POWERBLOX
ENERGIZING VISIONS

POWER WHEREVER YOU ARE

From grocery stores and small businesses to schools, camps or mobile operations.
Power-Blox delivers flexibility and simplicity for many applications.

• BENEFITS AT A GLANCE •

- CLEAN ENERGY IMMEDIATELY
- INTELLIGENT & FAILURE-SAFE
- SCALABLE - GROWS WITH YOUR NEEDS
- SECURED INVESTMENT
- NO ENGINEERING OR MAINTENANCE NEEDED
- EASY TO USE PLUG & POWER
- BUILD POWER GRIDS ANYWHERE IN NO TIME
- SWISS QUALITY
- UNIVERSAL ENERGY INTERFACE
- PAY AS YOU GO & PROSUMER

www.power-blox.com

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THE POWER-BLOX 200 SERIES

The Power-Blox 200 series, the first product that was developed based on our swarm technology, is a revolutionary modular energy system producing alternating current from 200W up to the Kilowatt range, which serves as a "portable socket" to off-grid energy demands. Its modularity allows it to produce and easily scale electricity.

The system is Plug & Power and requires no configuration, specific know-how or maintenance. It consists of intelligent energy cubes with an integrated battery (available as lead or lithium-ion version). Each cube provides 200 Watt of alternating current and can be powered by an optionally provided solar unit or from any external source (such as solar, wind, hydrothermal, biomass, or a generator etc) to supply a household or small commercial business with electricity. Power-Blox acts as universal energy interface and can be combined with various external energy sources or storage devices.

- 230V AC / 200W true sinus inverter
- 100 Ah solar battery
- 200W solar module + 10m cable included
- MPP solar charger
- Swarm- / mini-grid enabled

- 4 x stacking sockets
- Integrated stacking cable
- Grid / generator connector
- 12V DC / 3A (cigarette lighter socket)
- 2 x USB output

NEARLY UNLIMITED SCALABILITY

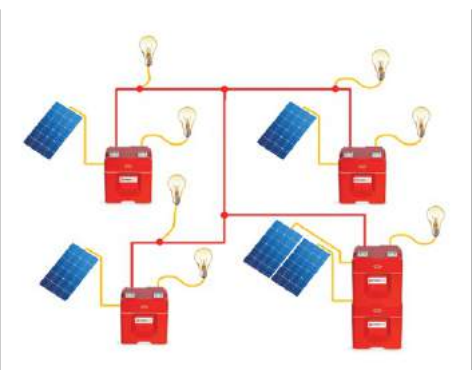
The nearly endless scalability of the Power-Blox system represents a breakthrough in energy technology. It allows scalable growth based on increasing energy requirements, without the need of modifying/replacing existing installations.

STANDALONE POWER-BLOX

Instant plug & power. Directly supplies 230V AC.

STACKING POWER-BLOX

Get more energy and power. Expand by stacking units.



BUILD A SWARM GRID

More units increase the stability and power of the grid. Every consumer in the system can use the full power of all units.

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KEY FEATURES

CLEAN ENERGY IMMEDIATELY

Deployed in a matter of minutes with minimal ecological footprint.

EASY TO USE - PLUG & POWER

Place the solar module outside. Switch on to get energy delivered to the integrated socket. Done!

SCALABLE - GROWS WITH YOUR NEEDS

Start with one single cube and then scale up to a theoretically unlimited size. From kW to MW with only one product.

BUILD GRIDS ANYWHERE IN NO TIME

Mini-grids can be quickly built at different locations and combined to deliver more power. Power grids for whole villages can be created.

NO ENGINEERING OR MAINTENANCE NEEDED

Our systems do not need any special skills to be configured, installed and maintained. Even bigger systems in the Kilowatt range can easily be built by simply connecting multiple cubes.

SECURED INVESTMENT

Scalability ensures the continued use of existing devices that can easily be supplemented with additional units. In conventional systems, some of the existing components must be replaced due to increased power demands and other limitations.

INTELLIGENT & FAILURE-SAFE

The technology is self-configuring and self-learning. In case of any failure or breakdown of the grid, the units automatically disconnect and run as autonomous off-grid power supplies.

SWISS QUALITY

Highest quality - engineered, produced and assembled in Switzerland.

PAY AS YOU GO & PROSUMER

Combined with a Pay-as-you-go model, it can serve as incubator for micro-entrepreneurs and provide affordable solar power to customers in developing countries. The excess production of electric power in the system can be sold for a fee.

UNIVERSAL ENERGY INTERFACE

Allows to easily combine various energy sources and battery technologies from different vendors. While there are many solutions for energy storage, they cannot be combined as every solution with an integrated master device tries to control the grid and gets in conflict with other masters.

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SWARM POWER

The next technology leap after smart grids

The most complex system we know is decentralized: It's nature and evolution. With nature in mind, we asked ourselves what kind of concept allows small to large groups of individuals to behave like an organism? How does nature act in complex situations with requirements of maximum flexibility, stability, survival but nevertheless simple principles?

Our answer was the swarm. A swarm in nature is based on simple principles and a few rules. The swarm helps individuals improve their chances of survival. The swarm provides safety, nutrition and guidance for every member. And it is a perfect example of how simple rules can manage a complex system without the need of a centralized control.

New ways to connect and power

Power-Blox has taken this concept and applied it to a power grid.

Swarm grids manage power generation, storage and consumption with a totally different approach than smart grids. They use a fully decentralized architecture to manage fluctuating current, as opposed to a smart grid which needs a centralized architecture to steer power generation and storage. The energy in the swarm is stored in nodes and every component of the grid learns how to adapt to the current state of the grid by observing the grid parameters and adapting its behavior with the use of artificial intelligence.

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Swarm grid distribution

Based on snowflake topology

How to set up a Swarm Grid

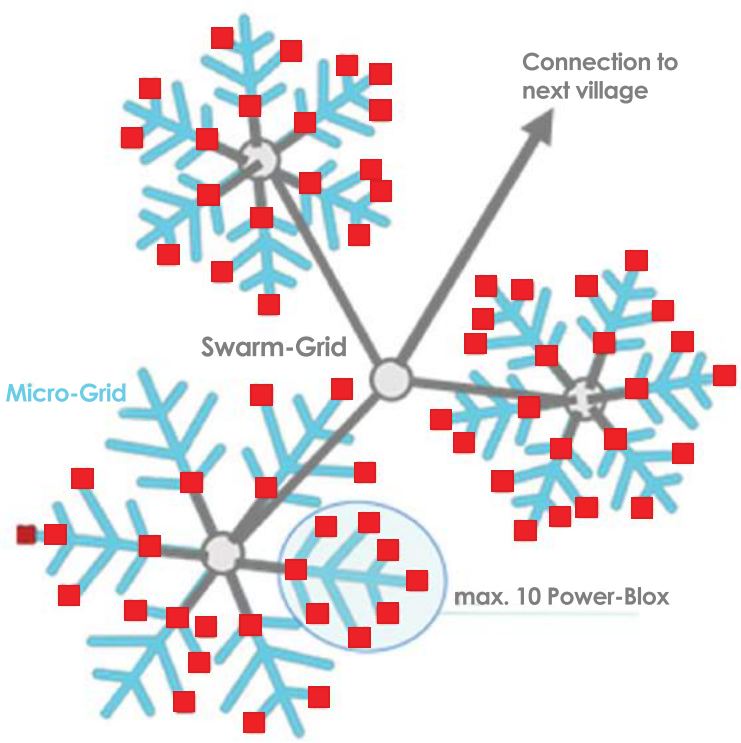
Setting up a Swarm Grid is easy. You have two options:

Create a **centralized installation** of Power-Blox cubes at one location (stack cubes to create towers and walls), from where you distribute the power to all consumers via switchboard with conventional wiring.

Create a **decentralized installation** by using Power-Blox at different locations and connect them based on a „snowflake topology". If there are less than 40 cubes (in total 8 kW) you can use a 16 mm cable and no special fuses.

Microgrid (snowflake branch)
(blue) Max 10A / 10 Power-Blox

Swarm Grid
(grey) For public distribution infinite number of Power-Blox



- Each Power-Blox works stand-alone
- Each snowflake branch works stand-alone
- Each snowflake works stand-alone
- The whole swarm-grid works stand-alone
- The Power-Blox algorithm stabilizes the whole grid.

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EASY AND AFFORDABLE ACCESS TO ENERGY

In emerging markets, the use of Power-Blox supports the development of the local economy and of continuously functioning structures. Mainly complex and inflexible solutions are available on the market for the higher power range, and it is precisely this range that is central to the growing middle class as well as to the small and medium-sized enterprises.

SMALL BUSINESSES

- Electrification fridges, hair shavers, etc.
- Workshop tools e.g. saw, drilling machines, welding, etc.
- Computers & Internet, printers, etc.
- Mobile phone charging services
- Reselling of electricity

HEALTH CARE

Electrification of hospitals • Vaccination fridges • Lighting of birth stations • Radiology stations • Dialysis stations • Water purifying / • water pumping

EDUCATION

- Electrification of schools
- Lighting of classrooms
- Electrification of computer rooms
- Digital learning
- Overhead projectors
- Internet infrastructure

FOOD & AGRICULTURE

Fruit drying • Water irrigation • Milling • Office infrastruture •

MOBILE CAMPS

- Lighting
- Medical appliances
- Infrastructure
- Heating
- Water treatment & pumping
- Telecommunication
- Phone charging
- Ventilation

WILDLIFE PRESERVATION

Electrification of radio outposts • Device charging • Fridges and freezers • Telecommunications •

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EASY AND AFFORDABLE ACCESS TO ENERGY

In industrialized countries, the modular energy units can serve as a portable socket and can be used for example, in mountain huts, for emergency units or for private use (holiday houses, campers, family gardens, boats, etc.)

TOURISM

Lighting •
Mobile phone charging •
Entertainment •
Food cooling •
Ventilation •
Home appliances •

EVENTS

- Lighting
- Powering audio & video equipment
- Mobile phone charging
- Entertainment
- Food cooling
- Infrastructure

FAMILY & GARDEN PLOT

Lighting •
Mobile phone charging •
Entertainment •
Food cooling •
Ventilation •
Home appliances •

REMOTE HOMES

- Lighting
- Mobile phone charging
- Entertainment
- Food cooling
- Ventilation
- Home appliances

CAMPER

Lighting •
Mobile phone charging •
Entertainment •
Food cooling •
Ventilation •
Home appliances •

CAMPING

- Lighting
- Mobile phone charging
- Entertainment
- Food cooling
- Ventilation
- Home appliances

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TECHNICAL DATA

INVERTER	PBX-200 Pb	PBX-200 Li
Rated grid voltage	230 V	
Rated frequency	50 Hz	
Harmonic distortion	<4%	
Continuous power at 25	200 W	
Power for 5 sec. at 25	230 W	
Power for 3 sec. at 25	370 W	
Maximum load	Up to short-circuit	
Cosφ	0.1 to 1	
Grid / generator input		
Input voltage	230 V ±15%	
Frequency range	47 - 64 Hz	
Grid charger current	5 A	
Charging characteristics	IUoU[1]	Li BMS[1]
Resettable fuse	10 A	
Transfer connectors		
Transfer voltage	230 V ±15%	
Frequency range	47 - 64 Hz	
Resettable fuse	10 A	
Solar input		
Solar charger type	MPP[2]	
Input voltage range	30 - 45 V	
PV current	8 A	
Maximum PV power	250 W	
Recommended PV power	200 W	
Charging characteristics	IUoU, temperature regulated	Li BMS[1], temperature regulated
Battery		
Included batteries	2 x Hoppecke sun power VR M 12 V 58	2 x Li-Ion batteries 12 V 50 AH
Battery technology	Lead acid / AGM[3]	Lithium / LiFePO4[4]
Internal battery voltage	24 V	
Cycle stability	2500 cycles	5000 cycles
Expected lifetime	3 - 5 years	> 10 years
DC Output		
Cigarette lighter socket	12 V, 3 A	
USB socket	2 x 5 V, 2 A	
Connectors		
Solar	Neutrik powerCON TRUE1 inlet / clamps	
Transfer / Stacking	Neutrik powerCON inlet / clamps	
Transfer cable	1.3m cable with Neutrik powerCON plug	
Grid / generator	Grid socket C14, 10A / clamps	
Clamps	Tool-less Phoenix clamps, 0.2 - 6mm2	
Swarm connection		
Stacking possibility	Via attached cable	
Connecting towers	Via attached cable	
Maximum tower height	3 units	
Maximum stacking / transfer power	10 units / 2.3 kW	
Maximum swarm-grid size	Infinite, tested up to 20 units	
Certificates		
EMC (Electro Magnetic Compatibility)	IEC/EN55022, IEC/EN61000	
Safety	EC/EN62109-1, IEC62109-2	
Environmental conditions		
Protection index	IP 20	
Relative humidity in operation	95% without condensation	
Operating temperature range	-10 to 45°C[5]	-20 to 60°C
Ventilation	Passive, no active ventilators	
Warranty	2 years	5 years
General data		
Weight	52 kg (114.6 lb)	27 kg (59.5 lb)
Dimensions (W / H / D)	400mm / 443mm / 400mm	

Your Contact:

[1] IUoU = Multiple charge process for optimal battery charging
BMS = Battery Management System

[2] MPP = Maximum PowerPoint Tracker for upto 30% higher solar yield

[3] AGM = Absorbent Glass Mat, electrolyte is bonded in a nonwoven of glass fibers

[4] LiFePo4 = Lithium iron phosphate

[5] If the operating temperature is above 30°C, the batteries age considerably faster

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200 W, 1.2 kWh
PBX-200 SERIES

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