SUNLIGHT 24 HOURS A DAY

VARTA Storage

Sun on Demand

CONTENTS

ENGION – THE ENERGY REVOLUTION FOR YOUR HOME

With the Energy Turnaround enacted in 2011, Germany has set itself an ambitious goal: by the year 2022 we wish to be the first country in the world to no longer use nuclear energy – and to reduce our CO_2 emissions at the same time.

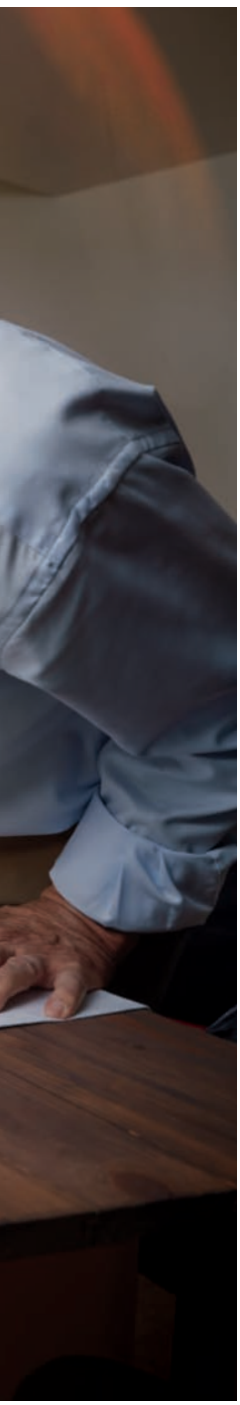
Sustainable Energy Supply
Particularly in the private sector, photovoltaic systems are an accepted method for emissions-free energy generation and also help to lower users' dependence on rising electricity prices. The problem is, often only a small portion of the solar power generated from such systems can be consumed by the producers themselves, meaning that the majority is fed into the public power grid instead. Furthermore, most of the power that the systems generate is produced at the time when demand for energy is at its lowest. Thus, at night and at other times with little sunlight, additional power needs to be bought in. VARTA Storage has developed an innovative solution, the Engion intermediate storage system, which allows users to considerably increase their proportion of own-power consumption and thus the efficiency of their photovoltaic system. VARTA Storage is making a contribution to the energy revolution by helping to ensure an independent and reliable energy supply.

High Self-Consumption Means Greater Self-Reliance
This modern technology allows the solar power generated to be stored and then used as it is needed. In this way, the proportion of own consumption can be increased to 70 percent or higher. With the "sun on demand," users of photovoltaic systems can make themselves less dependent on rising electricity prices.

Efficiency and Stability
The Engion intermediate energy storage system by VARTA Storage uses exclusively high-quality, thermally stable lithium-ion cells. These cells are particularly stable and guarantee sustainable, cost-effective energy supply for the home.

The Intermediate Storage System That Grows with You
Thanks to its modular construction concept, Engion can be adjusted to the size of the photovoltaic system being used as well as to the customer's own energy requirements. This storage system can "grow" as energy requirements do and is thus always technologically up to date.

ENERGY SUPPLY OF TOMORROW



Engion stores all the power the sun has to offer and makes it available on demand whenever it is needed. With this powerful technology, owners of photovoltaic systems can use their green energy at any time, be it in cloudy weather, in the evening, or at night. Engion's innovative system, the long life of its cells, and its highly efficient electronics make it an extraordinarily effective solution.

Engion's Modular Design – Flexible Energy Management
The Engion energy storage system features a modular design concept. Whether the photovoltaic system is small or large, the household has six or just two members, Engion offers a suitable solution for every consumer. The modular design concept makes it possible to tailor Engion's storage capacity to individual energy requirements. Energy management at home thus becomes simple, efficient, and flexible.

If energy consumption rises or the photovoltaic system is made larger, Engion can "grow" too without difficulty. Additional expansion modules can be purchased at any time. Furthermore, the modular construction allows future developments in battery technology to be integrated as well. Existing and new modules can be easily combined. This allows the energy storage system to always be at the cutting edge of technology, ensuring a highly reliable energy supply. Moreover, Engion's expected battery life of 6,000 cycles and operating life of more than 20 years make it a sound investment.

Energy and Ions – A Future-proof Connection
One thing that makes the Engion system so special is the excellent efficiency of the chemical reaction in the storage modules. The lithium-ion cells found inside the modules can stand up to the high demands placed on them as a short-term storage system and have an energy density four times higher than that of lead-acid batteries. The high quality of the storage system ensures that charging and discharging run reliably, without being hindered by the memory effect. Moreover, with a discharge depth of 90 percent, the useable capacity provided is approximately double that of comparable lead-acid solutions.

Engion – All-round Security

Multilevel Security Concept
Engion's multilevel security concept makes it especially reliable. The individual modules are separate from one another and installed using a closed-loop construction. The lithium-ion cells used in Engion also feature a particularly high level of thermal stability. The technical set-up of the system makes it such that the failure of an individual module does not cause the entire system to fail. A reliable energy supply is guaranteed. In addition, the comprehensive electronic security system, independent shut-off, and robust high-quality metal casing provide additional protection for the battery system.

Security Right from the Manufacturing Stage
VARTA Storage only uses state-of-the-art tools, time-tested methods, and highly qualified personnel in its manufacturing processes. Comprehensive checks during production, final product approval, and long-term testing ensure a professional level of quality assurance.

ENGION – QUALITY IN THREE SIZES

ENGION FAMILY

CAPACITY ▶ 3.7 kWh

USE:
- Increase consumption of self-generated power
- Short-term emergency power supply option

ENGION FAMILY PLUS

CAPACITY ▶ 8.3 kWh

USE:
- Increase consumption of self-generated power optimally through quick charging and discharging as well as higher capacity
- In particular for multi-person households, use with electronic appliances, and e-bikes
- Emergency supply option

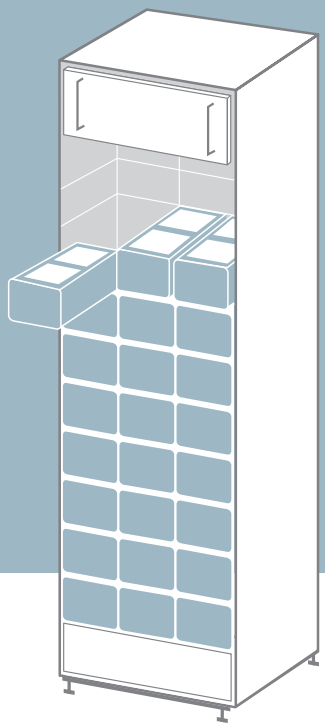
ENGION FAMILY MAX

CAPACITY ▶ 13.8 kWh

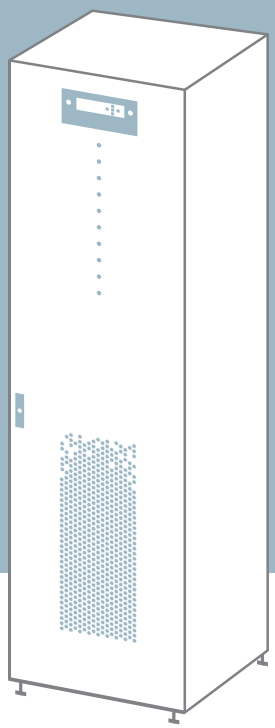
USE:
- Increase consumption of self-generated power optimally through quick charging and discharging as well as higher capacity
- Further increase of own consumption, in particular for larger households, multi-unit houses, use with large electronic appliances, e-bikes, plug-in hybrid cars, or electric cars
- Long-term emergency power supply option

Individualized expansion or later retrofitting of battery modules is possible at any time with all three models.

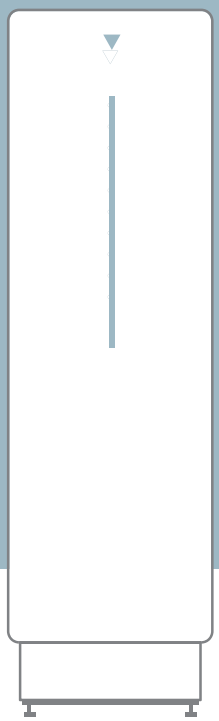
All three models have a battery inverter capacity of 4.0 kW.



Engion system
Inside view



Engion system
Front with user control panel



Engion system
Front with decorative panel

▶ Engion is available in three different sizes, each tailored to the energy needs of various household sizes and photovoltaic systems. Every package is additionally customizable with further modules – even after the system has been installed. The system also allows for future technological innovations to be integrated. Engion is thus a sound investment for the future.

The cells and electronic monitoring system are optimally attuned to each other in order to provide the greatest possible operating life, efficiency, and security. One module typically has a capacity of around 460 watt-hours and an output of 160 watts. The system's capacity can be expanded to up to 13.8 kWh at any time. In addition, the emergency power supply option provides security against the rising risk of power outages.

With Engion systems, consumers can choose between a functional front design with user control panel and a high-quality decorative front panel. Both options provide a visual display of the charge level on the front.

STORE SOLAR ENERGY – SIMPLY AND COST-EFFECTIVELY

With solar power generators, income and expenses can be calculated long-term more exactly than with almost any other investment. This is partly a result of the binding feed-in compensation set by the German Renewable Energy Act (EEG).* However, the size and capacity of the system are not the only key factors. In particular, the amount of energy generated used for self-consumption is critical in determining the cost-effectiveness of a system.

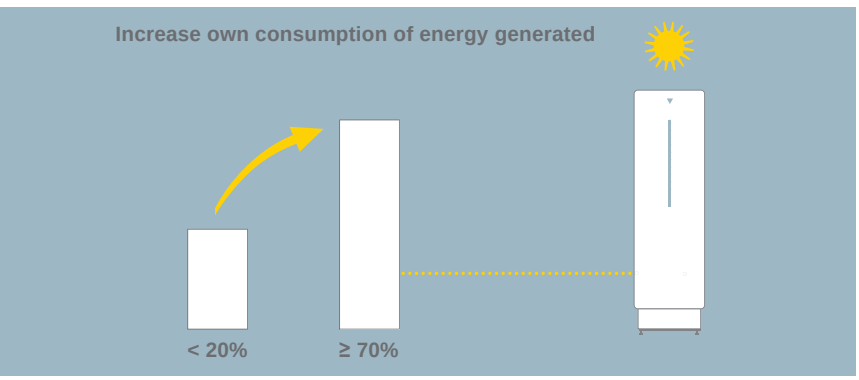
Increase Self-Consumption Cost-Effectively

For owners of photovoltaic systems, a higher consumption of the energy generated is always more economically efficient. Though public subsidies for solar power are decreasing considerably, the prices for electricity are climbing by up to seven percent annually. Furthermore, if fed into the grid entirely, only 80 percent of the power produced will be compensated. As a result, intermediate energy storage solutions are particularly important, since generally the level of own consumption is below 20 percent. With Engion, users can boost their consumption level to 70 percent and higher.

With Engion the 30-Percent Ceiling Is Cleared Effortlessly

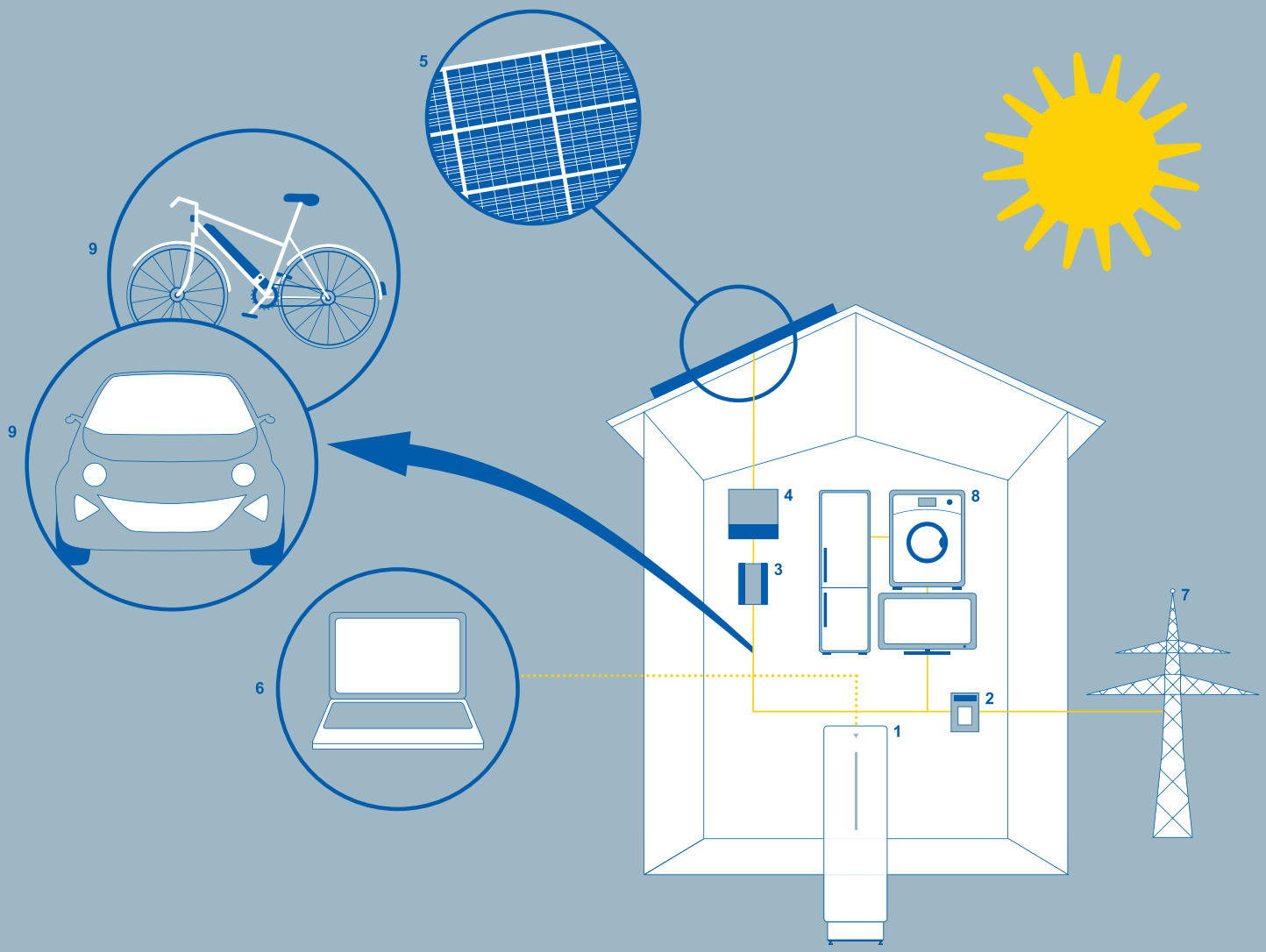
Even for existing systems** it can make sense to retrofit them with a storage solution, as these receive additional state subsidies. Owners who raise their self-consumption to over 30 percent with the help of an Engion storage system can profit from both the feed-in as well as the self-consumption subsidies. Retrofitting with Engion makes financial sense, as every kilowatt-hour used literally pays for itself. At the same time, owners can make themselves less susceptible to hikes in electricity prices.

*As of May 2012 **In operation as early as 01/01/2009



The average consumption of the electricity produced by own photovoltaic systems is below 20 percent. With the use of an Engion solution and an energy management system, this proportion can be boosted to 70 percent or higher. Thus, an intermediate energy storage system is not only good for the environment but also for the bottom line.

INDEPENDENT ENERGY MANAGEMENT



1	Engion Family system	**4**	Solar generator inverter	**7**	Public power grid
2	Electricity meter	**5**	Photovoltaic system	**8**	Electrical appliances
3	Solar generator meter	**6**	Remote monitoring by Engion	**9**	Electricity supply for electric car/e-bike

Engion creates independence from the power grid and supplements energy management in the home. The system's operations can be checked online anytime and monitored remotely via the easy-to-use user interface. This increases independence and facilitates self-consumption.

FACTS & SPECS

Energy capacity ▶ 3.7 kWh, modular expansion up to 13.8 kWh possible
Discharge depth ▶ 90%
Capacity of battery inverter ▶ 4 kW
AC voltage ▶ 400 V
Feed-in & output measurement ▶ 3-phase
Expected battery life ▶ 6,000 cycles
Operating life ▶ over 20 years
Interfaces ▶ Ethernet
Security ▶ comprehensive, redundant mechanical and electronic security concept, fire-resistant casing, and independent shut-off
Dimensions ▶ approx. 60 x 185 x 40 cm

ACCUBEL
HVAC SOLUTIONS | RENEWABLE ENERGY

Industriestrasse 28 | B-4700 EUPEN

T +32 (0)87 59 16 50 | **F** +32 (0)87 59 16 55
E-mail: info@accubel.be | Internet: www.accubel.be

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