

# The future of scalable, smart energy storage solutions

We are hearing more and more about solutions for making electricity available in remote locations. PES finds out about the latest revolutionary modular energy system, which might overcome the challenges of delivering electricity to rural areas. Power-Blox is the first scalable energy product that uses ‘Swarm Power’ and is capable of both storing and distributing electricity from a variety of inputs.

Power-Blox is the first modular solar energy system to offer alternating current up to the kilowatt range, based on swarm technology. This revolutionary concept also frees the supply to be completely mobile, serving as a portable outlet wherever it is required. Stäubli Electrical Connectors, the specialist in advanced contact technology and Power-Blox, the award-winning start-up, signed a strategic partnership and will together offer efficient solutions for energy storage and off-grid systems. This future-oriented partnership will develop innovative solutions for next-level autonomous power supplies.

The intelligent Power-Blox cubes are scalable, flexible and independent and can be used for a number of applications. At its simplest, a single Power-Blox 200 series cube and solar panel can function as an off-grid power supply, with the unit’s integrated 1.2 kilowatt-hour battery and 230 V AC/200 W inverter providing enough

electricity to run a small fridge, a television, three 7 W-LED lights and a mobile phone charger.

However, these energy storage devices are designed to be stacked together to build a bigger unit with a larger capacity that caters to higher energy demands. Joined together into a micro-grid, each of the connected units can draw on the full power of all of the units combined. The user is able to enlarge the system’s capacity by simply stacking one cube on top of the other, thus creating ‘power walls’.

This modularity allows users to quickly scale up a system to provide more power or back-up capacity – without the need of any additional engineering, calculations or instructions. As the Power-Blox system has been conceived as a ‘plug and power’ solution, getting it up and running is an extremely user-friendly process that does not require any special configuration or further expertise.

Alone, a single Power-Blox cube is not necessarily a major breakthrough in energy technology. The real hidden secret is that multiple devices can be joined together into a ‘swarm grid’ that imitates complex systems in nature, creating a completely autonomous, intelligent grid. At the root of the concept: swarms governed by a simple set of rules that are acted upon without the need for centralised decision making. As the individual entities within the swarm follow this set of rules, they interact with each other, so that the entire system works intelligently as a whole.

Applying this concept to a power grid, Power-Blox cubes take full advantage of what nature does so well: seamless function with no centralized control or regulation. With ‘Swarm Power’, power is generated, stored, and distributed using a fully decentralised architecture and the ability to manage fluctuating loads and inputs.



Every grid component learns how to adapt to the grid's current state by observing the given parameters and harnessing the power of artificial intelligence to change its behaviour accordingly. When a minimum of two Power-Blox units are combined, the system uses proprietary algorithms to adapt and react with swarm intelligence, thus creating a swarm grid that can provide sustainable and regulated power for schools, hospitals, telecommunications infrastructure, agricultural equipment, remote tourist resorts, events/festivals, disaster relief, or aid organizations, or to bridge power failures.

The devices act as a universal energy interface and can be powered by an optional solar unit or any other external source, such as wind, hydrothermal, biomass, a generator, etc. Manufactured in Switzerland, the Power-Blox 200 series cube comes in either a 52kg deep-cycle lead-acid (AGM) battery version or a 27 kg lithium ion battery version.

According to Bloomberg's Off-Grid Solar Market Trends Report 2016, the off-grid solar industry has been continuously growing in both developing and industrialised countries. Therefore, Power-Blox is not only a promising alternative for rural areas, but also offers significant advantages over other independent energy systems. Solar home systems, for example, have a small power range, short service life and cannot be expanded.

Diesel generators pollute the environment and depend on regular fuel supply which is a costly operation. Micro-grid systems entail high initial costs with rather limited opportunities for expansion, while lacking complex engineering and installation. Furthermore, a failure of a critical component in any of these systems will shut down the whole grid – not a problem with the Power-Blox independent smart grid technology.

This modular system has not only the potential to change how off-grid networks are built and operated, but could change the way conventional power grids work as well. Although the amount of renewable energy available is growing at an ever increasing rate, the design of today's public grids fails to tap into its full potential. The approach could address the challenge of public grids in a fundamental way: on the one hand, it renders obsolete the need for centralised architecture and control, while on the other it provides power storage capabilities both inside as well as in the "last mile" of the grid.

With over 20 years of experience in the photovoltaic industry and more than 1 billion PV connector components installed, Stäubli Electrical Connectors provides more than 150GW or 50% of the worldwide PV capacity. The first industrial photovoltaic connector (MC3) was introduced by Stäubli in 1996 followed by the original MC4 in 2004, setting the industry standard ever since.

The exclusive MULTILAM advanced contact technology raised the bar in terms of consistent quality and outstanding reliability. With the new 'Swarm Power' technology, developed by the Swiss start-up company Power-Blox, and its intelligent energy cubes, an innovative off-grid energy solution is the latest result of the company's continuous pursuit and passion for quality and innovation, inherited from long industrial experience.

'The Power-Blox product and range of solutions is perfectly in line with the strategic development of our 'alternative energies' business. Combined with our powerful and durable connector solutions for photovoltaic plants, these innovative systems and the swarm technology pave the way for totally new applications in the growing energy storage systems market,' says Franco Delvecchio, CEO of Stäubli Electrical Connectors.

Alessandro Medici, co-founder of the Intersolar Award finalist and CEO of Power-Blox, is delighted: 'We are thrilled that Stäubli Electrical Connectors, a world leader in the industry, has acknowledged our technology. Stäubli's experience, coupled with its global engineering and sales network, contributes valuable resources for further development and market cultivation.'

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Matthias Mack, Global Segment Manager Photovoltaic Stäubli Electrical Connectors; Franco Delvecchio, CEO Stäubli Electrical Connectors and member of the Executive Committee of the Stäubli Group; Alain Schilli, COO Power-Blox at the Stäubli trade show booth at Intersolar in Munich; Alessandro Medici, co-founder of the Intersolar-Award-Finalist and CEO Power-Blox.

### About Stäubli

Stäubli offers innovative mechatronic solutions in three core areas including Connectors, Robotics and Textile. With more than 4,500 employees, the company achieves annual revenues of 1.1 billion Swiss francs.

Founded in 1892, today Stäubli is an international group headquartered in Pfäffikon, Switzerland. Stäubli has a presence in 29 countries with production companies, sales and service subsidiaries and is supplemented by agents in 50 countries.

As a world market leader, Stäubli manufactures quick connector systems

for all types of fluids, gases and electrical energy. The Electrical Connectors product portfolio ranges from miniature connectors to high-performance connectors for power transmission, test and measurement. In Photovoltaics, Stäubli is the global market leader with its connector components. The core of all Stäubli electrical connectors is the unique MULTILAM technology.

### Further information

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### About Power-Blox

Power-Blox is an award-winning Swiss start-up company that develops, produces and distributes energy solutions based on swarm intelligence. The company developed a technology called “Swarm Power”, which allows the construction of an energy network with decentralised architecture, free from centralized control. The system regulates the generation, storage and distribution across the grid intelligently and autonomously.

Power-Blox was awarded the Axpo Energy Award 2014 and the UN National Energy Globe Award of Tanzania 2015.

Power-Blox was founded by Alessandro Medici and Armand Martin and is a privately-owned company based in Brugg, Switzerland.

[www.power-blox.com](http://www.power-blox.com)