The TESVOLT energy management system

Fully integrated and digital

TESVOLT

Free to go green.

Control and monitoring made easy

All generators and consumers locally networked in one system

The TESVOLT energy management system is unique: all generators and consumers are networked in one system. All energy flows are recorded, visualised, monitored and controllable. Your four cornerstones for success:

1. Fully digital

All generators and consumers on the TESVOLT compatibility list can be visualised in the myTESWORLD portal via a Modbus protocol.

2. Maximum economic efficiency

Numerous energy services ensure the optimisation of local energy production, consumption and load control (e.g. charging stations).

3. Absolute transparency

All generators and consumers are visualised in the myTESWORLD portal and in the app. Energy data can be stored and individually evaluated.

4. Local networking, global thinking

Our vision: all storage and generator systems are networked irrespective of location, while excess electricity is jointly marketed on the electricity exchange.

The three components of the TESVOLT energy management system

Hardware, online portal/app and energy services

The hardware: TESVOLT Energy Manager

The KC4S is the heart of our energy management system. It can be integrated locally in the meter cabinet or via the **TESVOLT Backup Control Box**.

- Recording of energy data and storage in the cloud
- Optimisation of energy flows via individually configurable applications
- Easy configuration of applications via a user-friendly interface in a web browser
- Local installation in the meter cabinet or in the TESVOLT Backup Control Box

Online portal and app

The **myTESWORLD portal** is simple to access using a web browser or app. It offers a wide range of functions for monitoring and controlling energy flows. Standard functions are already integrated in the free Basic version, while additional functions are available in the fee-based Pro version.

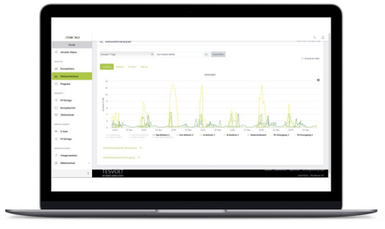
- Central cockpit of the energy management system
- Flexible analysis of energy consumption and production data
- Recording and monitoring of energy flows
- Remote control of charging infrastructure

GET IT ON Google Play

Download on the App Store

Test the myTESWORLD demo version now!

Would you like to get to know myTESWORLD better? Then simply sign up for trial access via our **EMS portal at https://mytesworld.tesvolt.com** and get an overview of all the functions of our energy management solution at your leisure. If you have any questions, don't hesitate to ask.



The energy services

Comprehensive, powerful and efficient

The free Basic version of the TESVOLT energy management system already covers traditional requirements such as self-consumption optimisation and straightforward charging station control. However, it is in the Pro version that the EMS really comes into its own, with features tailored to individual needs. Enter a world of transparency and control.

Basic version functions

The Basic version comes free with the battery storage system and includes all the energy service features listed below. Some of these functions can be combined.

Self-consumption optimisation	Use more energy from renewable sources and minimise feed-in: this application aims to maximise the consumption of renewable energy by striving for an output of zero watts. The battery is completely discharged when power is being drawn from the grid and is charged until full when power is being fed into the grid. This enables various control options for consumers and generators, and these options can be switched on and off depending on the available energy supply.
Physical peak shaving	Shave consumption peaks and cut demand rate costs: the grid connection must be capable of supplying all loads. If a peak load exceeds a defined limit, it is restricted by the storage system. By supplying the necessary electricity, the storage system helps to keep the grid load within the defined value.
Zero feed-in	VDE FNN-certified fulfilment of grid requirements for not feeding electricity into the utility grid: the battery ensures that no electricity is fed into the utility grid. For example, PV installations are curtailed when the state of charge increases, so that the battery remains capable of responding and absorbing excess energy.
Load control	Selectively switching consumers on and off optimises energy consumption in relation to the energy generated. Digital switching contacts control the consumers, and an adjustable tolerance time can be set in order to trigger the circuit when the time exceeds or falls short of certain limits.
Generation control	Actively switching consumers on and off optimises energy consumption in relation to the energy generated in grid operation. Digital switching contacts control the generators, and an adjustable tolerance time can be set. This time determines when the circuit is triggered once the time exceeds or falls short of certain limits.
Charging station control	Smart control of an individual charge set point and central controls via the TESVOLT Energy Manager: in the Basic version, exactly one charge set point can be integrated and controlled. This allows the charge point to be controlled together with other generators and consumers in order to reduce peak loads, adapt grid consumption for charging an electric vehicle, or define the maximum drawing capacity of the charge set point, for example.

Pro version functions

The Pro version of the battery storage system can be activated for a small additional annual fee per kilowatt (kW) of the battery inverter output. It offers all of the energy service features listed below as well as the features of the Basic version. Depending on the project requirements, these can be combined to allow simultaneous use of various energy service features.

Dynamic peak shaving	Smart reduction of consumption peaks at 15-minute intervals and optimal use of the storage system: dynamic peak shaving only kicks in if the average consumption threatens to exceed the maximum tolerated peak value within a 15-minute interval. Individual peak loads above the configured peak value are permissible. The 15-minute interval can be adapted to country-specific requirements. The battery is recharged when the target output is insufficient. After the configured peak load has been exceeded, the target output is automatically set to a higher value. The desired peak load can be entered manually. Changes to the target output can also be entered as a time series so that the new target value is used at the beginning of the next billing period.
Power quality	A battery inverter with a power quality function compensates for mains voltage fluctuations, ensuring that facilities have consistently high mains quality and therefore operate safely. Through dynamic compensation of harmonics, it improves power quality in the system. Excessive grid feedback can have an adverse effect on all connected devices and, in the worst case scenario, lead to the loss of guarantee and insurance coverage. These effects can be prevented by the active filter function of the battery inverter.
Multi-use	An adaptable decision tree can be used to combine multiple energy management strategies. The threshold of the SoC in the decision tree determines when certain strategies, such as SCO or PS, are to be applied. This allows multiple energy services to be linked to a single battery efficiently. The decision tree is flexible enough to integrate time series to determine when certain actions should be taken. Depending on whether the time series is activated or deactivated, a corresponding energy management strategy, such as PS or SCO, can be applied. The decision tree is adaptable and can encompass multiple levels.
Forecast-based charging	Incorporating weather forecasts helps prevent curtailment losses from photovoltaic installations and optimise self-consumption. An AI-based PV generation and consumption forecast controls the charging of the batteries to keep the maximum feed-in power as constant as possible. If less excess is forecast than is needed, the excess electricity is used to charge the batteries. For example, battery charging is shifted to the lunch break to minimise curtailment losses from the PV installation.
Semi-off-grid operation*	The consumers are supplied either exclusively from the utility grid or entirely from their own storage systems and generators. During off-grid operation, the operator's own power sources are disconnected from the public utility grid, with the battery inverter handling the formation of the off-grid system. If necessary, consumers and generators are synchronized with the off-grid network or the utility grid. The conditions for off-grid switching can be configured in the decision tree.
Charging station control (Pro)	Smart control of multiple charge set points and central controls via the TESVOLT Energy Manager: this application allows overarching configuration of the maximum potential grid load at the grid connection point or for the entire charging infrastructure. For each charge set point, it also allows the assignment of individual settings for minimum and maximum output, maximum usable electricity drawn from the grid, and priorities.
Off-grid	TESVOLT offers a solution for simple off-grid systems that consist solely of a photovoltaic installation and batteries. The battery inverter is configured to run in grid-forming (voltage-controlled) operation continuously. Load and generation control are independent of the battery's state of charge and the available generation capacity.
Micro-grid*	A small power grid can be supplied both with or without a connection to the public utility grid. A micro-grid consists of a battery storage system in addition to other generator systems and controllable consumers. An individual EMS connects and controls a multitude of generators and consumers to enable stable operation of a small distribution grid. From a technical perspective, a micro-grid is equivalent to an expanded off-grid installation or a more extensive back-up power system.
Time of use	Time-dependent use of energy features and services allows the definition of time series that are then evaluated in the decision tree. This means the user can deploy different energy management strategies depending on the time of day. Time series can include individual points in time or recurrent periods. Switching points with varying periodicity can be stored in a time series.
Back-up power	Storage system immediately takes over the power supply in the event of a power outage. The grid connection protection detects the disturbance and activates one or more isolating contactors, while the battery inverter switches from current- to voltage-controlled operation in order to operate the system as an off-grid installation. As soon as the utility grid is available again, the battery inverter returns to current-controlled operation.
Direct marketer interface*	The PV direct marketer transmits control signals to the PV installation via the EMS. Communication between direct marketer and PV installation takes place via the direct marketer interface in order to meet the requirements for selling solar power on the electricity exchange according to the market bonus scheme and to ensure controllability via the EMS.

** Project-based.*

Multi-functional multi-use

Unique operational management strategy combination possibilities.

Traditional multi-use applications typically allow two functions to be combined via a storage system, such as self-consumption optimisation and peak shaving. The TESVOLT EMS allows the user to combine numerous applications, including in a time-dependent manner. This opens up completely new possibilities for optimising the use of the storage system. It also makes it possible to respond to regulatory and economic changes in the market and to implement the business models of the future.

	Self-consumption optimisation	Physical peak shaving	Zero feed-in	Charging station control	Generation control	Load control
Self-consumption optimisation		1	1	1	1	1
Physical peak shaving	1		1	1	1	1
Zero feed-in	1	1		1	1	1
Charging station control	1	1	1		1	1
Generation control	1	1	1	1		1
Load control	1	1	1	1	1	

BASIC

	Self-consumption optimisation	Off-grid	Physical peak shaving	Back-up power	Zero feed-in	Charging station control (Pro)	Generation control	Load control	Peak shaving RLPM	Power quality	Forecast-based charging	Semi-off-grid operation*	Micro-grid*	Time of use	Direct marketer interface*
Self-consumption optimisation		0	1	1	1	1	1	1	1	1	1	1*	0	1	1*
Off-grid	0		0	0	0	1	0	1	0	1	1	na	na	1	na
Physical peak shaving	1	0		1	1	1	1	1	na	1	1	1*	na	1	1*
Back-up power	1	0	1		1	1	1	1	1	1	1	na	na	1	1*
Zero feed-in	1	0	1	1		1	1	1	1	1	1	1*	na	1	-
Charging station control (Pro)	1	1	1	1	1		1	1	1	1	0	1*	1*	0	1*
Generation control	1	0	1	1	1	1		1	1	1	1	1*	0	1	1*
Load control	1	1	1	1	1	1	1		1	1	1	1*	1*	1	1*
Peak shaving RLPM	1	0	na	1	1	1	1	1		1	1	0	1*	1	-
Power quality	1	1	1	1	1	1	1	1	1		1	1*	1*	1	1*
Forecast-based charging	1	1	1	1	1	0	1	1	1	1		1*	1*	1	1*
Semi-off-grid operation*	1*	na	1*	na	1*	1*	1*	1*	0	1*	1*		1*	1*	-
Micro-grid*	0	na	na	na	na	1*	0	1*	1*	1*	1*	1*		1*	-
Time of use	1	1	1	1	1	0	1	1	1	1	1	1*	1*		1*
Direct marketer interface*	1*	na	1*	1*	-	1*	1*	1*	-	1*	1*	-	-	1*	

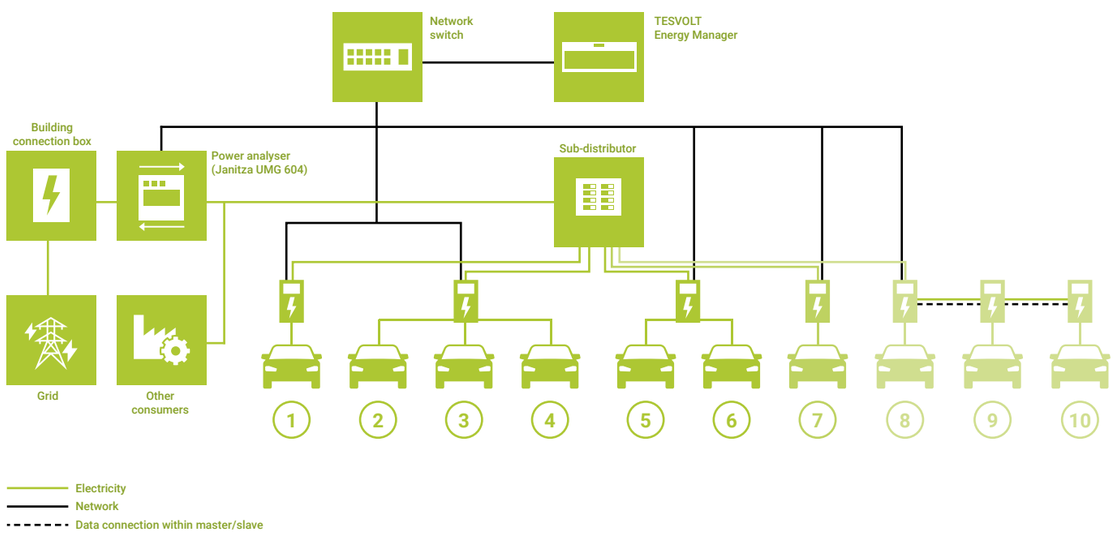
BASIC + PRO

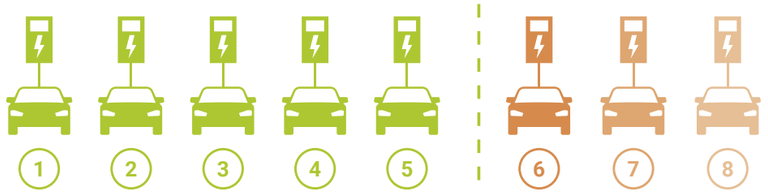
1 Combination is possible
0 Combination is not possible
* Combinations are possible on a project-by-project basis
na Not applicable
- Not yet possible to say

Charging station control

Limited grid connection? No problem with the TESVOLT EMS

Where a user has only a limited grid connection, they can dynamically control the output of the charging infrastructure. The only requirement for this is a TESVOLT Energy Manager and a power analyser. The power analyser gauges the power at the limited grid connection. The TESVOLT Energy Manager determines the power available for the charging infrastructure, taking into account other consumers and generators (e.g. whether a CHP can still be switched on if the power is not sufficient). It conveys the available power to individual charging points in the form of set points. This means up to 25 charge set points can be controlled easily using a mobile phone app or via the myTESWORLD online portal. TESVOLT facilitates compatibility with most charging stations and, combined with a TESVOLT battery storage system, offers an elegant solution for cushioning peak loads.





What is the difference between the Basic and Pro versions?

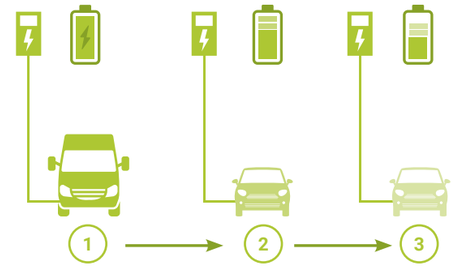
The **Basic version** of the TESVOLT Energy Manager includes charge controls for a charging point. You can control multiple charging points via one charge set point, but only with general power controls and not separately from one another.

The **Pro version** has all the features of the Pro package, while also permitting dynamic load management of up to 25 charging points with one Energy Manager. It also offers the option of prioritising different members of the charging system, for example hard or soft prioritisation according to charging point number. Each charge set point can also be configured so that it is charged exclusively from a PV installation, meaning only "green electricity" is used.

Types of prioritisation

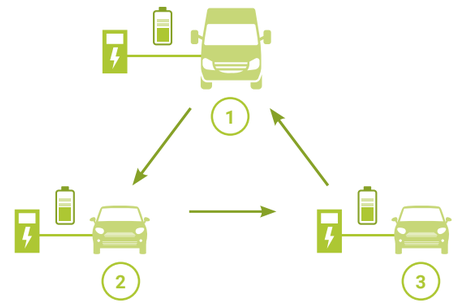
VIP distribution:
VIP distribution means that the charging points with VIP priority receive the required power without restrictions. The charging power is automatically allocated so that the VIP charging points are given maximum priority. Surplus power is distributed according to the order of priority, with each subsequent charging point receiving the power available.

Sample application: long-distance vehicle plus city car



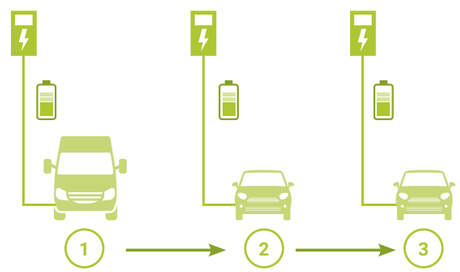
Prioritised distribution:
This type of distribution prioritises the available charging power so that the charging point with the highest priority is assigned the maximum charging power, while all other charging points are considered according to their priority. Surplus power is distributed according to the order of priority, with each subsequent charging point receiving the minimum charging power. If additional power is left over, it is allocated to the highest-priority charging point first of all before the next charging point in the priority list is considered.

Sample application: electric vehicle fleet of a parcel service



Fair distribution:
Fair distribution means that all charging points receive an equal allocation of power at the same time. The first charging point in the priority list is first to start the charging process with a minimum charging power of 6 A. The charging point with the next highest priority then begins to charge. Surplus power is distributed to the charging points according to the order of priority, with each subsequent charging point also receiving the minimum charging power to begin with. Once all charging points are active, surplus power is distributed evenly across all remaining charging points.

Sample application: shopping centres or multi-storey car parks

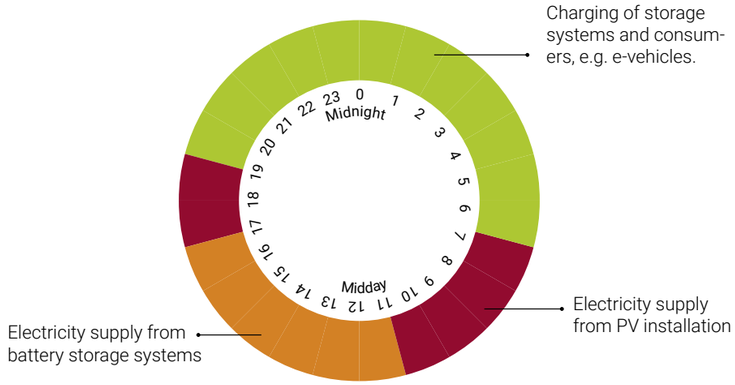


Multi-use and time of use

Benefit from multiple applications in parallel

Multi-use describes the **use of the battery storage system in multiple ways**. This means you can use operational management strategies in a variety of combinations: e.g. self-consumption optimisation (SCO) with time of use (TOU).

One of the key benefits of the TESVOLT Energy Management System is the **multiple options** for **combining applications**. You can combine virtually any applications with each other according to their requirements. This can include making various energy management strategies time-dependent (TOU), with the option of concurrent improved power quality. It is also flexible enough that it can give rise to business models that may not even exist yet.



Multi-use with the example of SCO and TOU

The **TESVOLT Energy Manager** is configured so the amount of electricity that you purchase from the supplier in addition to the electricity you've produced in-house is charged at a particularly affordable price, e.g. at the night tariff. The battery storage system delivers its power from the point at which the company's own electricity production is insufficient to **cover demand**, or at certain times when the supplier's electricity price is particularly high.

Benefits

Maximum flexibility when choosing operational management strategies

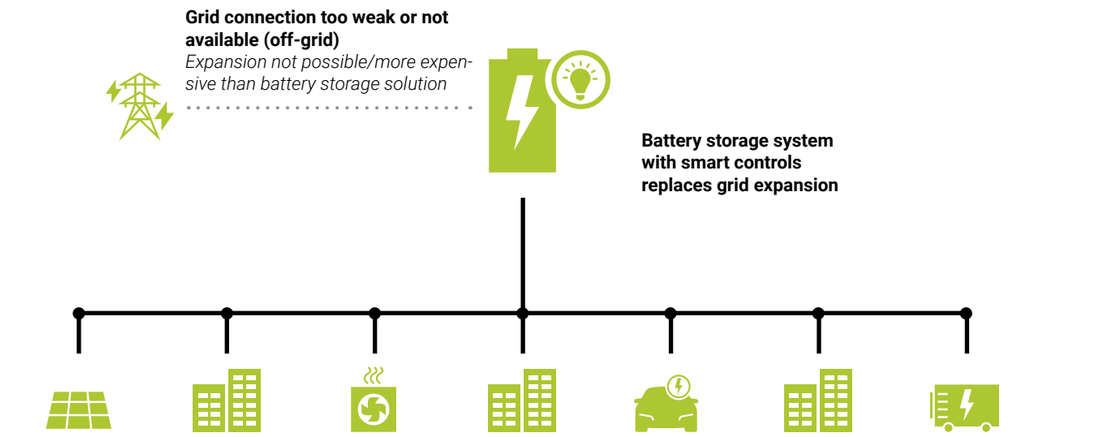
Higher cost savings for electricity

Investment written off sooner

Micro-grid

Utility grid not powerful enough? Try a storage solution rather than grid expansion

Every day, the TESVOLT Energy Manager ensures an optimal charging and consumption strategy. This is based on weather forecast data, and the battery capacity or charging level. In many cases, a maximum load reduction is specified by the grid connection. The TESVOLT system complies with this exactly. The difference between this and the maximum storage capacity can then, for example, be used in combination with a PV installation to optimise self-consumption.



Benefits

Avoid expensive grid connection expansion

Ensures the feasibility of construction projects

Higher cost savings for electricity

Investment written off sooner

Free to go green.

TESVOLT AG is an innovation and market leader for commercial and industrial energy storage system solutions in Germany and Europe. As an agile company, it enables its customers to reduce their dependence on power companies and play an active part in the energy transition thanks to intelligent lithium storage systems.

Excellent quality, TÜV-certified safety and a wide range of capacities – from 10 kWh to 20 MWh – meet even the highest product demands.

All storage systems are series-produced in the carbon-neutral TESVOLT gigafactory in Lutherstadt Wittenberg – from where they are delivered worldwide.

This project has received funding from the European Union´s Horizon 2020 research and innovation programme under grant agreement No 829877

Subject to technical changes. Errors excepted. All the services described are offered in selected markets only. Ask your TESVOLT Field Service Team at any time.

You will need to register on the manufacturer's myTESWORLD portal (https://mytesworld.tesvolt.com) before you can use the TESVOLT Energy Manager energy management system (EMS). To use the Data Manager M energy management system (EMS), you will need to register on the Sunny Portal powered by ennexOS and run by the manufacturer SMA.

TESVOLT

TESVOLT AG
Am Heideberg 31 | 06886 Lutherstadt Wittenberg
Germany

Tel. +49 3491 8797-100
info@tesvolt.com

www.tesvolt.com