

Communication needs a reliable energy infrastructure.

The solution: CellCube power supply systems.

Ultimate

answer for
telecommunications power
supply

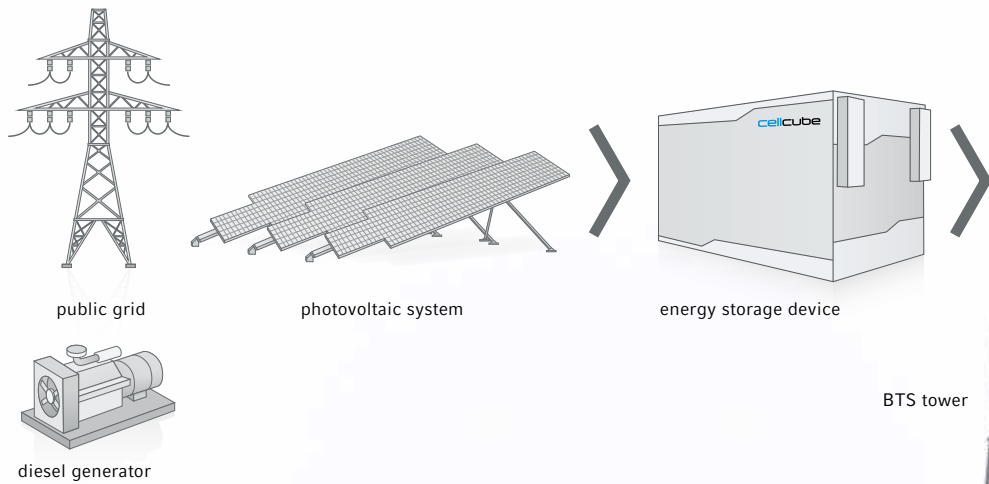


Modern telecommunications is based on a stable, secure energy supply.

Exacting demands in the telecommunications industry in terms of stability and safety rule out many traditional energy supply services from the outset. From an environmental and economical perspective, there is no future for a diesel generator, as the operative expenditure is too high.

Anyone looking for the ultimate solution will find it in CellCube. Discover the path to minimal operational expenditures. The intelligent energy storage device drastically reduces supply and site costs. Easy and seamless installation of CellCube storage systems enables plug-in replacements of existing legacy site equipment.

Installation example with charge options



Layout sketch



20+

Energy sources last more
than 20 years

3

Autonomy for
up to 3 days

99.9%

uptime!

In unstable grids and as an
off-grid solution

utilise

cellcube
store

generate



Five decision criteria: efficient, long-lasting, low-maintenance, reliable and universal applicable.

From energy generation with the SunCarrier photovoltaic tracking systems to storage and provision of power with the CellCube energy storage device, GILDEMEISTER **energy solutions** provides complete solutions for renewable energy. Efficient, long-life, low-maintenance, reliable. Universally use in many applications – you can find exceptional value for the telecommunication infrastructure.

CellCube highlights

- **Unlimited cycling** with vanadium redox flow technology
- **High degree of security** – not explosive and non-inflammable
- Plug-in replacement of existing mobile phone power supply systems
- Auxiliary service power supply (120 VAC; 230 VAC)
- Remote maintenance via **monitoring system**
- Advanced **smart grid compatible**
- Uninterruptible **telecommunications power supply**
- **Simple integration** with telecommunications DC system
- Variable storage capacities from 40 to 130 kWh
- **Weatherproof housing**
- **Theft-proof**
- Central **temperature management**
- Deep-discharge capable
- Up to 30 kW output
- Works without power and ageing losses
- No self-discharge in tank

self-sufficient

low-maintenance
durable lifespan

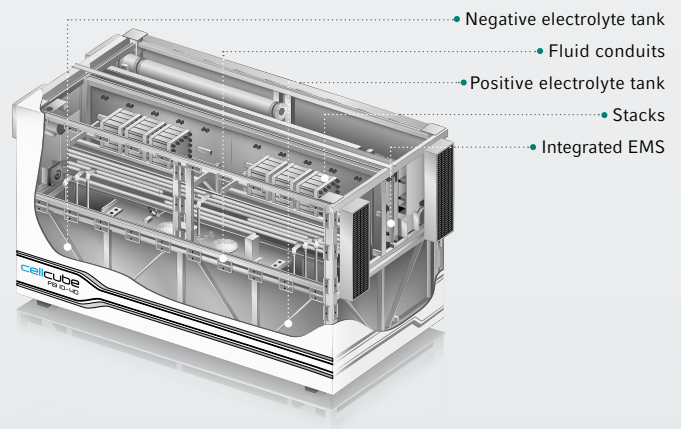


The electro-chemical process that charges or discharges the battery takes place **in the power stacks**.

How the redox-flow-battery works

The liquid energy carriers are stored in two tanks and are pumped through electro-chemical cells. Depending on the applied voltage, the energy carriers are either electro-chemically charged or discharged. In this context, the electrical charge regulators and inverters function as the interface to the electrical source, or, respectively, to the appliance.

The power and the capacity of the CellCube can be configured based on the requirements of your telecommunications system!



Integrated energy management system

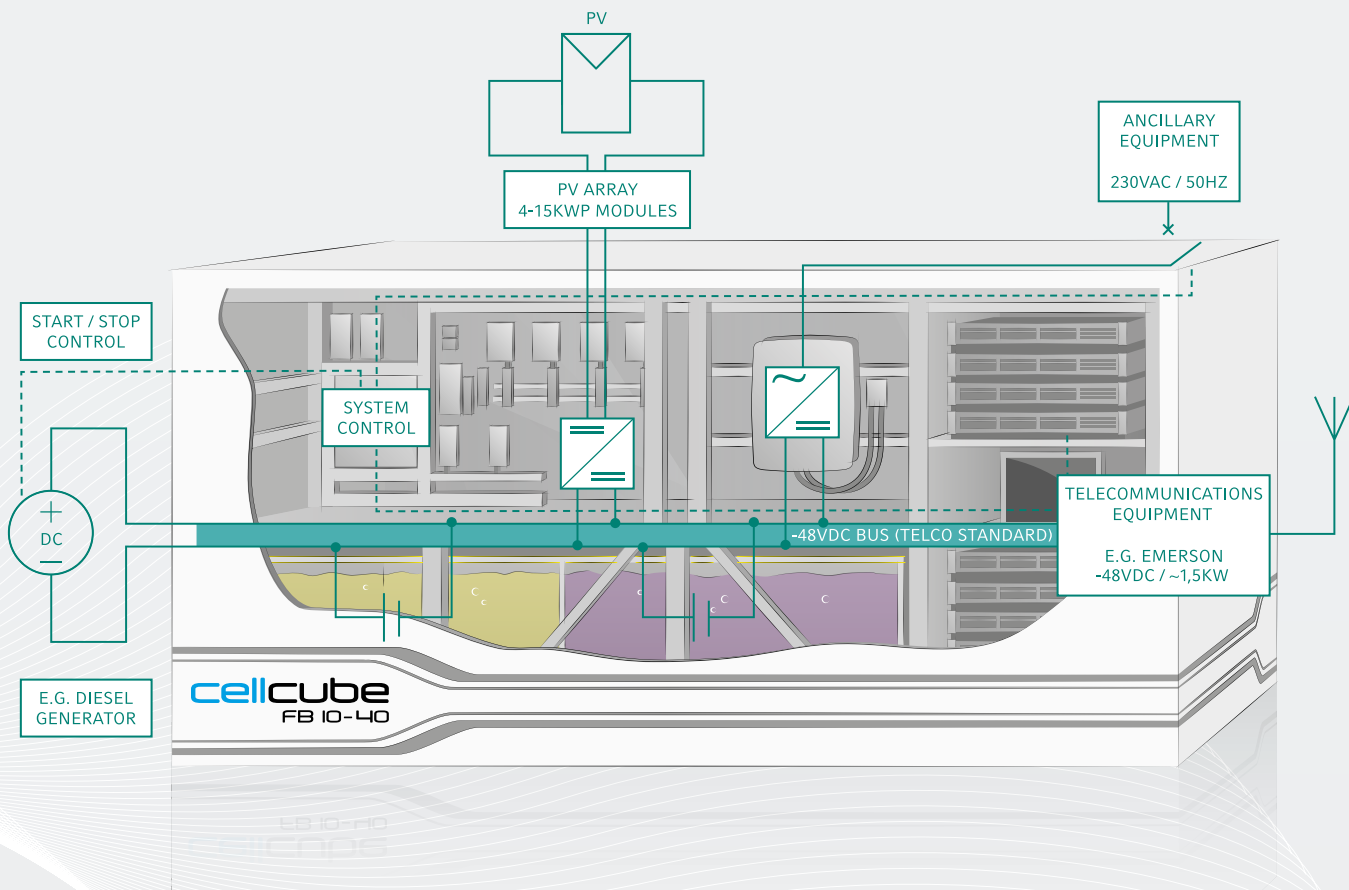
An intelligent micro-grid system checks and controls all components of the energy generation and consumption system and the integrated vanadium-redox-flow-battery.

Monitoring service function

All important operating parameters can be accessed online at any time, such as charge level and charging capacity.

CELLCUBE – THE INTELLIGENT ENERGY MANAGER

CellCube's principle is based on a redox-flow-battery, combines all telecommunications technology, including the power supply, in a single unit which concentrates on efficient energy management: remote maintenance, DC/DC converter for connection to the SunCarrier photovoltaic system or similar, connection of a diesel generator with a clever control system, outputs for additional equipment such as monitoring cameras or lighting.



Potential applications

- As a replacement for high-maintenance and environmentally damaging battery systems and diesel generator sets
- In weak grid with an unstable network
- As an off-grid solution in areas without grid connection
- Suitable for all signal transmission stations
- Scalable for multi-operator sites

Benefits of CellCube

- Reduction of the Total Cost of Ownership
- Eliminating or mitigating constant increases in diesel prices
- Easy integration into DC telecommunication infrastructure
- Elimination of service and maintenance cost of legacy storage solution
- Environmentally friendly and reusable
- Simple integration into standard online and remote maintenance systems

Technical data

- **Power charge rating:**
0 - 10 kW
- **Typical discharge rating:**
700 watts to 4 kW DC
- **Scalable capacity of energy store:**
40 to 130 kWh (8h - 3 days)
- **Nominal output voltage:**
-48 VDC (positive grounding)
120 VAC; 230 VAC (one-phase)
400 VAC (three-phase)
- **DC charge/discharge cycle:**
>80 % DC round-trip efficiency
- **Auto-discharge in standby:**
<150 watts
- **Auto-discharge in tank:**
negligible (<1 %/a)
- **Climatic operating conditions:**
-40°C to +50°C (monthly average)

WORTHWHILE INVESTMENT

Efficiency is best expressed in figures.

Especially if compared to diesel generators and conventional batteries, it quickly becomes clear **that a CellCube pays off on a number of levels when it comes to the stable supply of telecommunications networks.**

Total Cost of Ownership

Comparison: diesel generator and lead battery compared to SunCarrier 22 and CellCube FB 10-40 (period of 20 years). **A 10 kW diesel generator charges a lead battery and powers the base station. When the battery is full, the generator stops and the lead battery powers the unit. Alternative: one CellCube FB 10-40 with SunCarrier 22 with 14 kWp.**

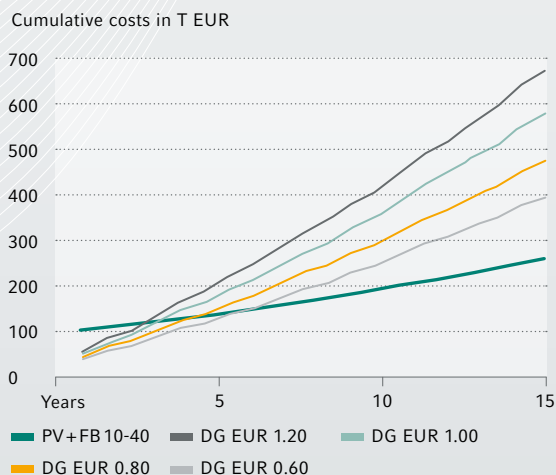
20 years	Diesel generator 10 kW and lead battery	Photovoltaic and CellCube FB 10-40
Initial investment	EUR 47,700	EUR 104,775
Service life of generator	15,000 hours	20+ years
Service life of battery	1,500 cycles	> 10,000 cycles
Diesel costs	EUR 236,640	-
Total spare parts costs	EUR 132,231	EUR 67,176
Maintenance	EUR 92,703	EUR 53,741
Total investment	EUR 509,274	EUR 225,692

You save 135,000 litres of diesel in 20 years

Assuming a diesel price of EUR 1.20/l and an inflation rate of 3 % per year, the **break even is reached after around 5 years**. Additional 356 tons of CO₂ will be saved over 20 years.

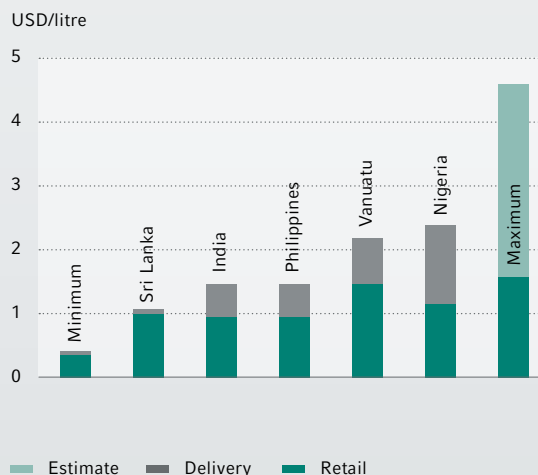
Development of diesel prices

DG (fuel price) vs PV and FB 10-40



Source: GILDEMEISTER energy solutions

Build-up of wholesale diesel price



Source: GSMA Member Operators

CellCube – successfully used around the world.



Off-grid Abu Dhabi, UAE



Emobility in Iga, Japan



Farm in Vierakker, Netherlands



Volkswagen in Wolfsburg, Germany



Off-grid Bhopal, India



Industrial solution in Bielefeld, Germany

The energy-efficient complete solutions.

windcarrier



suncarrier

cellcube



generate

SunCarrier: The SunCarrier is a unique tracking system which continuously aligns the surface of its modules with the current position of the sun.

WindCarrier: The small wind turbine using the Darrieus principle with a rated power of 10 kW guarantees efficient power generation.

store

CellCube: The long-life vanadium-based energy storage device provides an uninterrupted power supply. It is available with a power output of 10 to 200 kW and a scalable capacity in the MWh range. This means that covering the base load, capping electricity peaks and securing supply to sensitive areas can be achieved at all times.

utilise

Intelligent products and technologies for modern energy management:

- e-mobilitysolutions
- telesolutions
- backupsolutions
- off-gridsolutions
- industrialsolutions
- powersolutions

Contact us

GILDEMEISTER energy solutions:

T +49 (0) 931-25 064-120, F +49 (0) 931-25 064-102, energysolutions@gildemeister.com, www.gildemeister.com

a+f GmbH: Carl-Zeiss-Strasse 4, 97076 Wuerzburg, Germany

cellstrom GmbH: Industriezentrum NOE Sued, Strasse 3, Objekt M36, 2355 Wiener Neudorf, Austria



More information here!

If your mobile phone comes with QR-Code recognition software, you will be directed to www.gildemeister.com.