

THE SOLUTION FOR POWER SUPPLY

when there is no or limited access to the public grid or an independence from the existing power grid is desired

PowerCube THE SMART GRID

120-230 Volt, 60Hz

240-400 Volt, 50Hz



There is no Plan "B" because we do not have a "Planet B"!

POWERCUBE

24 HOURS 365 DAYS POWER SUPPLY!

Aside WTE (waste to energy), self sustainable power supply technology is one of our core business areas, and with 15 years in business and operation of our own plant in Austria we are the leading technology provider in these sectors.

Our PowerCube is based on a four components hybrid system. Up to 90 % of power may be derived from wind and photovoltaic as an energy source, a massive battery storage as a secondary energy source and an engine/generator unit as a back up. Our PowerCube technology is unbeaten in regards to

- Stable and reliable energy supply with or without any connection to a grid, so specially designed for remote areas
- Minimum running time of the engine (starts from as low as 1 hour per day) contrary to any other power unit
- Minimum requirement for fuel (diesel) based on the low running times
- Minimum maintenance
- Environmental benefit
- Remote control technology

Your advantage: PowerCube can be tailor-made exactly to what is most needed in the immediate environment!

POWERCUBE

24 HOURS 365 DAYS POWER SUPPLY!

INTEGRATED INTELLIGENCE

PowerCube delivers power via a combination of

- Photovoltaic
- Wind Turbine
- Massive Battery Storage
- Motor-Generator Unit

It recharges the batteries fully automatically and coordinated thanks to its integrated control units.

Power is either taken from the wind turbine and the photovoltaic system, and if no sun shines, power is generated by a specifically designed motor-powered generator. This process is fully automatic, without the need for external intervention. Switching takes place without any interruption of the power supply.

POWERCUBE

STAND ALONE OPERATION AND DISPOSAL OF BIOWASTE!

STAND ALONE OPERATION OR NETWORK STABILITY

A connection to the public power grid is not required. PowerCube is completely self-sufficient and independent, and works as an isolated solution.

It can also work in parallel with a public power grid. PowerCube recognizes autonomously when the utility grid does not provide electricity and feeds the connected electrical loads at its own capacity. Once the public power returns, PowerCube will automatically go into sleep mode or recharge its batteries if necessary.

ENGINE FUEL

Diesel, heating oil or vegetable oil can be used for feeding the engine.

MICRO-BIOGAS PLANT

With an optional, specifically designed Micro-Biogas plant, biodegradable waste (without packaging material) can be fed. Fermentation produces biogas that can be added to conventional engine fuels. Incidentally, food waste for example can be completely disposed off in an energy-efficient way.

If a micro-biogas plant is going to be used, PowerCube will be equipped with the appropriate gas technology (safety gas control system, gas storage, etc.).

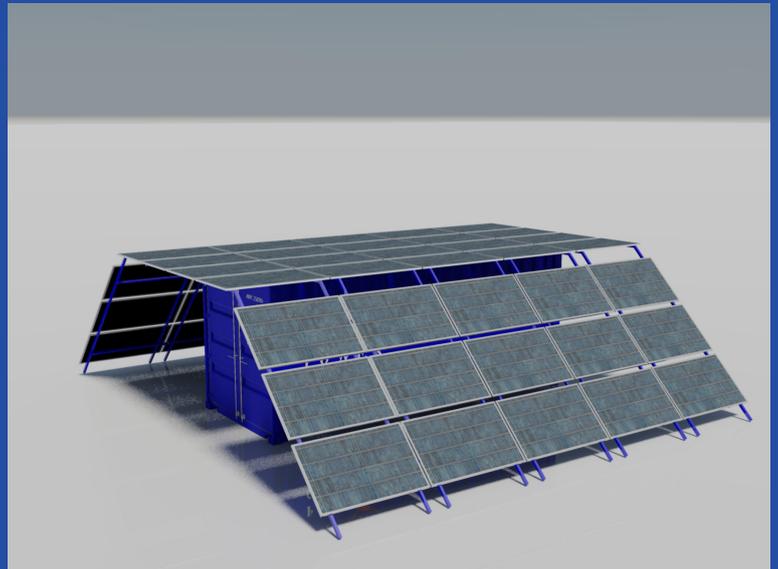


Figure 1: PowerCube at maximum expansion level (graphical representation)

POWERCUBE - FEATURES!

HOT WATER

To avoid wasting waste heat while the engine is running, the optional buffer tank with a capacity of at least 400 liters can be heated to 85 degrees. Thus, hot water is available at the same time as the electricity.

DIFFERENT PERFORMANCE LEVELS

PowerCube is available with different power levels, starting at 10kW up to 90kW peak power. Individual performance levels are listed on page 6.

PowerCube comes assembled as a total within a compact, easy to ship 20-foot container.



Figure 2: Micro Biogas Plant (graphical representation)

REMOTE CONTROL

A remote control can be carried out via an Internet connection. The port can be wired (LAN) or wireless (WLAN).

If, contrary to expectations, a malfunction occurs, it can enable us to diagnose or correct the problem quickly, without having to be on-site.

**WE ARE LOOKING FORWARD TO SERVE YOU AND YOUR ENVIRONMENT!
YOU CANNOT AFFORD TO GO WITHOUT US!**

PERFORMANCE LEVELS

Photovoltaic system: from 2.5 KW up to 15 kW
(mounted directly on the PowerCube)

Photovoltaic system: additionally up to 45 KW
(externally mounted)

Battery storage: from 10 KWh to 230 KWh

Peak power: from 10 KW to 90 KW

Motor / generator unit: from 8 KW to 32 KW

EXAMPLES-OPERATIONAL SCENARIOS-MECHANISM

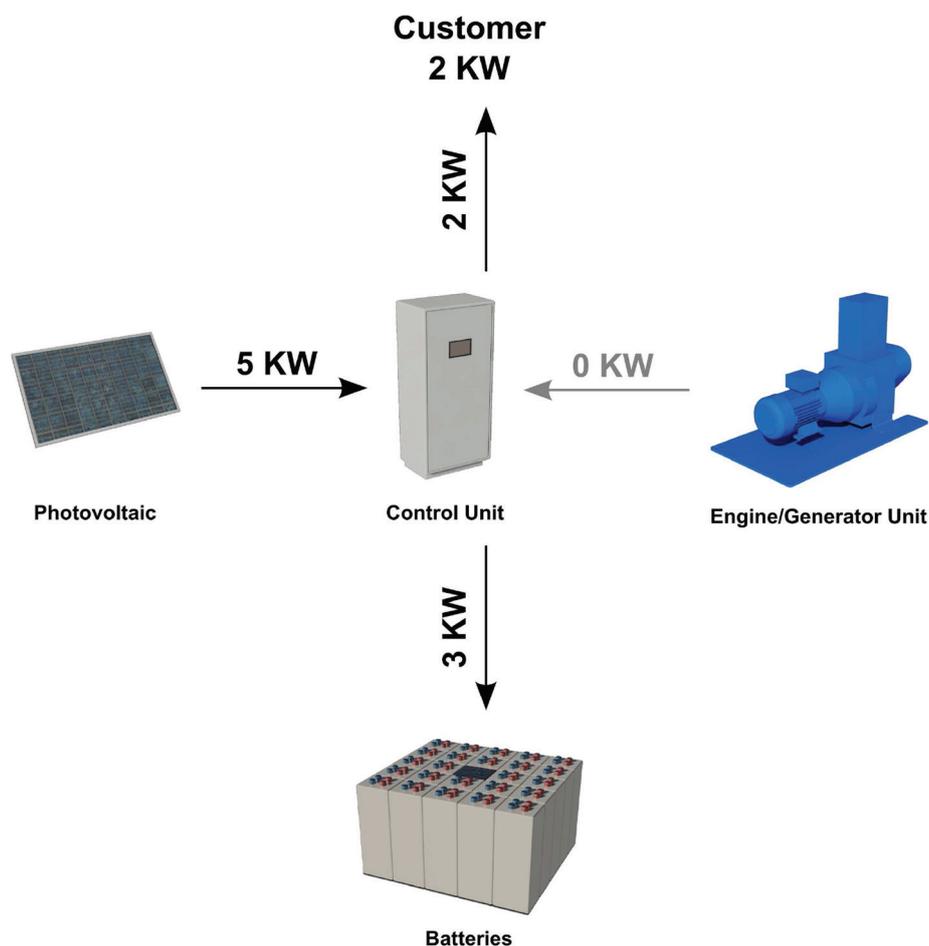
Following, 3 scenarios are shown that illustrate the basic functionality in an exemplary course over 24 hours.

EXAMPLE-SCENARIO BRIGHT SUNSHINE

The photovoltaic modules deliver more energy (5 KW) than needed by the consumer (2 KW).

The control unit sends 2 KW from the 5 KW to the consumer and uses the remaining 3 KW to charge the batteries.

It is not necessary to start the motor-generator unit since the solar energy supplied is fully utilized.



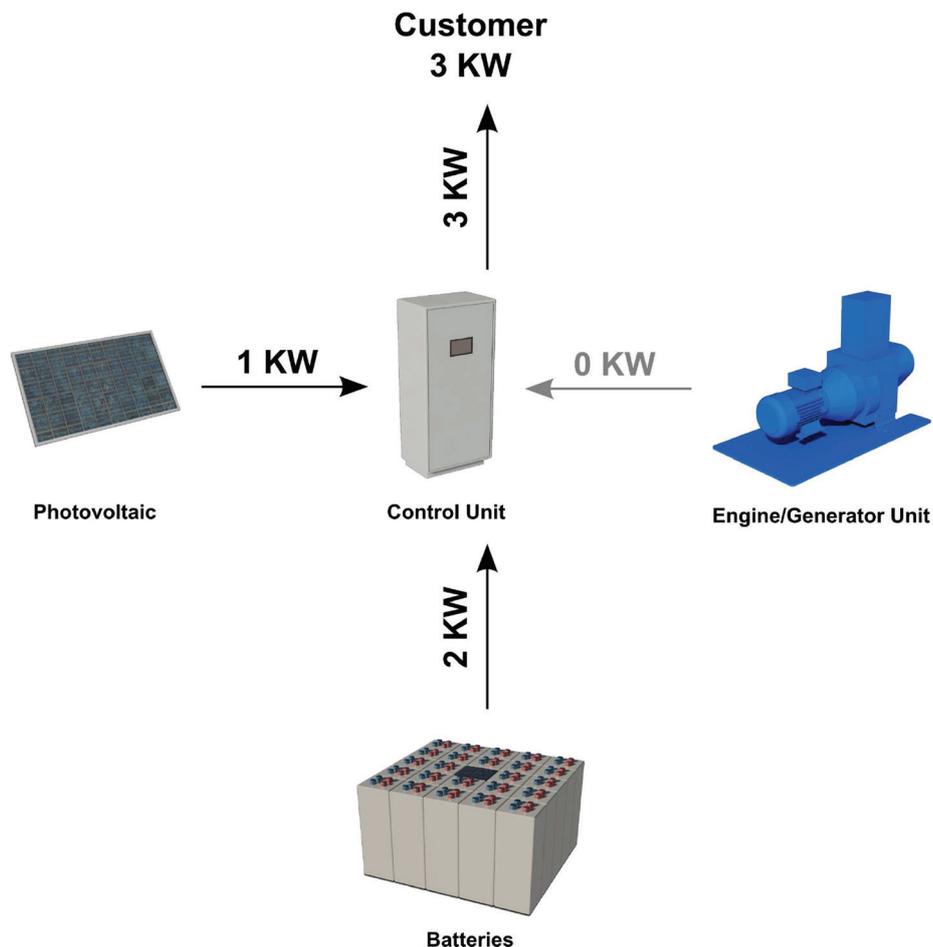
EXAMPLES-OPERATIONAL SCENARIOS-MECHANISM

EXAMPLE-SCENARIO

TOO LITTLE SOLAR ENERGY

In the evening (or in the case of a cloudy sky), the photovoltaic modules deliver less energy (1 KW) as required by the consumer (3 KW).

The control unit transmits 1 KW from the PhotoVoltaic and additionally 2 KW from the batteries to the consumer. It is not necessary to start the motor-generator unit because the batteries were charged in the previous scenario.



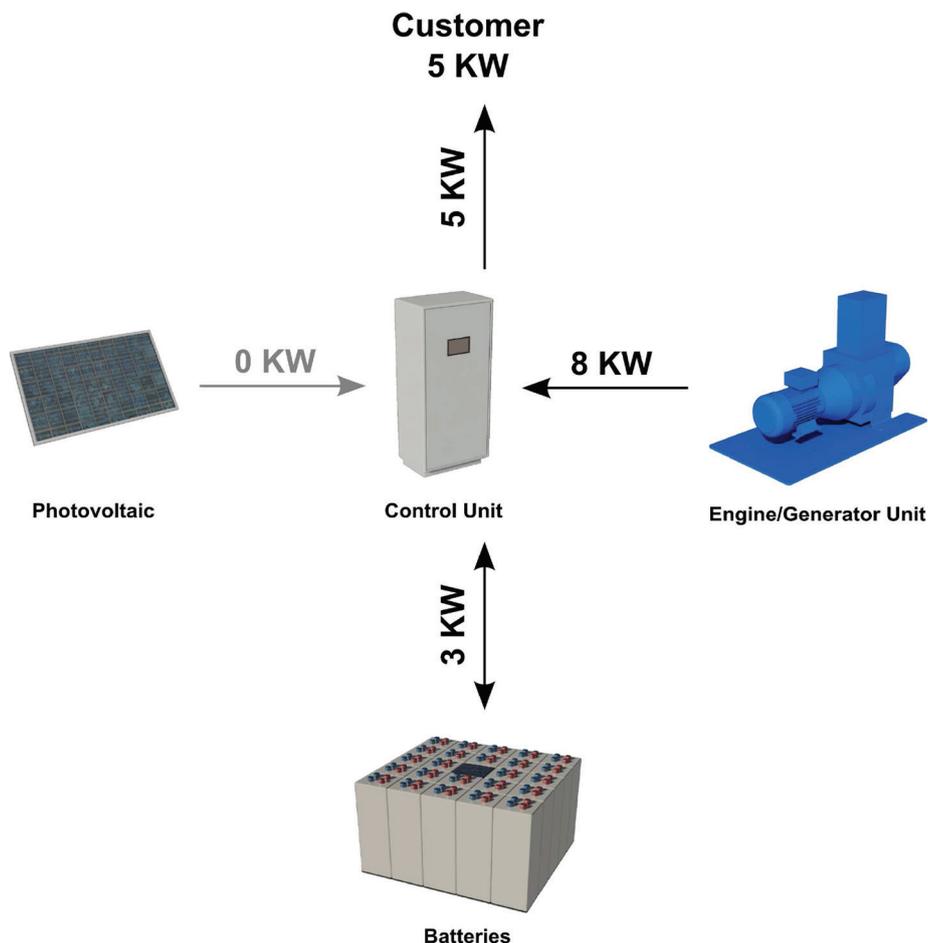
EXAMPLES-OPERATIONAL SCENARIOS-MECHANISM

EXAMPLE-SCENARIO

NO SOLAR ENERGY AT ALL AND BATTERIES PRETTY EMPTY

During the night or when the batteries are exhausted: The control unit starts the engine, and this constantly returns 8 KW to the control unit. The control unit feeds 5 KW to the consumer and uses the remaining 3 KW to recharge the batteries.

As soon as the batteries are charged or the photovoltaic power is restored, the motor is stopped, and the photovoltaic consumer (or sometimes the batteries, depending on the quantity) is fed. The switching between the energy sources happens without any interruption.



AREAS OF APPLICATION

- Remote houses or places
- Protection from an unreliable public power grid
- Longer outdoor events
- Commercial and industrial facilities away from any infrastructure or wanting to become independent
- As a supply for charging stations for electro mobility
- As an independent power supply for important infrastructure (military camps, weather stations)
- and so on



With an integrated micro-biogas plant, food waste (without packaging material) can be fed and used to produce fuel while at the same time disposing off the food waste.

TECHNICAL DESCRIPTION

PHOTOVOLTAIC

The photovoltaic modules are mounted on consoles on the roof of the PowerCube, and laterally at an angle to the PowerCube.

For reasons of space, only a maximum of 15 kW_{peak} can be mounted on the PowerCube itself. If enough space is available to be able to set up further photovoltaic modules in the vicinity (within a radius of up to approx. 40 meters), the total output of the photovoltaic system can be increased up to 60 kW_{peak}. The latter makes it possible to increase the number of possible consumers.

BATTERIES

The batteries are completely controlled and monitored by the control unit and, if required, power is taken from them or they are charged with power.

The batteries are completely maintenance-free.

ENGINE AND GENERATOR

The motor is connected to the generator and forms a unit.

This unit is the only component with moving parts, so special attention has been paid to features such as simplicity, robustness and longevity.

Depending on the desired output power, up to 4 such units can be mounted in one PowerCube.

TECHNICAL DESCRIPTION

ENGINE

Starting and stopping the engine is performed fully automatically by the control unit.

The engine (and thus also the generator) is always operated with a constant power. As a result, the entire unit always works in its optimum range.

As fuel diesel, fuel oil, or vegetable oil can be used. An admixture of biogas to the aforementioned fuels is possible. This admixture can be up to 60%, depending on the methane content of the existing biogas. The switching of fuels and the addition of Biogas can take place during operation without stopping the engine beforehand.

The engine is the only part that requires maintenance. This maintenance mainly consists of oil change, oil filter replacement and air filter replacement. Since the engine is used only when needed, the operating hours - compared to a running 24 hours a day commercial emergency power unit - are low, and the maintenance intervals correspondingly long.

To extend the maintenance intervals of oil changes even further, the engine is equipped with its own oil sump extension. This further extends the times between oil changes. Run times of 500 hours to 1,000 hours between oil changes are standard, but they also depend on the quality of the fuels used.

If maintenance on the engine is required, this will be indicated on the control cabinet display.

TECHNICAL DESCRIPTION

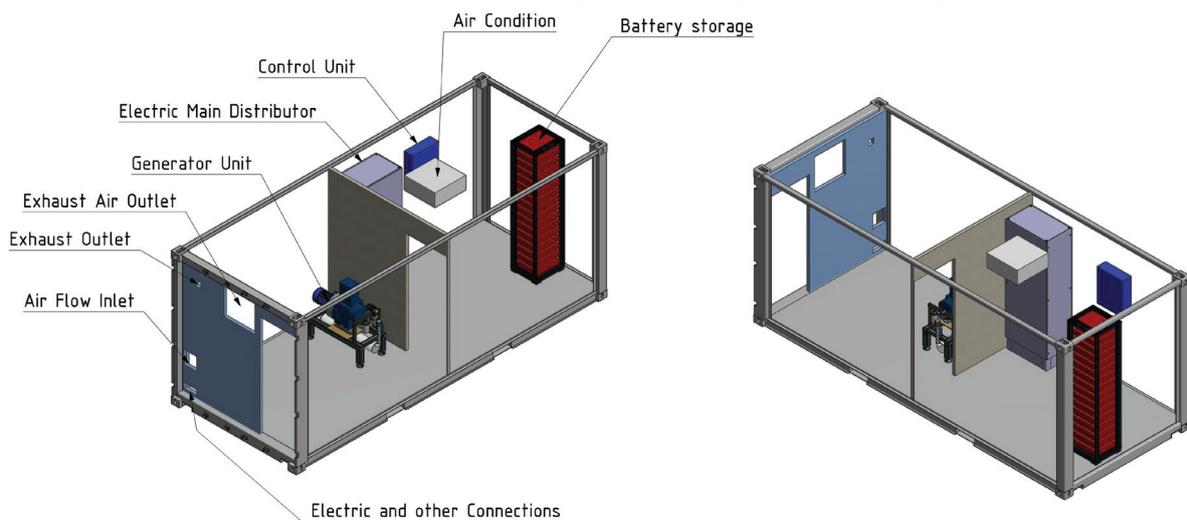
GENERATOR

The generator (which is connected to the engine) is our own development. It is designed to work optimally with the entire combination of batteries, photovoltaic and control unit. The generator itself requires no maintenance.

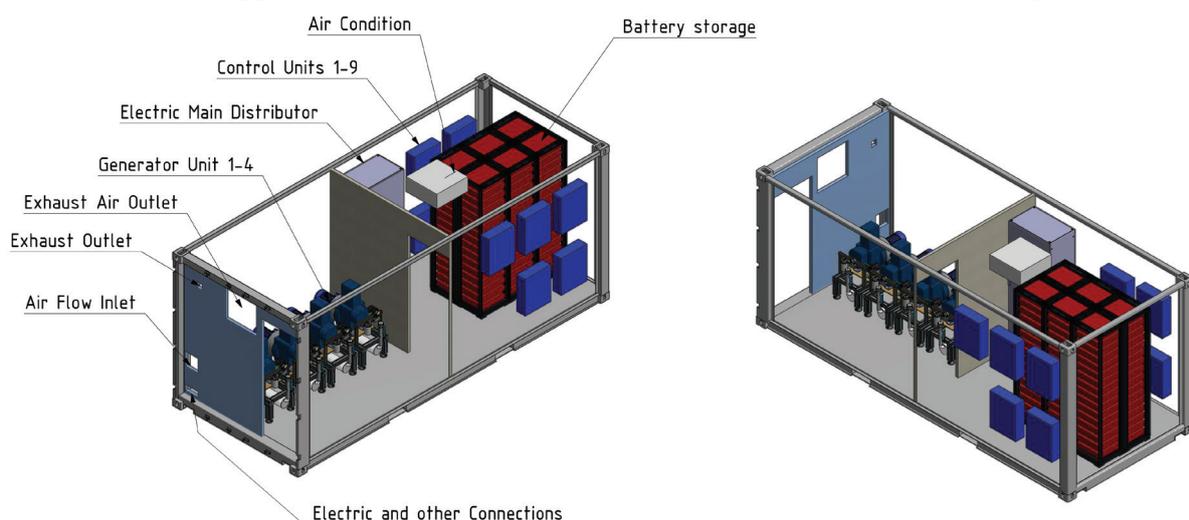
WASTE HEAT FROM THE ENGINE-GENERATOR UNIT

All waste heat (engine, generator and exhaust waste heat) can be provided for hot water or heating purposes. This results in a 100% utilization of the energy generated by the motor-generator unit.

Smallest Version PowerCube, 10kW Peak, 10kWh Battery Storage



Biggest Version PowerCube, 90kW Peak, 230kWh Battery Storage



POWER CUBE VERSUS COMMERCIAL GEN-SET

In a conventional backup generator, the generator must be rated at 1.5 times the expected peak power.

Example: If an emergency power unit is to operate a load that requires 60,000 watts (= 60 kW), the generator of the emergency power unit must be designed for 90,000 W (= 90 kW). Even if this performance may only be needed for a very short time (a few minutes) or only once a day. The rest of the day, the emergency power unit runs only in part-load operation, or even at idle. In these areas engines of emergency power units are very uneconomical, the need for fuel (mostly diesel or fuel oil) is high although little energy is supplied or needed. The generators of emergency generators are exposed to extreme load fluctuations and have to cope with this 24 hours a day.

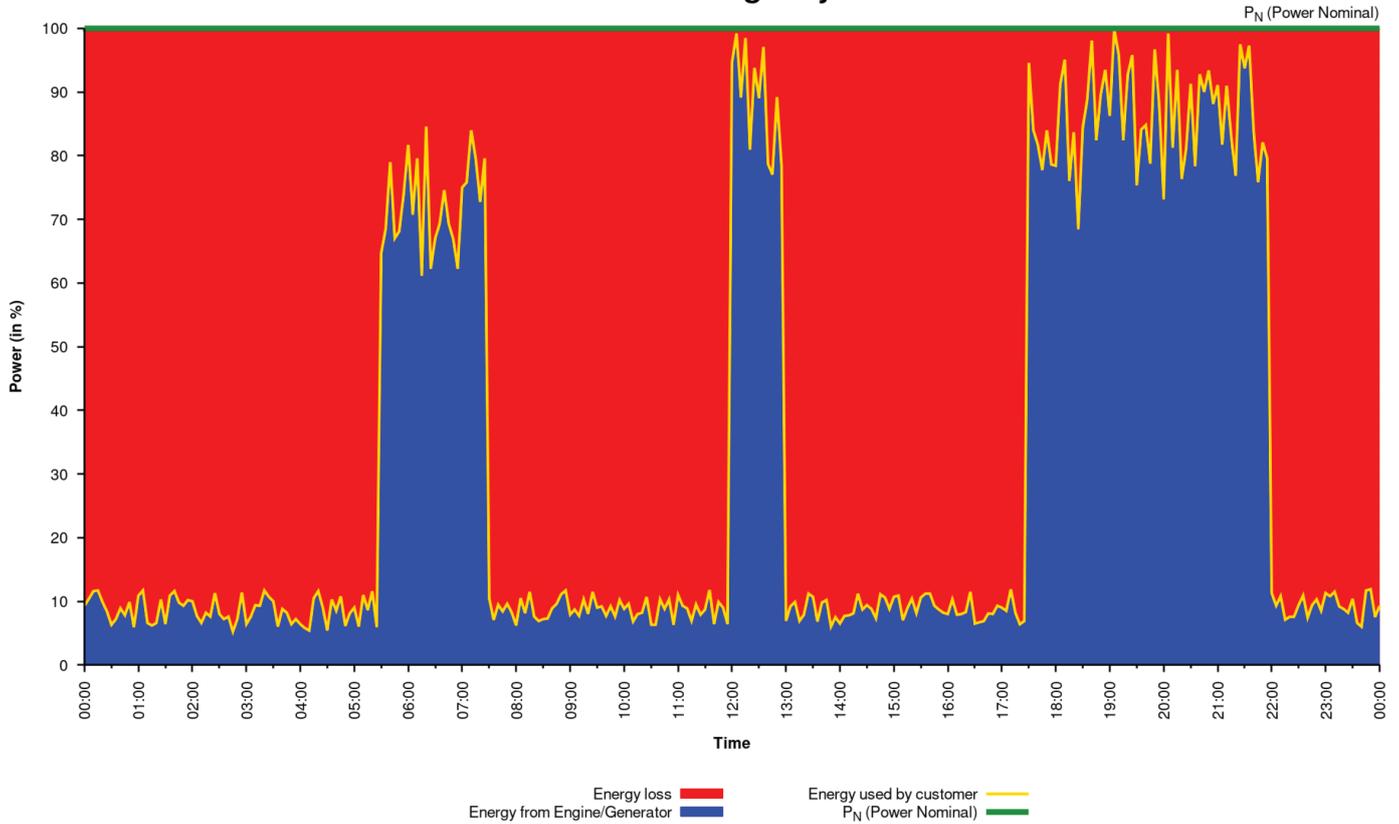
All of these factors enormously reduce the lifetime of an emergency generator. The waste heat generated by an emergency power generator can not be used at all and evaporates unnecessarily.

If a fault occurs within the emergency power unit, at the same time no energy is available at all.

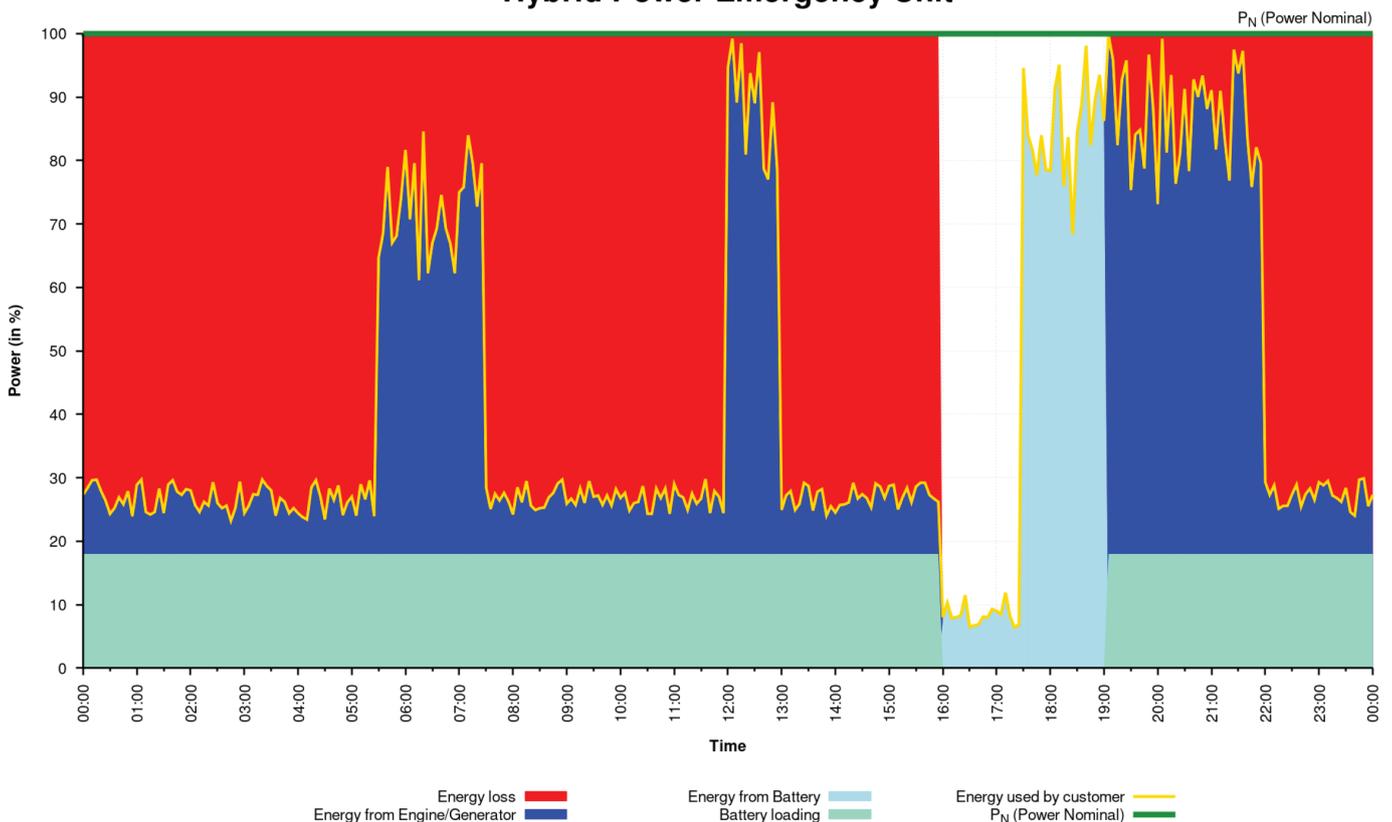
See graphic illustrations on the following pages.

POWER CUBE VERSUS COMMERCIAL GEN-SET

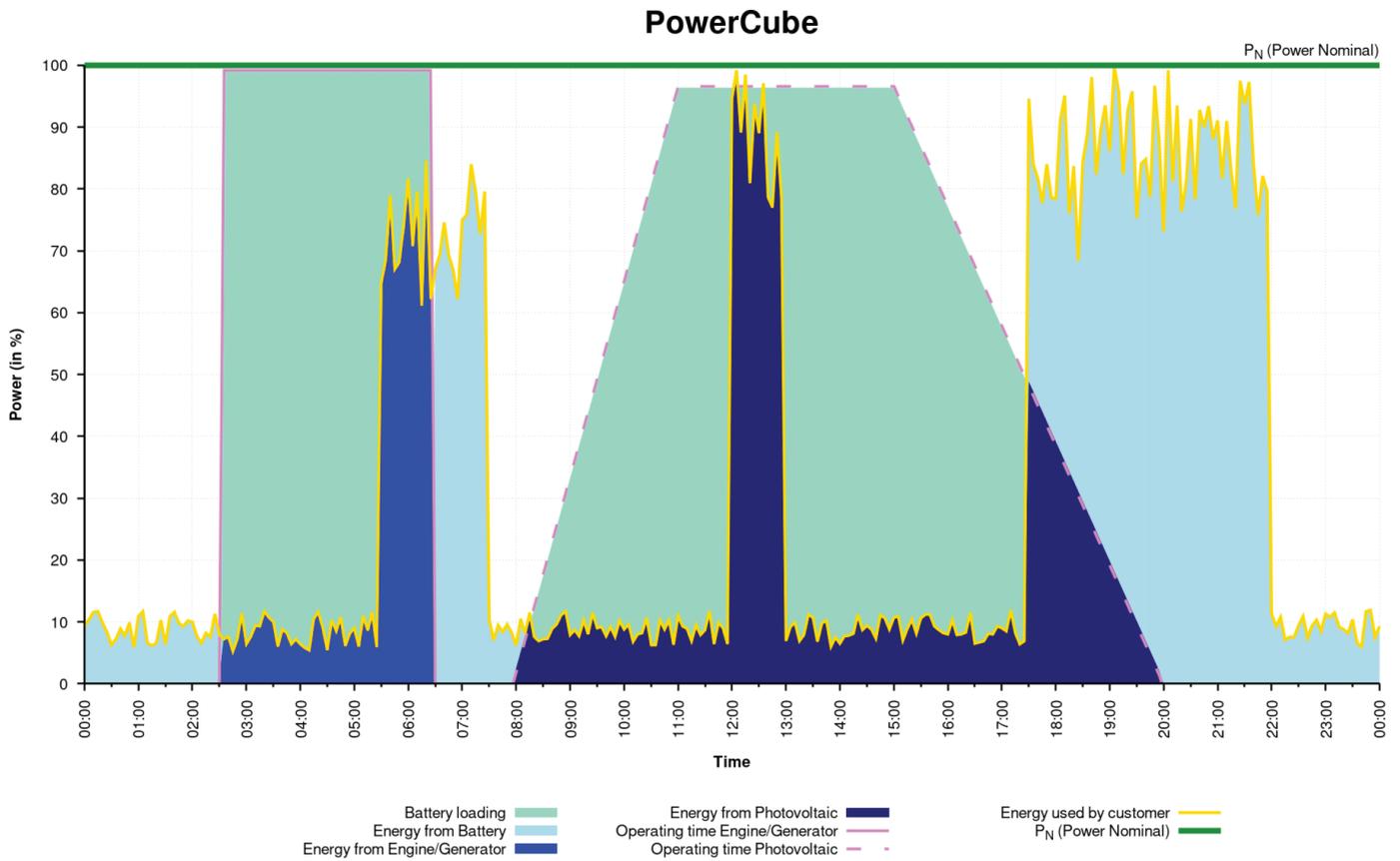
Power Emergency Unit



Hybrid Power Emergency Unit



POWER CUBE VERSUS COMMERCIAL GEN-SET



CONTACT

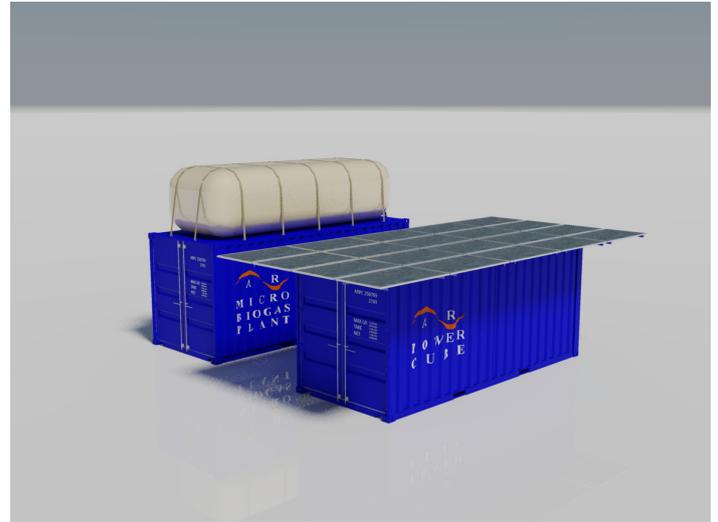
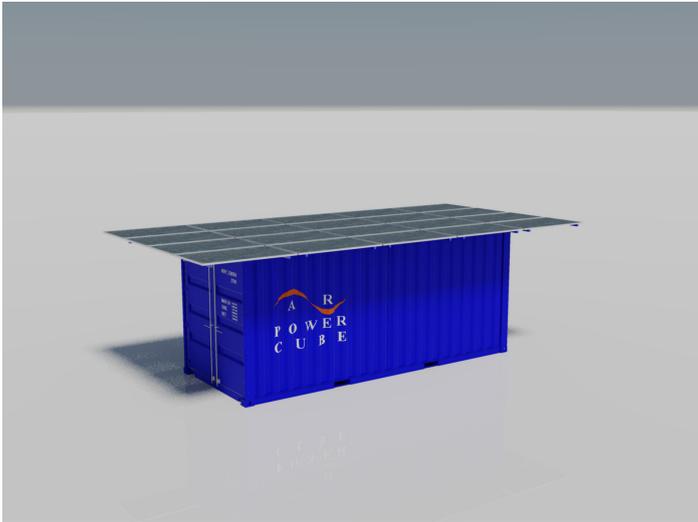


Figure 3: PowerCube - standalone (a) and combined with Micro Biogas Plant (b)

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