is a 4,000-people-village in the east of Rwanda, about 150 kilometres from the capital Kigali. The region is relatively flat and fertile, with bananas, maize, beans, and rice growing there. However, until recently, the people in Rutenderi could hardly use electricity to process these crops, as the village is not connected to the national grid and stand-alone systems with the capacity to power agro-processing machinery are not affordable for the rural population.

For the miller Joseph Singirankabo this was a challenge. He used a diesel generator to power his mill. However, the generator caused many troubles: It would sometimes break down and fuel supply was costly and often cumbersome.

In 2019, this situation changed. As the hilly topography of Rwanda makes it hard to extend the national grid to all villages, EnDev supports the Rwandan private sector to develop and operate solar mini-grids. Support is provided to the developers and operators in terms of technical assistance as well as financially via a result-based financing approach. This makes mini-grid based rural electrification a business case compared to the previous situation where the private sector did not see opportunities in remote rural areas. In Rutenderi, a 50kW mini-grid was developed by the Rwandan company *Absolute Energy,* now serving 457 households, 36 businesses and 7 social institutions. In parallel to its rural electrification activities, EnDev partners with *Energy4Impact*, an international NGO, in order to target businesses and increase the productive use of the electricity supplied. During the mini-grid construction, *Energy4Impact* coaches the entrepreneurs with business trainings. Then, based on the trainings and the interest of the entrepreneurs in specific businesses, the most promising businesses get a 70% subsidy on their needed equipment like milling and sewing machines.

Singirankabo's business has benefited a lot from the support: The new electricity source is clean and makes power available around the clock. Therefore, his earnings have increased by about 20%. At the same time, he does not have to buy diesel for RWF 60,000 (about EUR 60) per month anymore. For electricity, he will have to pay a maximum of RWF 20,000 (EUR 20) monthly. Thus, his costs for energy went down by two thirds.

"The new grid has improved my business significantly", Singirankabo says. And the new electricity access has even motivated him to expand his business: Between April and May 2019, he is planning to install a bread making factory next to his mill, hiring new assistants.

Abbreviations

ADES	Association pour le Développement de l'Energie Solaire, Switzerland
ASS	After Sales Service
AVSI	Association of Volunteers in International Service
BMZ	the German Federal Ministry for Economic Cooperation and Development
CCA	Clean Cooking Alliance (formaly GACC Global Alliance for Clean Cookstoves)
CDM	Clean Development Mechanism
CES	cooking energy systems approach
CES	Cooking Energy Systems approach
CLASP	Collaborative Labeling and Appliance Standard Program
DEZA / SDC	the Swiss Agency for Development and Cooperation
DFID	the UK Department for International Development
EnDev	Energising Development programme
ESMAP	Energy Sector Management Assistance Program
GCF	Green Climate Fund
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
GTF	Global Tracking Framework
HH	households
HIVOS	Humanistisch Instituut voor Ontwikkelingssamenwerking
ICS	improved cookstove
KOFIH	Korea Foundation for International Healthcare
KPI	key performance indicator
KPT	kitchen performance test
LDC	least developed countries
MECS	Modern Energy Cooking Services Programme (DFID)
MFA / DGIS	the Netherlands Ministry of Foreign Affairs Directorate-General for International Cooperation
MFA-NOR	the Norwegian Ministry of Foreign Affairs
MFI	micro finance institution
MHP	micro hydropower
MoU	Memorandum of Understanding
MTF	Multi-Tier Framework
NIS	Nordic International Support Foundation
PAYG	Pay-As-You-Go
picoPV	pico photo voltaic
PPP	public private partnership
PU	productive use of energy
RBF	results-based finance

RVO	Rijksdienst voor Ondernemend Nederland
SDG	sustainable development goals
SEforALL	Sustainable Energy for All initiative
SHS	solar home system
SI	social institutions
SIDA	the Swedish International Development Cooperation Agency
SME	small and medium enterprise
SNV	Stichting Nederlandse Vrijwilligers / Netherlands Development Organisation
SSHS	small solar home systems
SWH	solar water heaters
UNEP	United Nations Environment Program
UN-HLPF	High-Level Political Forum
WHO	World Health Organization

ANNEX 1 – Overview of results presented in this report

The tables below provides an overview of all quantitative results of EnDev 2 presented in this report. With this table the results can be attributed to the respective project phases.

Table 1 presents the results that have been reached since 2010 based on the indicator as per 2010. It also shows resulst based on the additional indicator per 2015 that can be traced back until 2010 (Number of people, social institutions and SMEs with access, renewable power installed).

Table 2 presents the results that have been achieved on the additional indicators on which EnDev also reports since 2015 that have a specifc reporting period (climate, employment, leverage).

Table 1: EnDev 2 results presented in the Progress Report 2018

		Endev 2	EnDev 1+2
People with access [in mio]	people with access	16.27	21.28
	people with access to cooking	11.62	15.81
	people with access to electricity	4.65	5.47
	indirect supported		86
	people with reduced exposure to IAP	6.4	8.4
	women with reduced exposure to IAP	1.28	
	children with reduced exposure to IAP	2.56	
	people with access (without adjustment)	28.8	37.8
Social institutions	SI with access	13,659	21,150
	schools		13,577
	health centers		1,247
SMEs	SME with access	34,289	46,200
EUR/person	cost efficiency cooking	9.00	
	cost efficiency electrification	30.20	
	cost efficiency combined	15.50	
Watt installed [MW]	Watt installed	48.4	63.4
	Minigrids	20.4	
	MHP-Minigrid	12.6	
	PV-Minigrid	7.8	
	SHS	23.7	
	PicoPV	4.2	

Table 2: EnDev 2 results presented in the Progress Report 2018 - based on additional indicators of 2015 with specific reporting period

		only 2018	2015-2018
Climate	t CO2 savings all technologies (without CDM)	2.33 mio	
	t CO2 savings stoves (without CDM)	2,198,441	
	t CO2 savings stoves (only CDM)	214,651	
	t CO2 savings all technologies (incl. CDM)	2,591,667	
	stoves sustainable in use	3.7 mio	
	sustainable electricity access in use	1.26 mio	
Employment effects	FTE in stove production	3,264	
	stoves produced	1,728,760	
	FTE in biogas installation	385	
	FTE stove prod. and biogas install	3,649	
	FTW stove distribution	711	
	FTE solar system distribution	780	
	FTE Minigrid operation	2,748	
	FTE in SMEs	3,429	
	total FTE	11,318	
Leverage [mio EUR]	value of all systems sold/installed		264.2
	program expenditures		126.6
	total investments along value chain		625.9

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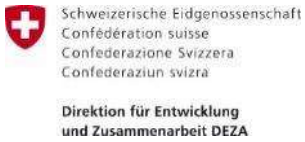
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