

*TESVOLT product portfolio*  
***Energy storage systems  
to meet every need***



**TESVOLT**  
*Free to go green.*



# Free to go green.



**We believe that you can measure freedom by the energy storage solution you use. Because effective storage of renewable energies takes smart technologies. These solutions free us up from fossil fuels and economic pressure, paving the way for a world where everyone can choose to use green energy independently.**

Renewable energies create independence – and we see the energy transition as an opportunity. Our battery storage systems allow you to reduce your electricity costs and accurately calculate your outlay, even in times of uncertainty.

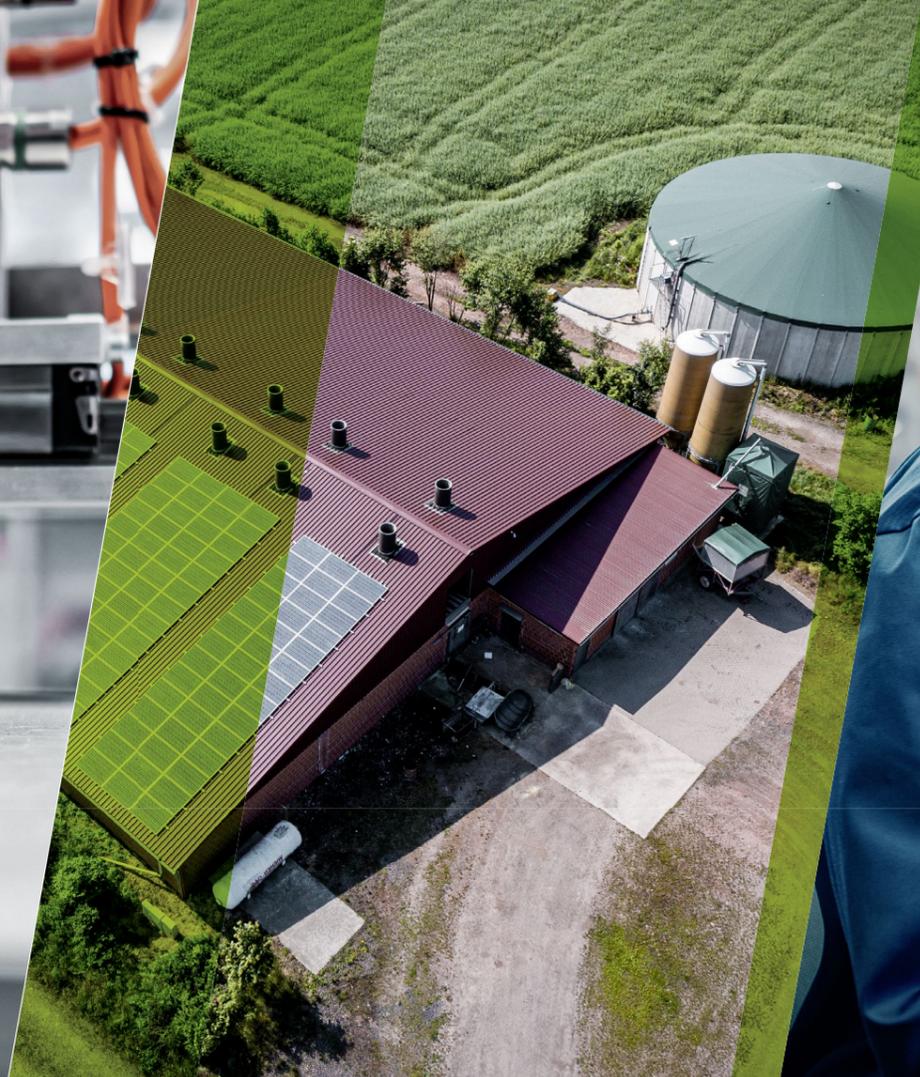
Join us! Together, we'll change the energy market and pave the way to freedom. There is remedy for volatile electricity prices.

TESVOLT offers companies integrated, tailored battery storage systems that cover all key areas in the commercial and industrial sector and just about every application. With outputs from 10 kWh to 20 MWh, connected to high- or low-voltage systems, on- or off-grid, in combination with solar, wind, hydroelectric or combined heat and power sources. What are your needs?



# *Commerce*





# Optimised for stringent requirements in commercial operations

**Our battery storage systems have to be super-robust, particularly in commercial enterprises that are seeking to become greener and more independent with our products. In almost every sector, the key factors are safety, reliability and economic efficiency.**

We provide individual solutions for discerning commercial enterprises in the areas of agriculture, production, logistics and trade. Our experience has shown that the functions of self-consumption optimisation and peak shaving are vital in these sectors, so they're included as standard. With the "Time of use" application, you buy electricity when it's particularly cheap. If your electricity is more expensive at times of high demand than low demand periods (peak and off-peak tariff, respectively), TESVOLT battery storage systems and corresponding tariffs ensure that your commercial operation automatically draws more power at cheaper times – and save power when the cost is high. Alternatively, you can com-

bine various functions such as self-consumption optimisation and peak shaving at the same time to optimise your use of the energy storage system based on local conditions.

You can do this with the TPS HV 80 E or the models from the TS HV 30-80 E series. These and many other potential applications, including multi-use and smart charging station control, provide commercial enterprises with tailored solutions for storing and using their self-generated electricity.

Join us on a journey towards a greener future!



## TS HV 30-80 E – The new benchmark



Time of use



Charging station control



Multi-use

**Optimised for continuous use in industrial, commercial and agricultural applications**

**Free choice of energy management system**

**Variety: from 32 to 80 kWh energy content**

**Compact design, reduced space requirements**

**10-year system guarantee,  
10-year performance guarantee**

**Other products  
for this area  
of application**

- TS 48 V
- TPS HV 80 E
- TS-I HV 80/100 E

# *Small commercial enterprises*





## For hidden champions with lower energy requirements

**Smaller commercial enterprises face the same challenge as large companies: how can electricity derived from renewable energies be used efficiently and made available at all times?**

A business that generates and uses its own energy is well on the way towards independence. In trades, gastronomy or agriculture – whatever your line of business, TESVOLT battery storage systems reduce your dependence on energy suppliers and make you less vulnerable to price fluctuations and interruptions in supply.

Our TS 48 V battery storage system provides the flexibility your business requires and delivers impressive performance in many areas of use, such as self-consumption optimisation, off-grid and back-up power.

The modular structure means you can expand capacity by replacing individual battery modules. And as your company grows, we'll always have the right storage solutions.



### TS 48 V – The flexible one



Off-grid



Self-consumption optimisation



Back-up power

**Modular expansion in 4.8 kWh steps**

**Flexible configuration and expandability**

**Built for a lifespan of 30 years or 8,000 full cycles**

**Charging speed 1C**

**Extremely safe cell technology**

**Other products for this area of application**

• TS HV 30 E



# Where milk and electricity flow

## Dairy farmer saves with photovoltaics and a storage system

**Matthias Kampert installed a photovoltaic system on his farm to save on electricity. But without robotic milking systems, the primary working hours in the dairy industry are traditionally outside of daylight hours.**

To obtain maximum volumes of milk from his animals, Kampert milks them twice a day at intervals of approximately 12 hours – once before sunrise and once in the evening – in a 10-stall milking parlour. However, the vacuum pumps of the milking machines and the time-delayed cooling device require the most power when the sun is not in a favourable position and the PV installation is not delivering peak performance.

The solution? TESVOLT's TS 48 V battery storage system, with its energy content of 38.4 kWh and a continuous discharging power of 18 kW. This solution satisfied the farm's requirements, distributing self-generated electricity across the day and delivering optimised self-consumption.

### Facts and figures

|                       |  |
|-----------------------|--|
| Storage system        | TS 48 V  |
| Energy content        | 38.4 kWh   |
| Discharging power     | 18 kW  |
| Cell                  | Lithium NMC prismatic (Samsung SDI)  |
| Efficiency (battery)  | up to 98%  |
| Cycles                | 6,000–8,000 (0.5C to 1C cycles, at 23°C +/-5°C with 100% depth of discharge) |
| Operating temperature | -10°C to +50°C   |
| Battery inverter      | SMA Sunny Island   |
| Installer             | B&W Energy GmbH & Co. KG   |



*We're big TESVOLT fans. The products are impressive, installation is a piece of cake, and the service is outstanding.*

**Josef Busch**  
Managing Partner, B&W Energy

# *Energy suppliers and large-scale industry*





# Think big, think green

For energy suppliers and large industrial companies, reliability is a top priority. With our high-performance battery storage systems, TESVOLT is the optimum partner for demanding projects.

Our battery storage system can be adapted perfectly to every application. Use our container storage systems as a standalone solution for operating reserve, for energy trading on the electricity exchange, or for black start and grid provision in distribution grids – and as hybrid plants combining generation systems and consumers. In micro-grids, these systems ensure PV-diesel hybrid optimisation and enable an efficient supply of electricity independent of the grid. In industrial production processes, on the other hand, the standard applications are self-consumption optimisation and peak shaving.

Whatever the application – whether it's in the desert or the Arctic Circle – the TESVOLT TPS-E offers a technical energy storage system fit for every purpose. The advanced, cost-optimised design ensures unbeatable cost efficiency without sacrificing quality or performance.



## TPS-E – The great all-rounder



Network services



Grid system services



Self-consumption optimisation

High energy and power density, low space requirements

Up to 5 MWh in a 45-foot container

Flexible scalability for storable energy and power

Planning services for system design and project implementation

Individual product configuration for specific customer requirements



# Support for the utility grid

## Battery storage systems make solar farms more economical

Based in Leipzig, the Green Energy 3000 group is an international project developer, general contractor and operator of wind, solar and battery storage system installations. Since it was founded in 2004, the company has implemented over 60 installations, some of which it still owns itself. Green Energy 3000 is always searching for new spaces and has chosen an industrial estate with an area of 5 ha in Großschirma, between Leipzig and Dresden, as the site for a solar farm.

The battery storage system uses the TPS-E from TESVOLT, housed in a 45-foot container. The TPS-E is the largest product in TESVOLT's E-series and features the new dynamic balancing system DBO. With 3.84 MWh of energy, the storage system can supply a typical family home with electricity for a whole year. Its robustness and redundant air conditioning mean the battery storage system is ideally suited to both cold winters and hot summers.

### Facts and figures

|                       |   |
|-----------------------|---|
| Storage system        | TPS-E   |
| Energy/output         | 3.84 MWh/1.7 MW   |
| Cell                  | Lithium NMC prismatic (Samsung SDI)   |
| Efficiency (battery)  | up to 98%   |
| Cycles                | 6,000–8,000 (0.5C to 1C, 100% depth of discharge)   |
| Operating temperature | -25°C to +50°C  |
| Battery inverter      | SMA Sunny Central Storage 2475  |
| Installer             | Green Energy 3000 GmbH / TESVOLT GmbH together with FM Elektrotechnik & Photovoltaik GmbH |



*We've been familiar with TESVOLT for a long time and they were on the shortlist for our innovation pilot project from the start. We're delighted that we found a regional partner who we could work with constructively and extremely efficiently to implement the project. This is an excellent basis for future collaboration between our companies.*

**Andreas Renker**  
Managing Director of Green Energy 3000 Holding



## What exactly does that mean?

### Full cycle

A full cycle is a single instance of complete charging and discharging of a storage system. In practice, this involves adding up partial charges and discharges. The number of full cycles is one way of indicating the lifespan of a storage system.

### LCOS

Levelised cost of storage describes the costs incurred for a kilowatt hour of energy fed into a battery storage system and drawn back out of it. The determining factors here are the lifespan and number of cycles, the maximum depth of discharge, and the system efficiency.

### DoD

Depth of discharge indicates the greatest depth to which a storage system can be discharged. Many storage systems cannot be fully discharged, so not all of the energy in the storage system is available. Good storage systems have a depth of discharge of 100%.

### C-rate

This indicates how quickly a storage system can be charged or discharged. 1C means that a storage system can be fully charged or discharged within an hour. A storage system with 0.5C needs two hours for the same process, while with 2C it takes just half an hour.

### SoH

State of health indicates the health of the battery as well as the percentage of the initial battery capacity that is still usable in current charging cycles. How fast the battery ages depends in part on the quality of the battery, as well as the balancing process used.

### Li-NMC

Lithium-nickel-manganese-cobalt-oxide – or Li-NMC for short – is a cell chemistry characterised by high energy density, high performance and a long lifespan.

## What makes a good storage system?

### High degree of efficiency and low standby losses

Some energy is "lost" in each storage process. The storage system efficiency indicates how much of the energy fed into the system can be taken out of it. This value should be well over 90%, while standby losses should be no greater than 5 watts.

### Rapid discharge (1C)

Essential for high power levels. If the C-rate is too low, the storage system has to be very large to provide the required power. This ultimately makes the system unnecessarily expensive.

### Maximum safety standards

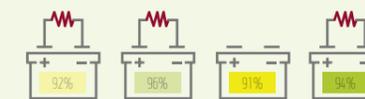
For storage systems you need cell-level battery monitoring, so if maintenance is required you can catch it early on. The battery cells should also come from a reputable source. Established manufacturers offer cells that will not ignite even if damaged.

### Smart battery management

Each individual battery cell must be monitored in order to guarantee maximum performance, safety and durability. This ensures that all cells are optimally charged and discharged at all times and potential errors are detected promptly.

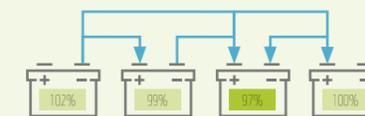
### High cycle stability and lifespan

Each charge cycle subjects battery storage systems to wear. This means a storage system has a specified number of full charge cycles before it goes below a certain residual capacity. There is also the "calendar life", which indicates the maximum lifetime in years.



### Passive balancing

Efficiency: 0%, balancing current: 0.05 A  
high losses



### Active balancing

Efficiency: > 90%, balancing current: 5.0 A  
low losses

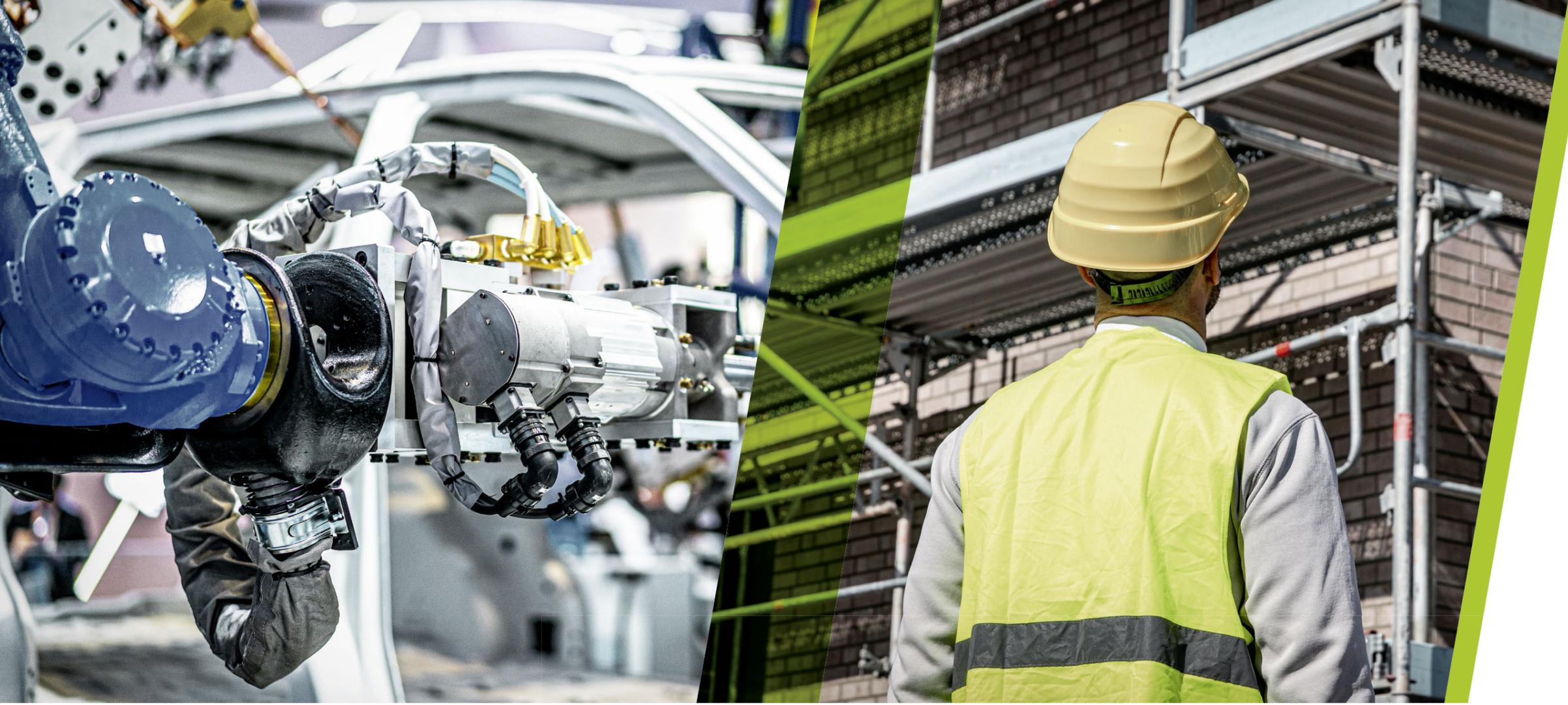
### How does balancing work?

In passive balancing, all cells are reduced to the level of the weakest cell by having the stronger ones burn off energy. So in our TS HV 30-80 E and TPS-E systems, we put our DynamiX Battery Optimizer to work, using energy that is otherwise burned off during balancing between different modules to operate the fan. This improves the efficiency of the overall system, permits increased balancing currents, and reduces the investments required.

The Active Battery Optimizer uses active balancing between all battery cells within the battery module, e.g. in the TS 48 V and TS-I HV 80, and even between different battery modules. This results in lower energy losses compared with active balancing, although the investment costs are higher.

# Industry





# Reliability for industrial production

**Production downtime is the worst-case scenario for any industrial operation. In the automotive industry, downtime of just five minutes can cause losses of around EUR 100,000.**

Thanks to their built-in power quality function, TESVOLT TS-I HV storage systems can guarantee maximum power quality both on- and off-grid. This ensures that machinery always runs in the optimum voltage and frequency range. The result? Less damage, compliance with manufacturer specifications, and longer maintenance intervals.

In the event of power outages, our energy storage solutions supply reliable back-up power, so our industrial customers don't

have to worry about instability in the grid. The TS-I HV performs standard functions, such as self-consumption optimisation or peak shaving, almost in passing.

Sustainable, cost-effective operation on an industrial scale – that's the hallmark of our industrial solutions. Always coupled with the TESVOLT energy management system, of course, for transparent monitoring of all generators and consumers in the local utility grid.



## TS-I HV 80/100 E – The great allstar



Power quality



Micro-grid



Back-up power

**Black start-capable: off-grid operation or back-up power in the event of a blackout**

**Power quality: stabilise voltage and frequency while reducing load imbalance, reactive power and harmonics**

**High control rate in the millisecond range**

**Other products for this area of application**



• TPS HV 80 E

# *Charging station control*





## Charging for electric vehicles in the smallest of spaces

Around the world, e-mobility is developing at a rapid pace. And we need emission-free vehicles to make our cities liveable, sustainable environments. What's crucial here is how we design the infrastructure we need for the future of electromobility.

Once the energy transition is complete, limitless freedom and independence will be within reach – and e-mobility will be an essential part of this process. It doesn't take long for a grid connection to reach its limits – especially when it comes to larger charging parks or expansion work on electric vehicle charging infrastructure at apartment buildings, supermarkets and commercial enterprises. This is where the smart charging station of the TESVOLT Energy Manager comes in.

In many cases you can avoid the expensive process of expanding the grid connection, as our system regulates the power consumption from the regional utility grid using the battery storage system, avoids peak loads and protects against overloading. The TS-I HV 80/100 E models are ideal for this purpose – and you can also combine it with a PV installation, for example, so you can use in-house electricity for charging and significantly reduce your electricity costs.



### TS-I HV 80/100 E – The great allstar



Charging station control

Avoid peak loads

Smart control over the charging park

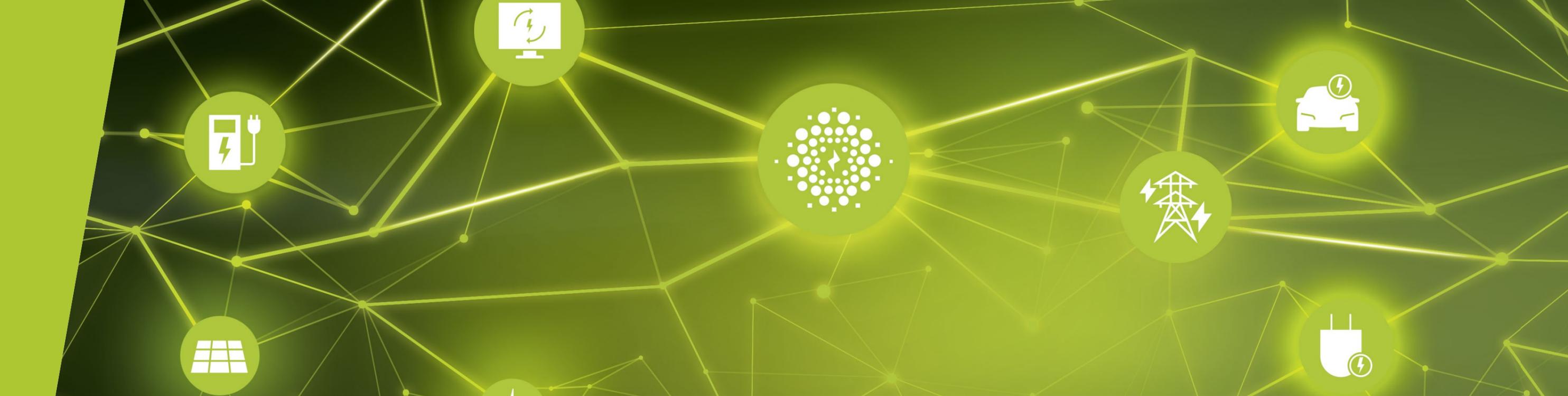
Avoid expensive grid expansion

Prioritisation of vehicles

Cut electricity costs

Other products  
for this area of  
application

- TPS HV 80 E
- TS HV 30-80 E



## The TESVOLT energy management system

### Get the edge with an EMS

You can record, monitor and control all energy flows using our innovative TESVOLT energy management system – which combines the TESVOLT Energy Manager and the myTESWORLD portal. By configuring individual operational management strategies, you can combine wide-ranging applications and perfectly adapt the system to the needs of your commercial or industrial operation.

#### Functions of the myTESWORLD portal

The myTESWORLD portal offers a wealth of functions for monitoring and controlling energy flows. It is available in both a free, Basic version and a fee-based, Pro version with expanded functionality, depending on the associated areas of use.

- Real-time dashboard
- Overview of power consumption and generation
- Detailed breakdown of consumption and generation
- Energy balance
- Metering data history
- Energy reports and detailed meter readings (not to be used for billing purposes)

Would you like to get to know myTESWORLD better? Then simply sign up at <https://mytesworld.tesvolt.com> for test access.

## Services and digital products

Which system suits your project? Our configurators determine the potential savings and identify suitable solutions. Try them out now!

#### TESVOLT LCOS calculator

Our LCOS calculator allows you to calculate the actual costs for a stored kilowatt hour of electricity based on a TS HV 80 compared to your chosen storage system.

#### TESVOLT storage calculator

Our storage calculator helps you find the optimum storage system for your requirements. Just enter the annual power consumption, the nominal power of the photovoltaic installation, and the desired applications. The energy and power of the storage system are adjusted to your specific requirements.

#### Product configurator

Configure individual products, generate parts lists and submit orders easily online. The product configurator can only be accessed by registered partners via our partner portal.

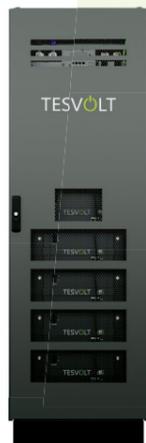
# Optimised for every application

Safety, reliability and economic efficiency – not to mention first-class installation service – are the priorities in all of our products. And we ensure this by using top-quality components and carrying out production of battery storage systems entirely in Germany.

Based on our experience from several thousand projects involving the installation of our battery storage systems, we've adapted the technical design precisely to applications in commercial, industrial and agricultural settings. This includes everything from the high-performance prismatic cells from Samsung SDI to our unique systems for battery control and much more. Our products are not only

state-of-the-art, they also set new standards in quality and performance in the field of independent energy supply. And through the TESVOLT Partner Portal we offer installers and project developers comprehensive service – from planning support and simple installation right through to after-sales support.

## TS 48 V – The flexible one



### Overview of areas of application

- Self-consumption optimisation
- Back-up power
- PV-diesel hybrid optimisation
- Off-grid power supply
- Time of use
- Charging station control
- Micro-grid
- Forecast-based charging
- Ancillary services
- Zero feed-in
- Direct marketer interface

## TS-I HV 80 – The allstar



### Overview of areas of application

#### Free Basic version:

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

#### Fee-based Pro version:

- Peak shaving RLPM
- Power quality
- Multi-use
- Charging station control
- Forecast-based charging
- Semi-off-grid operation
- Time of use
- Micro-grid
- Back-up power
- Off-grid

\* Multiple charging stations incur additional costs for project planning.

## TS HV 30-80 E – The new benchmark for commercial storage systems



### Overview of areas of application

#### Free Basic version:

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

#### Fee-based Pro version:

- Peak shaving RLPM
- Multi-use
- Charging station control
- Forecast-based charging
- Time of use
- Direct marketer interface\*\*

\* Multiple charging stations incur additional costs for project planning.

\*\* project-based

## TS-I HV 80/100 E – The allstar with the E-factor



### Overview of areas of application

#### Free Basic version:

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

#### Fee-based Pro version:

- Peak shaving RLPM
- Power quality
- Multi-use
- Charging station control
- Forecast-based charging
- Semi-off-grid operation
- Time of use
- Micro-grid
- Back-up power
- Off-grid
- Direct marketer interface\*\*

\* Multiple charging stations incur additional costs for project planning.

\*\* project-based

# The application for everything

Our container solutions have all of the technical attributes associated with our normal-sized battery storage systems in cabinet format – except they're bigger and more powerful with a robust metal body to offer optimal protection from wind and weather.

## TPS HV 80 E – Compact in the container

### Overview of areas of application

#### Free Basic version:

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

#### Fee-based Pro version:

- Peak shaving RLPM
- Multi-use
- Charging station control
- Forecast-based charging
- Time of use

\* Multiple charging stations incur additional costs for project planning.



## TPS-E – The great allrounder

### Overview of areas of application

- Self-consumption optimisation
- Back-up power
- Off-grid
- Direct marketer interface
- Micro-grid
- PV-diesel hybrid optimisation
- Charging station control
- Multi-use
- Grid system services
- Zero feed-in
- Time of use
- Load control
- Generation control



### Self-consumption optimisation

If the solar yield is greater than the current power consumption, the excess is fed into the battery storage system. If the solar yield dips below power requirements, the storage system kicks in and supplies the necessary electricity. When it runs out, electricity is drawn from the utility grid. This approach can boost the self-consumption share to 80% or more.

#### Potential users

Operations with a photovoltaic installation or a suitable roof, e.g. hauliers, agricultural operations, workshops, factories



### Physical peak shaving

Consumers with load profile measurement primarily pay for the utilised power. Costs are determined by the moments when power consumption is at its highest, i.e. the peak loads. Battery storage systems can supply stored electricity during peak loads and reduce utility grid consumption. This brings down the connected load and can save you thousands of euros per year.

#### Potential users

Operations with high power consumption and load profile measurement, e.g. quick charging stations, agriculture, workshops, manufacturing



### Charging station control

It doesn't take long for the grid connection to reach its limits – especially when it comes to larger charging parks or upcoming expansion work on electric vehicle charging infrastructure at apartment buildings, supermarkets and commercial enterprises. This is where you stand to benefit from charging station control with the TESVOLT Energy Manager.

#### Potential users

Trade, manufacturing, industry



### Off-grid

If your customers need electricity but there's no grid connection available, battery storage systems allow for creation of off-grid systems in conjunction with a power source such as a photovoltaic installation and/or a CHP. They can also optimise the consumption of diesel generators.

#### Potential users

Properties that need electricity but lack a grid connection



### Multi-use applications

Multi-use allows you to combine operational management strategies, e.g. self-consumption optimisation (SCO), peak shaving (physical or registered) and time of use (TOU). A storage area can be defined for each of the selected applications depending on specific requirements. For maximum service life and economic efficiency.

#### Potential users

For commercial and industrial companies with wide-ranging requirements



### Back-up power

Battery storage systems help ensure a reliable power supply. You can also optimise or completely replace a diesel generator with a battery storage system. In the event of a power outage, your battery storage system takes over the power supply and your operation keeps running without interruption.

#### Potential users

Operations that depend on a reliable power supply, e.g. livestock farming, cold stores

*Free to go  
green.*

TESVOLT

# *We are TESVOLT*

We believe that energy belongs to everyone. Anywhere, any time. Because energy means freedom. The freedom to create, to develop, to research. Independent of fossil fuels. Independent of weather conditions. Independent of politics. With our ideas, our technologies and our partners, we're driving the energy transition by enabling everyone to be independent and sustainable. We do everything we can – so you can do everything you want.

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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.

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An aerial photograph of a small village with red-roofed houses and green trees, with several wind turbines visible on a hill in the background under a blue sky with light clouds. A thick green diagonal line runs from the top left towards the bottom right, separating the text from the image.

**TESVOLT**  
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