



Minigrid solutions

Smart and flexible energy

Key benefits

With a mini grid solution from **studer** it's easy to realize a system on a new level of flexibility and energy optimization to get the maximum value of the investment.



Social economics

The system is designed to operate with different social and economic business models like pay-as-you-go (PAYG). These are important instruments to develop the consumer energy behaviour.

Swiss made & 100% renewable energy

Our products are designed and manufactured in Switzerland in a factory powered 100% by renewable energy. We're not only talking about green energy, we're leading by example. The swiss made quality of our products is proved and known in the market since 1987.



All battery technologies

Our products are designed to work with most types of battery technologies. The charging current algorithm is freely programmable and adaptable to ensure a long battery lifetime.

OPEX optimization

High reduction of the operation cost through active management of the diesel genset's running time. In addition, the diesel genset is run on a higher efficiency level avoiding its use during low consumption periods.



DC - AC mix

The combination of different solar technologies makes the system more stable and offers a higher efficiency with a higher use of renewable energy.



All PV inverter technologies

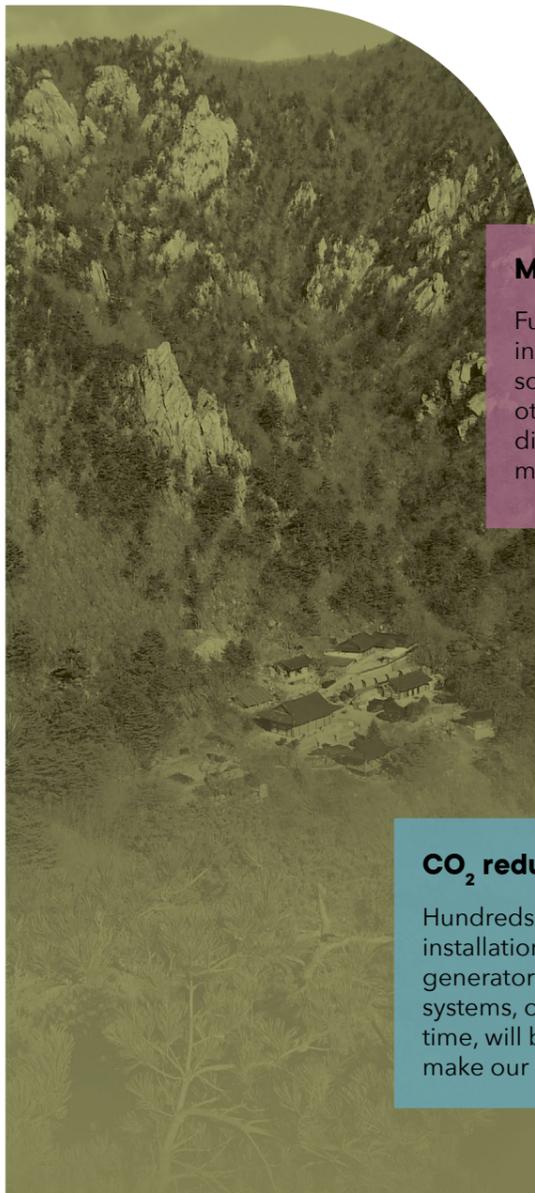
Inverter/chargers of the **xtender** series are compatible with most brands of grid-tied PV inverters. So you can implement your preferred grid-tie inverter brand in your system for AC-coupling applications.

Modularity

Full flexibility to combine studer's inverter/chargers and MPPT solar charge controllers with other technologies, to adapt to different energy sources and to meet higher load requirements.

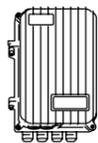
CO₂ reduction

Hundreds of thousands of offgrid installations are today powered by diesel generators. Replacing them by minigrd systems, or reducing their running time, will benefit our environment and make our children's future brighter.



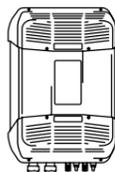
variotrack series

- vt 40
- vt 65
- vt 80



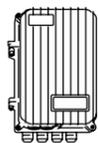
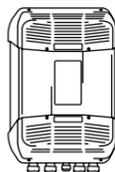
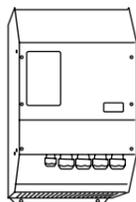
variostring series

- vs 70
- vs 120



xtender series

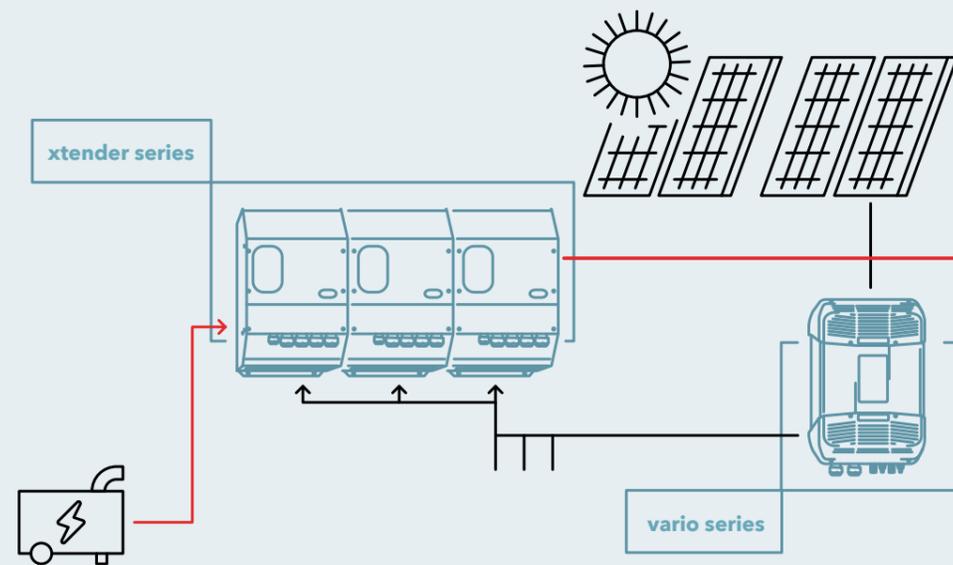
- xth 3000-12
- xth 5000-24
- xth 6000-48
- xth 8000-48
- xtm 1500-12
- xtm 2000-12
- xtm 2400-24
- xtm 2600-48
- xtm 3500-24
- xtm 4000-48
- xts 900-12
- xts 1200-24
- xts 1400-48



Minigrid

The **xtender** series are at the heart of a minigrid system. These multifunctional and bidirectional hybrid-inverters are the key for a smart, efficient and smooth energy management system (EMS). This includes intelligent source and load management like automatic start and stop of the generator, disconnection of non-priority loads and frequency shifting.

Central system



Diesel generator / Mains

AC sources like diesel generators can recharge the batteries during weak renewable production time or peak power consumption in the Minigrid to secure the system. Automatic handling of the Start and Stop by the central **xtender**.

The system may be connected to a future public grid by this point.

Battery

The advanced battery management system of the **xtender** and **vario series** allows to use most types of battery technologies like: AGM, Gel, Flooded Lead-acid, NiCad, NiFe, Redox Flow or Lithium.

Monitoring

Different types of monitoring are possible:

- **rcc 02/03** remote control unit for local on-site monitoring including datalogging and programming.
- **xcom LAN/GSM** for monitoring and datalogging with internet access.
- **xcom 232i /CAN** for a communication with an external monitoring device.

Grid feeding

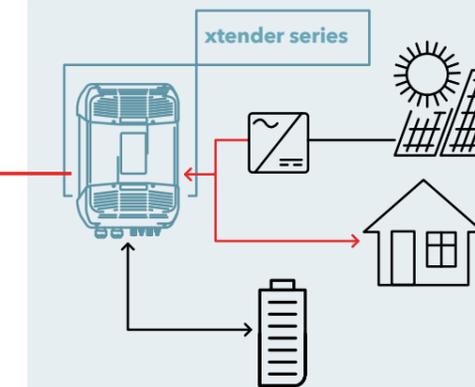
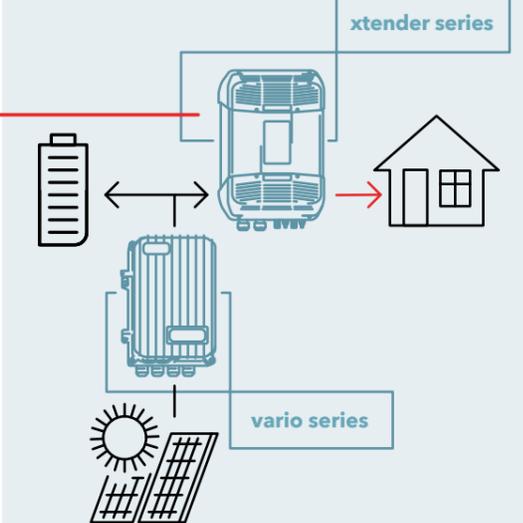
Producer of renewable energy feeding back to the minigrid. Most of grid-tied inverter brands are compatible for this application.



DC Coupling

Back-up system which includes a local solar production. This configuration allows to use in priority the own produced solar energy and to minimize the grid consumption.

The **xtender** is automatically managing the energy flow to use a maximum of the local produced solar energy by the **variotrack** or **variostring**.



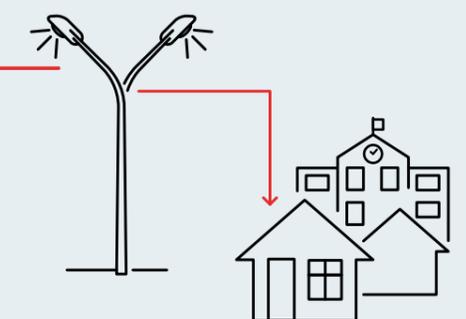
AC Coupling

Local production of solar energy by a grid-tied inverter. This configuration includes a backup function and the solar overproduction is fed back to the minigrid.

The **xtender** is able to control the grid-tied inverter by frequency shifting and thereby manage the battery charge.

Loads

Direct energy consumers of the minigrid, like small households or communal consumers (eg. Streetlights). Typical pay-as-you-go consumer with different tariff scales. Different tariff schemes and management models can be implemented.



Case studies

Rural electrification with minigrids in Ghana (170kW)



The solution

The five minigrids implemented by Trama TecnoAmbiental (TTA) required a different design and configuration based on the demand surveys and project context. By choosing the studer solution it was possible to use the same equipment in different configurations (three-phase or single-phase, batteries of different size and configuration, a mix of PV and wind power generation, different size of back-up diesel generators) monitored with the same tools and procedures.

The centralised system provides electricity through a low-voltage distribution grid consisting of a three-phase backbone feeder with single-phase laterals connecting single-phase loads at each customer's premises. A dedicated line feeds high-efficiency LED street lamps throughout the villages.



The challenge

The Ghana Energy Development and Access Project (GEDAP) by the Ministry of Power aimed to provide access to electricity service 24/7 and enhance income generating activities to a total population of around 3,500 in remote island communities on Volta Lake.

The project was the first of its kind to promote RE based minigrids to play a key role in Ghana's transition to a low-carbon economy while electrifying population in rural areas.



Project outcome

The five minigrids serve as a demonstration project to representatives from other West African countries. This flexible design can be adapted to any configuration required by a rural electrification project with the following advantages:

- The modularity allows the minigrids to be scaled up (or down). Requests for service upgrading started immediately after the start-up phase, for corn-mills operating, cooling equipment, etc. A 20% extension is already under negotiation.
- Installation and operational cost are minimized using the same equipment with different configurations

Studer products

The five minigrids include:

- 21 x **xth 8000-48** inverterchargers
- 46 x **vt 80 MPPT** solar charge controllers
- 5 x **rcc 02** remote control centre
- 5 x **xcom GSM** internet communication module

Distributed minigrid in the heart of the Alps in Switzerland (42kW)



The challenge

In the heart of the Alps, a small community "Mayens sur le Scex" regroups 32 small buildings, historically used for livestock summer pasture and currently used as summer cottages. These houses generally have individual solar systems: each house has its own solar PV generator, battery and inverter. Looking at the whole system, there is a lot of unused solar energy production and the global efficiency is very low.

In order to improve the electrification of this alpine community, the independent solar PV systems were linked together in a network of individual systems, with the goal of sharing the advantages (use excess energy of your neighbor) and not disadvantages (the system remains autonomous and share only the excess of energy, keeping its battery full).

The solution

A minigrid composed of a central system (6kW) and various distributed systems (36kW). The system is fully stable independently from any external control, communication, or infrastructure. The simple and robust electrical infrastructure is the heart of the system and the information carrier. Once the solution is implemented there is no interdependence with third parties demanding higher level of control, engineering, communication, etc. The solution can be adjusted and modified according to the users' needs without having to be adjusted in terms of control infrastructure.

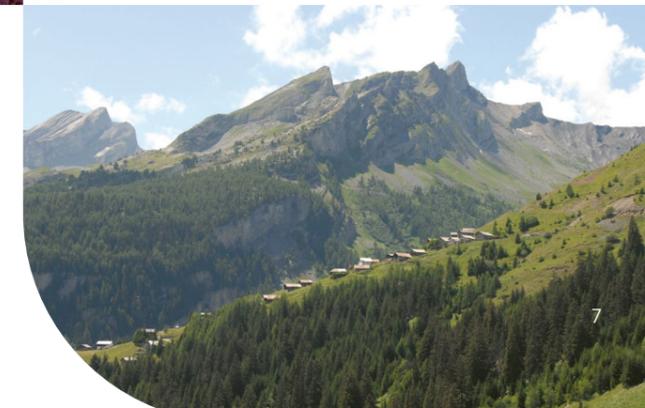
The flexibility for further extensions or changes is ensured given that adding or removing a user from the system has a very low influence on the global system. In addition, the reliability of the global system results in an extremely low rate of service interruption. Every installation keeps its autonomy, therefore when there is a problem in one installation, the other users will keep operating with the minigrid as usual. If there is problem in the central unit, the rest of users are still autonomous to keep running their system independently without having any influence on their loads.



Project outcome

The distributed minigrid has been successfully operating for more than 6 years, proving as a more efficient solution in which the users collaborate between each other for a better global energy service for the community.

The minigrid concept has received great feedback from the community where it has been tested, responding and adapting to their needs and improving the previous situation of individual home systems. For studer, the "Mayens sur Scex" project is a very successful example, which sets the path for further development to integrate new possibilities and facilitate the minigrid development for community electrification worldwide.



Built to last.

All our products are designed and manufactured in our factory in Sion in Switzerland and come with an exceptional warranty of 10 years.

Studer Innotec SA
Rue des Casernes 57
1950 Sion, Switzerland
+41 (0)27 205 60 80



ISO certified factory
9001:2020/14001:2020.

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