

Promotion of village grids

Call for interested companies

In short

Companies can apply for a financial incentive for the commissioning and operation of a village grid by submitting a sound project proposal. The call is open from 15 June 2017 until 15 September 2017. Urwego Bank will sign contracts with accepted companies; and the incentive is paid after commissioning and verification of the village grid (Results-Based Financing approach - see blue box on page 2).

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What business cases are supported?

Village grids are conceptualised as isolated power grids or mini-grids that connect customers of a (number of close by) village(s) via a low voltage distribution networks. The business case of a village grid is therefore competing with the alternatives to either connect the village directly to the national power grid, or to provide electricity services via stand-alone approaches such as Solar Home

Mini-grids and productive use

*Most business cases for mini-grids make only sense, if there are enough large customers served through the mini-grid. Following the **Anchor-Business-Community (ABC) model**, companies can increase the profitability and bankability of their projects. Anchor customers are large, reliable and credit-worthy; they could be a telecom tower, a technical or vocational centre, a mining centre, a coffee washing station, etc. Anchor customers provide stable demand and revenues for the mini-grid and are therefore crucial for the viability of the mini-grid. Service contracts with anchor customers should accordingly have a long-term duration to provide investment security. Businesses are customers which use energy for productive use throughout the day; they could be a carpenter, a welding shop, etc. Daily power demand of business customers can significantly increase the load factor of hydropower mini-grids or reduce the size of the required battery storage of PV mini-grids. Community stands for residential customers who mostly use electricity early in the morning and in the evening. For more information please consult the annex Mini-grids and productive use literature.*

Systems (SHS) or PicoPV systems. The competitive advantage of village grids is defined by the distance to the existing grid, the density of a relevant number of customers within the reach of low voltage distribution and the power demand of these customers. If power demand is largely

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defined by basic lighting and phone charging needs, as well as small electric appliances only, stand-alone supply options become increasingly competitive. To increase power demand, project developers should put emphasis to **potential commercial customers** (see blue box on productive use on page 1 as well as the annexed overview on literature on productive use of energy.)

EnDev benchmarks all received proposals against other mini-grid proposals, grid connection and stand-alone options to select only proposals with value for money. Both new and expansion of existing mini-grids are eligible for support.

What technologies are supported?

For companies to receive the incentive, they have to connect customers in remote rural areas with one of the following:

- **Hydro village grids:** An AC mini-grid based on hydro power;
- **Solar village grids:** A mini-grid based on solar or solar-diesel systems (min. 50% of energy produced from solar); could be either AC or DC;
- **Distribution village grids:** An AC mini-grid with an electricity distribution system only (purchase energy from an independent power producer, or from EUCL and therefore act as a Small Power Distributor in accordance with the RURA Simplified License Regulation for Isolated Grids).

What is the scale of support?

In Rwanda, Energising Development intends to support the private sector in developing village grids. **The call for proposals is open between 15.06.2017 and 15.09.2017.**

A single company or investor cannot, even for multiple projects, receive more than EUR 250,000 of funding.

For solar and hydro AC village grids

The incentive will cover **up to 70% of investment costs**, taking into consideration the profitability of the project, the technology and the service provided to customers. The calculation of the

What is Results-Based Financing?

Results-Based Financing (RBF) is a new financing approach introduced by the UK Department for International Development (DFID) and implemented by Energising Development in several countries, including Rwanda. The idea behind the approach is to reward companies for their previously-agreed and delivered results.

In essence, RBF is a private sector support mechanism to motivate private companies to move into new business areas in renewable energy. RBF is different from traditional grants. The key feature is payment upon delivery. Private companies are expected to take the full risk until the contracted results – in this case the successful construction and operation of a village grid – have been achieved. Funds are disbursed after independent verification of results. This means that participating companies will have to pre-finance their projects, either through commercial bank loans or other sources of funds.

incentive will be carried out after the application is reviewed, and the Viability Gap Funding (the total amount of incentives to be given to a company) will be communicated to the company. The grant will be paid in two parts:

- A one-time payment as contribution to the investment cost after village grid completion (commissioning incentive);
- 15 EUR per quarter for every paying customer during the first year of operation (connection incentive).

The sum of both commissioning and connection incentives cannot exceed 70% of investment costs.

For solar DC village grids

Solar DC village grids will receive an incentive that is **fixed at 20 EUR per paying customer**. The full amount of the grant is transferred after the village grid completion, i.e. after commissioning.

For distribution village grids

Distribution village grids will receive an incentive that is **fixed at 150 EUR per paying customer**. The grant is split in two parts:

- A one-time payment as contribution to the investment cost after village grid completion

(commissioning incentive) equivalent to EUR 90 per paying customer connected;

- 15 EUR per quarter for every paying customer during the first year of operation (EUR 60 total - 4x15 connection incentive).

The sum of both commissioning and connection incentives is equal to EUR 150 per paying customer connected.

If you are interested in this business model, please approach EnDev for an individual meeting. EnDev will assist companies in the dialogue with RURA and EUCL.

Connecting customers through a virtual grid

In addition to connecting customers to the village grid via cable, companies can connect additional customers through a virtual grid. This means customers are not directly connected via cable, but served via SHS, PicoPV or battery systems which are owned by the village-grid operator and rented to the customers (fee for service). SHS and PicoPV systems used must be Lighting Global certified.

For example, a village grid could utilise the otherwise wasted electricity to charge batteries. These batteries would serve customers for which a cable connection does not make sense (too far away, too little consumption, etc.). Virtual village grids will receive an incentive that is **fixed at 20 EUR per paying customer** if they provide more than Tier 1 service according to the SE4All Global Tracking Framework. If less than Tier 1 is offered, the incentive will be the same as through the RBF Solar Lighting. The full amount of the grant is transferred after the village grid completion, i.e. after commissioning. Virtual grids will only be accepted if they increase the profitability of the overall village grid project. EnDev will carry out a comparison with and without virtual grid to determine this. Additionally, the number of customers connected to the cable grid has to be higher than those connected via a virtual grid at the same location.

Who is eligible?

Private firms, private individuals, registered associations and cooperatives are eligible to apply

for the support. NGOs (those not registered as a commercial business in Rwanda), charities and government organisations are not eligible for support. However, these organisations can team up with an eligible company that will be the project implementer and applicant.

A company must fulfil the following criteria:

- Customers need to be physically connected through a grid. Additional customers (number not exceeding cable-connected customers) can be connected through a virtual grid.
- Have an agreement (accord de principe) with the district to provide electricity at the proposed site.
- The project must have a realistic commercial potential (i.e. a relevant share of medium to large commercial customers) and be technically viable and safe.
- Have a clear plan for the maintenance of the village grid.
- Projects which receive grant financing from other donors or donor-financed institutions are in principle not eligible; however, grants from Rwandese public institutions, local districts or local contributions are allowed. Also, minor support in form of grants for feasibility studies, surveys, side-activities to increase demand, etc. are allowed as well. Please approach EnDev with your concrete project in case you have existing donor financing to clarify eligibility.
- Be registered with the Rwanda Development Board (RDB) as a private company;
- Have a valid tax and social security clearance certificates at the time of submission of the business plan;
- Have a commercial bank account;
- Have bank financing, investors or own funds to finance operations;
- Comply with the conditions set out in this document.

For **village grids with own generation** (solar and hydro), companies have to also fulfill the following requirements:

- Generation capacity of the plant is between 5-50 kW; for solar village grids it is possible to bundle several village grids in the same district to reach that capacity.
- The village grid/ village grid bundle must connect at least 40 paying customers. In the case of a village grid bundle, there must be at least 25 paying customer in each village.

- Plants with a capacity of 50-100 kW can be accepted, in line with the new RURA Simplified License for Isolated Grids. However, companies have to demonstrate high technical and managerial capacity to be accepted for such an approach.

Excluded from support are:

- Charities and research/academic institutions operating in or outside Rwanda.
- Public or publicly-owned actors including REG, MININFRA, RURA or private companies owned by staff who are directly involved in the Energising Development (EnDev) programme from the above mentioned public institutions.
- Private companies owned, co-owned or managed by staff from Urwego Bank, EnDev, GIZ, Energy4Impact, SNV or any other actor involved in the EnDev programme.

What are the technical requirements?

EnDev Rwanda aims to leave as much freedom as possible to the project developers in regards to technical design and business model. However, some minimum requirements for the quality and safety of the village grid installation must be fulfilled to ensure:

- a reliable power supply within the village grid,
- the quality of electricity supplied to protect electrical appliances connected, and
- the safety of the customers and staff.

Separate guidance is provided on hydro and solar village grids as well as small power distribution projects (available [on the Urwego Bank website](#)) and the checklist used for project commissioning (available from Urwego Bank). In any case, EARP guidelines must be applied for the distribution network.

Which actors are involved?

Urwego Bank

Following a nation-wide tendering process, Urwego Bank was selected as the implementer of the programme and executes the financial management of the fund on behalf of Energising Development Rwanda. Urwego Bank assesses the

proposals together with EnDev during the application period, realises the contractual arrangements with the private companies, administers the fund, disburses the incentives, and monitors and verifies the results.

Energising Development (EnDev) Rwanda

Energising Development (EnDev) is an energy access partnership currently financed by six donor countries – the Netherlands, Germany, Norway, the United Kingdom, Switzerland and Sweden. The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH acts as lead agency for the implementation of the programme. EnDev has a mandate to facilitate and finance the access of households to electricity through village grids in Rwanda. EnDev will assist UOB in the technical assessment of the projects.

The Independent Verification Agents (IVA)

The IVAs are consultants recruited by EnDev Rwanda to independently verify results in parallel to the Urwego Bank verification. A four-eye principle ensures reliability of results verification and a decreased risk of fraud.

Scaling Up Renewable Energy Programme (SREP)

The SREP is a programme which aims to facilitate and foster access to credit in the off-grid and mini-grid sectors. The funds will be disbursed through the Renewable Energy Fund (REF) administrated by the bank BRD. In the case of mini-grids, the REF will lend funds at accessible commercial rates directly to companies that present commercially viable projects (with or without grant). **EnDev and the REF/SREP have agreed to collaborate on the development of mini-grids.** This means that a company should have an easier access to credit with BRD with a grant (RBF) commitment from EnDev. The procedures and due diligence between EnDev and BRD will be as aligned as possible so that the process of applying for a loan with a grant commitment from EnDev won't be too cumbersome. All details regarding SREP procedures can be obtained from BRD.

Energy for Impact (E4I)

E4I and EnDev Rwanda are collaborating to provide support to private sector mini-grid developers willing to expand off-grid energy services in Rwanda. In this regard, E4I is able to provide to selected mini-grid project developers that wish to apply for RBF funding a wide range of technical assistance support for mini-grid development as well as parallel activities such as productive uses of energy. For more information regarding E4I’s support please contact:

Victor Hakuzwumuremyi
Program Technical Manager
Victor.Hakuzwumuremyi@energy4impact.org.

Note that EnDev and E4I are in close contact regarding all applicants to both programs. Thus, companies may approach both the organizations on the facility and support available as well as on the selection criteria.

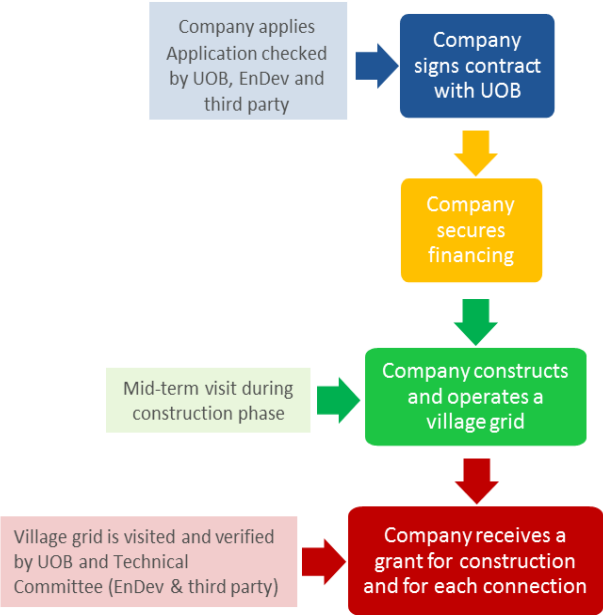
How does it work?

Application process

Companies can apply for the financing by submitting an application to Urwego Bank. Applications are assessed on a **first-come first-served basis** during the open window of the call. This means that proposals can be accepted for financing while the application period is still open. This also means that if a company applies early enough and their proposal is rejected, the company will have the opportunity to resubmit their improved application before the closing of the call. Consequently, it is in the company’s interest to **apply as early as possible** to ensure they benefit from a round of feedback on their proposal in case it does not meet all EnDev requirements.

If the application is successful, the company will conclude a contract with Urwego Bank that fixes the maximum results that have to be fulfilled (e.g. connecting 200 customers), and the incentives that can be received per contract (e.g. EUR 32,000). Companies are **guaranteed the incentives** after the results are verified according to the contract.

The figure below gives an overview of the process.



Claims, verification and incentive disbursement

Each participating company has **one year** from the signing of the contract with Urwego Bank to commission the village grid. Urwego Bank and EnDev will carry out a mid-term visit, if necessary, to provide additional guidance on the construction.

Once the construction is ready, the companies will claim their commissioning incentive at Urwego Bank. Urwego Bank will organise a commissioning visit together with EnDev and a third party (IVA) and assess the village grid according to the Commissioning Checklist (which is part of the contract). After positive results of the verification, Urwego Bank will disburse the commissioning incentive.

Companies claim quarterly for the connections incentives. For this, they prepare the claim including the information about the customers (name of customer, telephone number, location, and tariff paid, etc.) and submit it to Urwego Bank. Urwego Bank will carry out a document check, followed by a telephone verification of a sample of customers. If this verification is positive, an

independent verifier will call another sample of customers and, on some occasions, visit customers in the field. Once these checks are done, Urwego Bank will initiate the disbursement of connections incentive.

How to apply?

Application documents are available for hydro, solar and distribution village grids separately. Application documents are available [on the Urwego Bank website](#) (full link available at the bottom of this page). The hydro documents are available in English and French, while solar and distribution documents are available in English only.

Applications will be assessed on a first-come, first-serve basis. A complete project proposal is required as this document is the basis for the contract. The project proposal will not only serve as an application for the EnDev funds, but can also be used by companies to apply for loans from banks.

The application should be submitted **electronically only** (not as scan) to Urwego Bank as a filled out project proposal in MS Word format.

If the application is successful, Urwego Bank will contact the company to sign an incentive contract that states the terms and conditions that need to be fulfilled to receive the incentives.

For further information, companies can request additional information or meeting with the RBF Officer at Urwego Bank.



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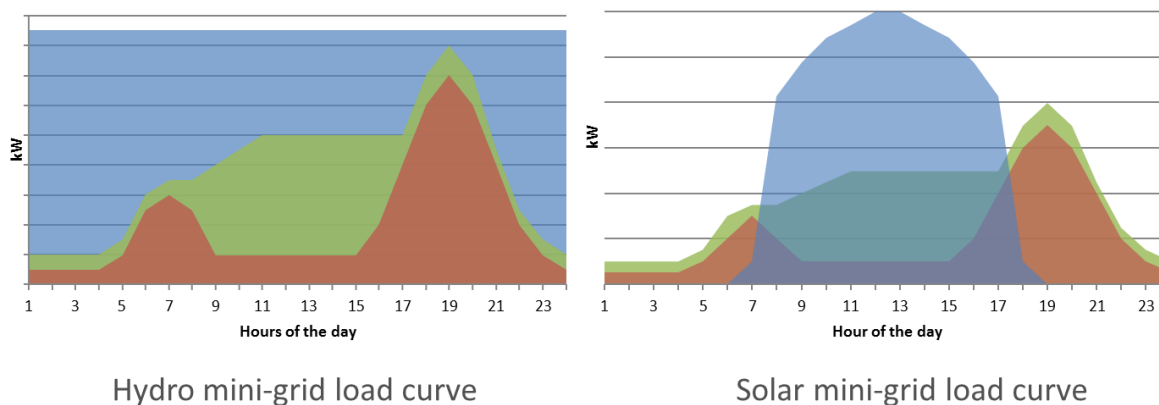
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Annex: Mini-grids and productive use literature

To be least-cost in comparison with stand-alone power supply systems, mini-grids must reach a significant power demand density within the area covered by its distribution network. In the absence of productive use activities in a village, power demand is largely defined by basic lighting and phone charging needs, as well as small electric appliances only. The resulting load curve will be characterised by a strong peak in the evening hours caused by the power demand of domestic customers. In this case, alternative stand-alone supply options become more cost-competitive while offering the same service.

The figures below show exemplary load curves for hydro and PV mini-grids:



■ Produced electricity ■ Demand without productive use ■ Demand with productive use

- In the case of a hydropower mini-grid, the installed capacity must be large enough to cover the peak load, which results in a very large amount of produced electricity (blue area) compared to the power demand without productive use (red area). As a consequence, the load factor will be very small, which means a loss of potential revenues. By adding commercial customers over the day (green area), the total electricity demand can be significantly increased without impacting too much on the evening peak load. This increases the load factor and the revenues of the mini-grids.
- In the case of a PV mini-grid, the produced electricity during the day (blue area) must be sufficient to cover power demand (red or green area) and losses of power storage and conversion. Without productive use (red area) almost all power generated over the day (blue area) must be stored in batteries before it can be supplied to customers, increasing the losses and cost of the storage system (a significant share of CAPEX) of the mini-grid. With productive use (green area), the total power supply can be increased and a larger part of the power supplied directly during the day, reducing the relative cost and losses of the storage. Another way to decrease the costs associated with a large battery bank is the hybridisation of the system through the introduction of a diesel generator. However, note that a minimum of 50% of the energy produced should come from renewables.

To increase power demand, project developers should therefore put emphasis on **potential commercial customers** and **productive use activities**. Productive use is a wide concept, covering all kind of activities that use electricity to generate income; it also includes the use of applications with very low power demand such as light for fishing or retail activities in the evening. However, to increase viability of a mini-grid, activities with significant power demand that can be carried out during day should be in the focus, such as irrigation pumps, mills, workshops, agro-processing etc.

Consideration of productive use starts during the demand assessment for a mini-grid, describing existing activities that e.g. use small gen-sets or mechanical/human force as power source. It could also include an assesment of the market potential and value chains of a specific location. Owners of small gensets or entrepreneurs with labour-intensive activities could be asked for their interest and willingness to invest into

electric motors, as well as the possible size and planned daily use of these motors. Investment capital and good understanding of the related business case could also be constraints and addressed/facilitated by the project developer. Many NGOs are active in this field of value chain development, agro-processing and rural economic development, which could be approached for possible partnerships.

The successful integration of productive use and respective connection of anchor and business customers will make a mini-grid investment more viable and avoid the dependence on domestic customers only.

Below is a compilation of literature as a source of information and inspiration for potential uses of productive use in mini-grids.

1. Energypedia has a Productive Use Portal with articles and information, including examples, available technologies, finances and business aspects, and an overview of studies and publications. There is also a long article on [Productive Use in the Agricultural Sector](#). The portal is available at [https://energypedia.info/wiki/Portal:Productive Use](https://energypedia.info/wiki/Portal:Productive_Use)
2. Powering Agriculture (www.poweringag.org) supports and finances projects that combine energy and agriculture. Additionally, they offer an online course on [Sustainable Energy for Food](#) (how to use energy in agro-processing), have a compilation of [resources](#) on the energy-agriculture nexus, and [published an analysis](#) of the energy requirements, and possible clean-energy solutions, along three agricultural value chains—milk/dairy, rice and vegetables.
3. Productive Use of Energy (PRODUSE - www.produce.org) is a joint initiative of the Energy Sector Management Assistance Program (ESMAP), the Africa Electrification Initiative (AEI), the EUEI Partnership Dialogue Facility (EUEI PDF) and GIZ. PRODUSE features a **manual** that is structured according to a generic project cycle covering each phase from initial planning to the implementation and evaluation of projects and components promoting productive use. It is comprised of six sequenced modules, each with a description of the practical tasks to be conducted, as well as references to publicly available tools.
4. Best, S. (2016) Energising local economies: Experiences of solar start-ups in Kenya’s small-scale fishing and agriculture sectors. IIED, London. <http://pubs.iied.org/16620IIED>
This paper looks at what is happening on the ground in Kenya, examining six examples of solar projects and start-ups that target productive energy needs in rural and fishing communities not connected to the grid. It asks: what productive energy needs do the projects target, and what barriers prevent communities or customers from using energy productively? How are the projects or start-ups addressing these barriers?
5. GIZ (2016) Photovoltaics for Productive Use Applications. A Catalogue of DC-Appliances. GIZ: Eschborn. Available on <https://energypedia.info>
Part 1 provides an overview of various productive use applications and associated aspects, such as users of PV appliances. Part 2 comprises the actual appliance factsheets. The factsheets contain basic technical specification and, where available, information on markets and distribution chains. Part 3 of the catalogue explores the potential of appliances to establish viable businesses and create net profit in micro, small and medium sized enterprises in rural areas.
6. GIZ (2016) Business plan calculator. This spreadsheet tool is a supplement to the publication “Photovoltaics for Productive Use Applications” above, enabling quick cash flow simulations for small rural businesses to check the profitability to invest in electrical appliances and machinery. Available on <https://energypedia.info>
7. GIZ (2011) Modern Energy Services for Modern Agriculture - A Review of Smallholder Farming in Developing Countries. GIZ: Eschborn. Available on <https://energypedia.info>.