

Build Your Dreams

Mission

100 % Energy Revolution

Optimally prepared for
the energy future with
FENECON energy storage solution

Welcome to FENECON

Our story began more than 6 years ago with the acronym for Feilmeier New Energy Consulting in a garage with our very first energy storage systems.

Since then thanks to our concepts and customers we evolved to one of the leading providers for energy storage solutions of all sizes. We are proud to be able to control our fates independently and to keep our vision of a 100 % energy revolution as our immovable corporate key-note. Our most important partners are electric utilities, installers and specialised wholesale traders. We gladly support them with optimised solutions for their projects.



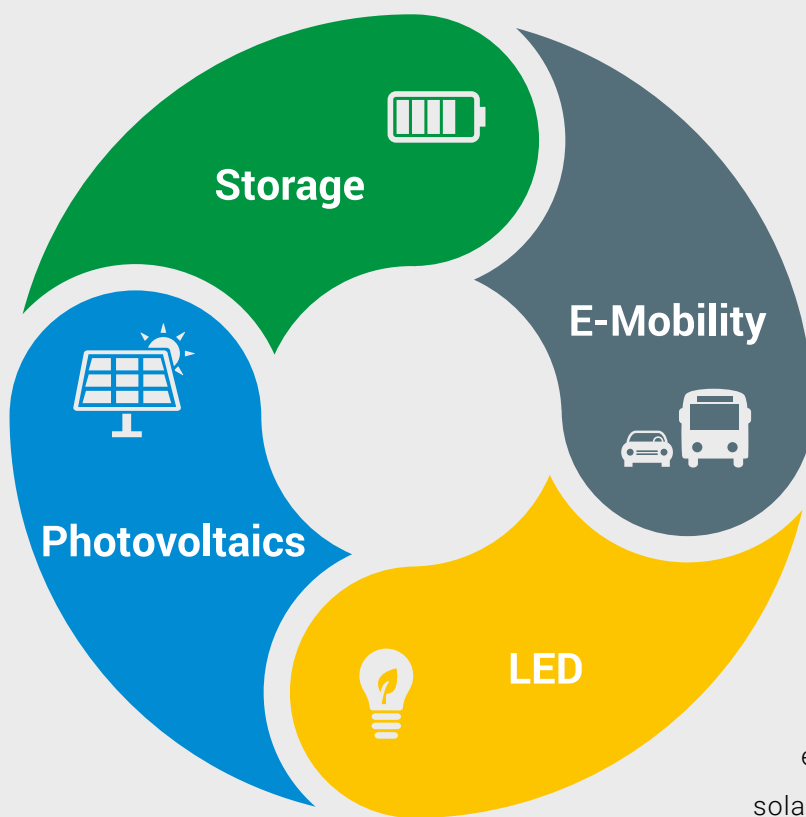
Starting point for many storage systems is self-consumption optimization for a photovoltaics installation. Of course this is a reasonable application. But if the single purpose over its entire lifetime of a storage system is to solely shift pv energy behind the meter from day to night, not only its owner is losing possible savings - eventually the storage system is working against the grid and the energy transition. This is why we designed our systems especially to support this community project and to bring additional savings and earnings for each individual owner.

We are thrilled if you share our vision and philosophy and if you find yourself in our products and solutions and invite you to get in touch with us.

A stylized, handwritten signature in blue ink, appearing to read 'F. J. Feilmeier'.

Franz-Josef Feilmeier
Founder and CEO FENECON GmbH

Mission 100 % Energy Revolution

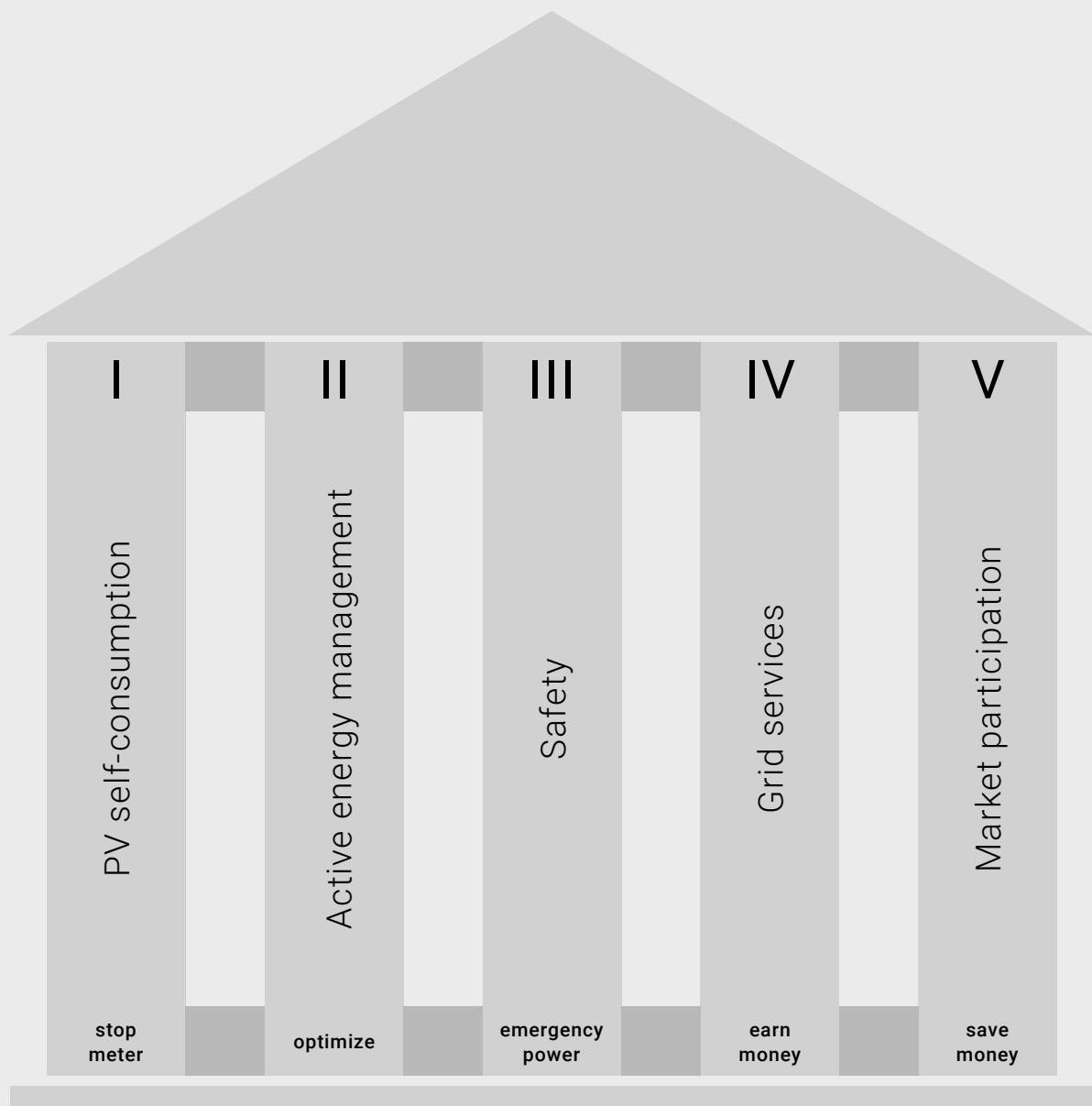


We are known for our energy storage systems. But for us an integrated approach requires also renewable energy generation, efficient consumption and the transition to e-mobility. Because of this we also specialize in solar modules, commercial LED lighting projects and e-mobility solutions for business, taxi and bus fleets.

In all areas we are consequently implementing our corporate principle „Energy Engineering“. Our committed engineers provide additional, sustainable value to the projects of our partners and customers.

5 economic pillars of energy storage systems

Storage of electrical energy is the essential pillar for a successful, economically feasible energy transition. Depending on the perspective - residential, commercial business or electric utility - different applications are coming to the fore. At FENECON we identify five pillars as the basis of economic usage of energy storage systems. Based on this principle we designed our products.





PV self-consumption

„Produce energy during the day and consume during the night“ - this is the basic application of energy storage systems and the first step to your personal energy transition. This way you are effectively stopping your energy meter and immediately save money - however you are not necessarily contributing to the energy transition.



Active energy management

Combine photovoltaics and energy storage and you have varying electricity prices throughout the day. Using active energy management, producers and consumers (like block-heating stations, electric vehicles, heat-pumps and heating elements) can be dynamically controlled to reduce total costs and avoid peak loads.



Safety

Do you know that your existing photovoltaics installation cannot supply your loads at a power outage? What value does an emergency power supply have for you? Applications in municipal or commercial environments, in hotel industry and agriculture or at manufacturing and service companies have different needs for emergency power supply. FENECON energy storage systems fulfil different requirements: from emergency power to uninterrupted power supply to off-grid mode.



Grid services

Electricity production from renewable sources like solar and wind is fluctuating. Therefore the demand for grid stability services increases with the advancement of the energy transition. FENECON energy storage systems were explicitly designed to provide fast reaction rates and high output power. Because of this they are perfectly suitable for grid services like primary control. This way your storage system is earning money for you.



Market participation

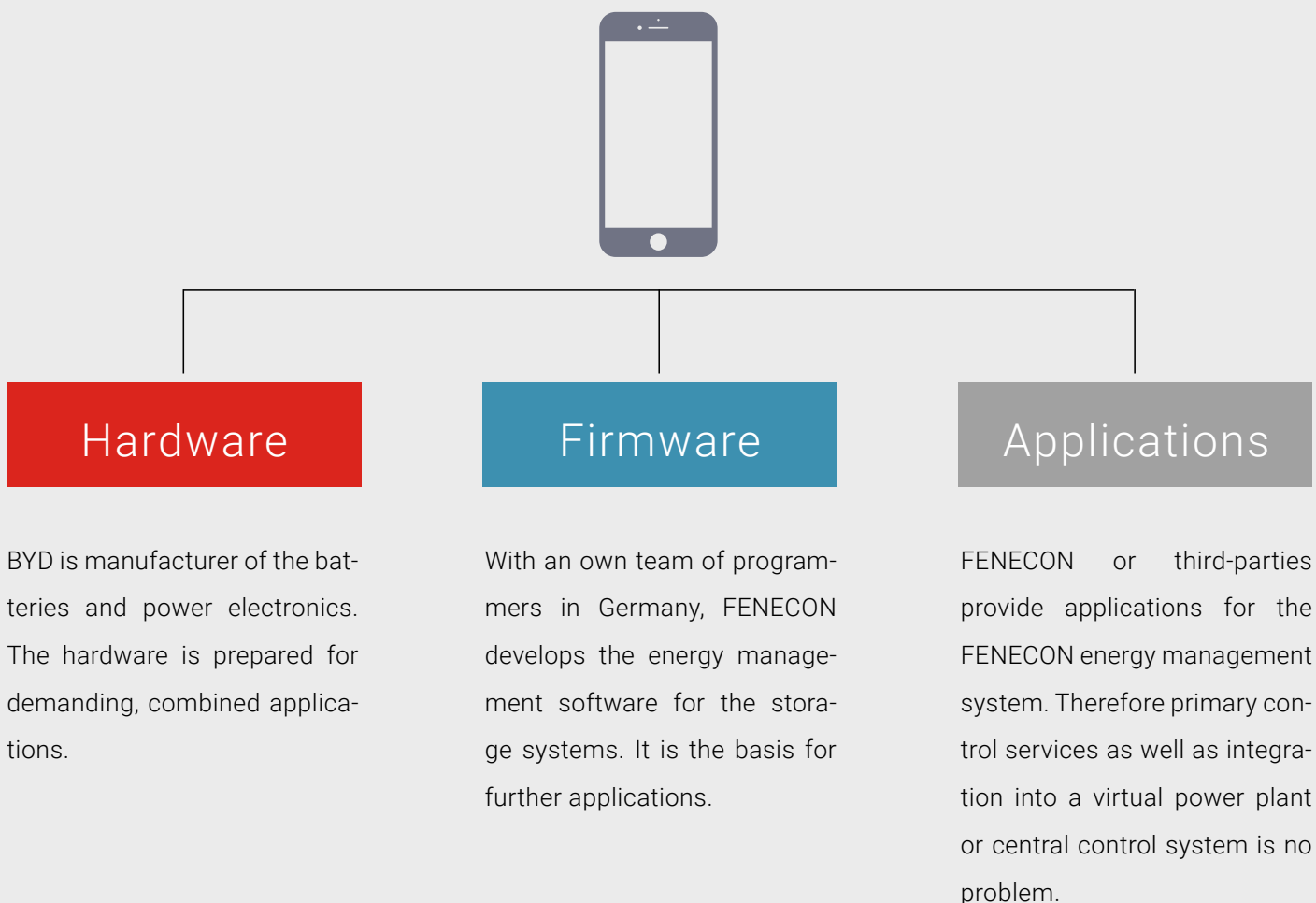
For private customers and small business constant electricity prices are still the norm, while industrial consumers are charged by connection power and load peaks. At the same time the electricity price at the stock market is often fluctuating extremely. Storage systems with high input/output power can flatten load peaks and charge the battery from the grid during times of low or negative electricity prices.

A strong partnership

The cell phone industry is the role model: solid hardware needs a capable operating system and tailored applications to become really smart and future-proof. FENECON energy storage systems combine modern lithium-iron-phosphate batteries by BYD with our FEMS (FENECON Energy Management System) firmware.

Under the umbrella of the open-source project OpenEMS, FENECON develops - similar to Android for smartphones - a comprehensive energy management operating system as entirely free software.

On top of the flexible architecture of this system we implement the requirements of the „five pillars“ model - PV self-consumption optimization, active energy management, emergency power supply, grid services and market participation - and enable the development of further applications.





Build Your Dreams

BYD - Build Your Dreams - is an international high-tech company based in Shenzhen near Hongkong, specialized in IT, automotive and renewable energies. BYD as well as its founder and president Wang Chuanfu were awarded with the Zayed Future Energy Prize - the nobel prize for renewable energies.

BYD is ...

- one of the biggest manufacturers of rechargable batteries
- the biggest producer of electric cars
- the biggest producer of electric busses
- leading manufacturer of energy storage systems
- employing approx. 223,000 people
- achieving an annual turnover of more than 13 bn USD

FENECON is a German engineering company. Our target is a decentralized, renewable energy supply. Therefor we integrate energy storage systems, e-mobility, photovoltaics and LED to a sensible integrated concept.



We are ...

- a young team of highly qualified and motivated colleagues
- software developers for energy management solutions
- one of the innovation leaders for energy storage systems and their applications
- reliable energy storage system supplier for wholesaler, electric utilities and installers
- partner of the energy industry for project and distribution solutions
- provider for commercial electric vehicles from BYD and charging solutions
- provider for commercial LED lighting and BYD solar modules

FENECON energy storage systems



FENECON Mini 3-3 | 3-6

The clever residential storage system

- up to 5,000 kWh annual electricity demand
- 3 kW charge and discharge power
- 3 kWh net storage capacity; easily extendible to 6 kWh
- LiFePO₄ battery technology
- optimal for self-consumption optimization
- emergency power supply
- visualization and energy management by FEMS (FENECON energy management system)

FENECON Pro 9-12

The smart professional storage system

- from 5,000 kWh annual electricity demand
- 9 kW charge and discharge power
- 12 kWh net storage capacity
- LiFePO₄ battery technology
- future-proof solution, technologically fully equipped and possibility for further applications
- grid parallel and off-grid mode possible
- three-phase alternating current in on- and off-grid mode
- visualization and energy management by FEMS (FENECON energy management system)



FENECON Commercial 40-40

The business-grade storage system

- from 30,000 kWh annual electricity demand
- 40 kW charge and discharge power
- 40 kWh net storage capacity
- LiFePO₄ battery technology
- future-proof solution, technologically fully equipped and possibility for further applications
- grid parallel and off-grid mode possible
- three-phase alternating current in on- and off-grid mode
- visualization and energy management by FEMS (FENECON energy management system)



FENECON Industrial

The grid- and industrial-grade storage system

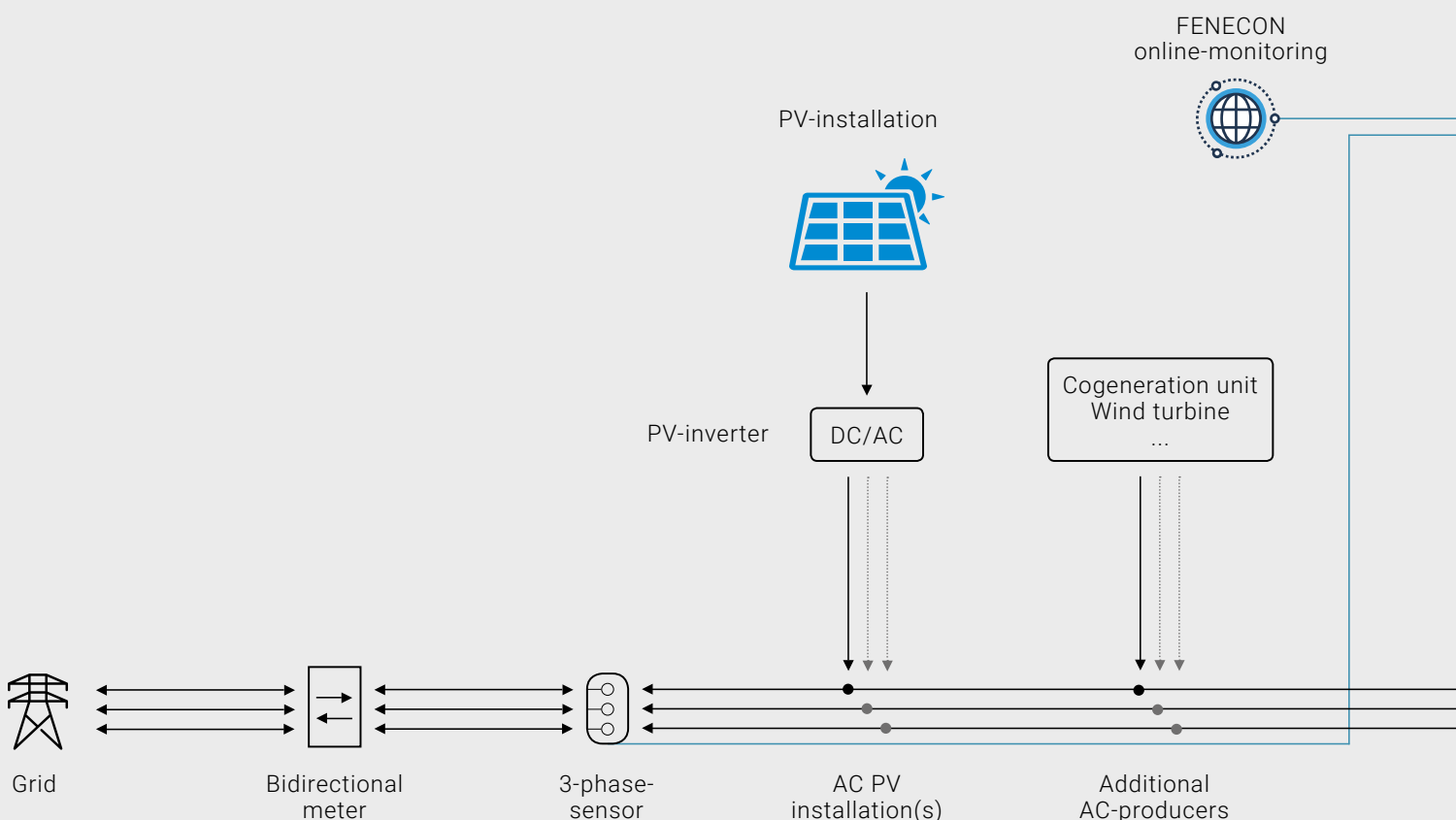
- from 100,000 kWh annual electricity demand
- 100 kW charge and discharge power
- 100 kWh net storage capacity
- LiFePO₄ battery technology
- fully modularized system architecture
- visualization and energy management by FEMS (FENECON energy management system)
- individual project design

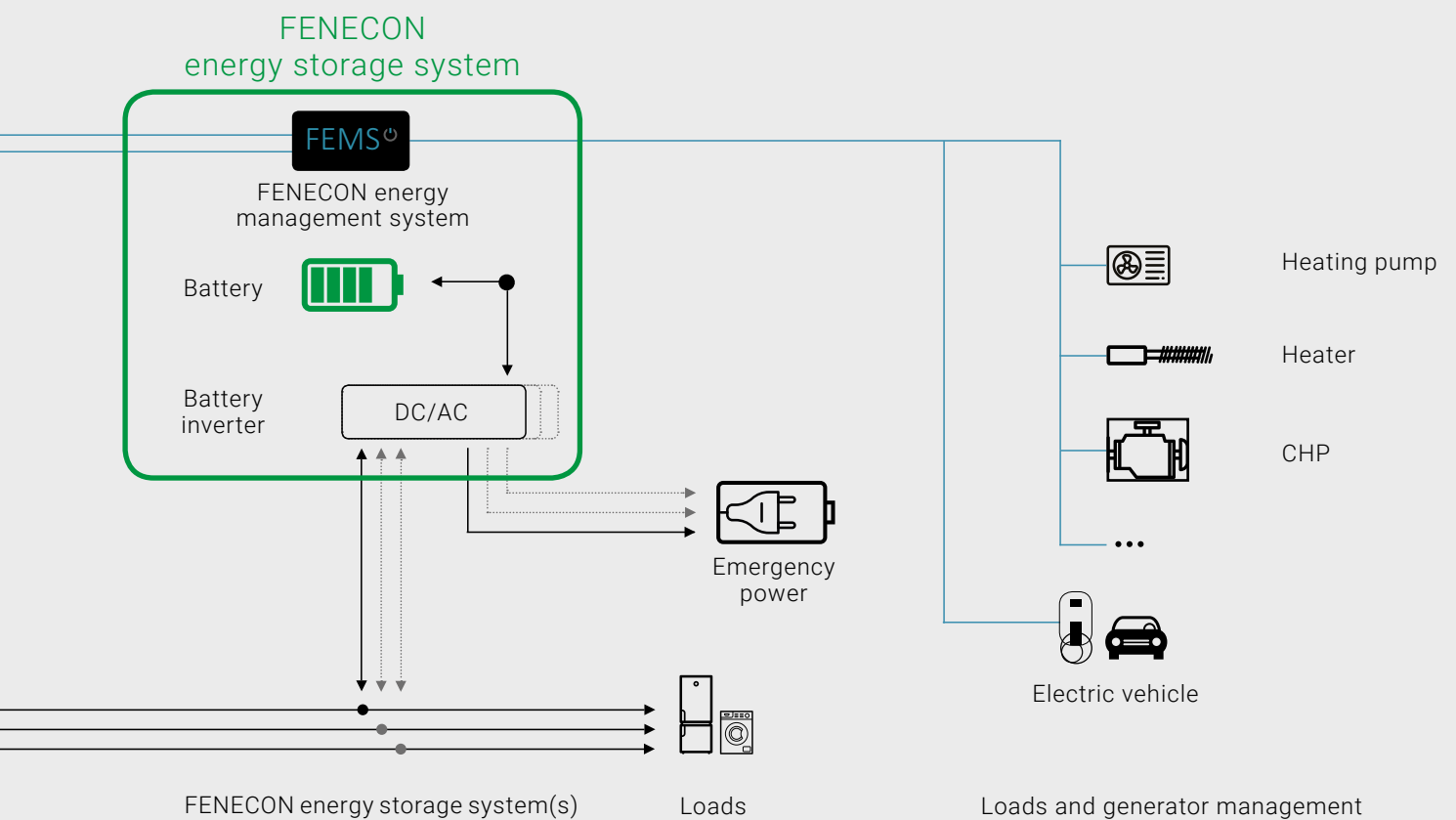
Electrical installation

No matter if Mini, Pro, Commercial or Industrial - all FENECON energy storage systems follow the same electrical connection schema. They are connected to the distribution panel using a branch line and need only an additional sensor at the grid connection point. In this way the integration of existing photovoltaics installations and any other generator is trouble-free and further energy storage systems can be added anytime, to extend the setup in power and capacity.

Grid disconnectors are already included in the storage systems. Therefore important loads can be directly connected to the emergency power connector. While for Mini one will typically select specific devices, Pro and Commercial can often supply complete houses or companies with emergency power at power outages.

FEMS (FENECON energy management system) controls charging and discharging of the battery according to the selected application, for example to optimize self-consumption or to flatten load peaks. Additionally FEMS Apps can dynamically control loads and generators - like block-heating stations, electric vehicles, heat-pumps and heating elements - and add them to the integrated setup.





Energy partner

Partner of electric utilities

We realized early that energy storage systems could only contribute to the energy transition if they are able to support grid operations and to store excessive energy from the grid. This is covered by the pillars 4 and 5 of our 5-pillar-model - and it is only possible if electric utilities play an active part. With our hard- and software solutions we understand ourselves as partner of electric utilities, to enable solutions for an intelligent electrical energy future.

Small and large storage systems

We enjoy the fact, that we can shape the storage market from the perspective of private PV self-consumption as well as from large storage systems for grid services. This is why it was obvious for us to offer the same business models that bring interesting yields in the large storage market also to decentralized storage systems. Our solutions for electric utilities range from standardized, decentralized systems to large scale storage projects - each with fitted solutions for virtual power plants and optimized combination of applications with our „App“-model.

Award-winning concepts

We were many times awarded for our solutions for connecting energy consumers and electric utilities via the energy storage system as the central flexibility and intelligence. We were presented several regional founder, innovator and environment prizes. Also we received a grand award for our energy partner model with the Handelsblatt Energy Award 2016 in the category Smart Home.



Energy partner model

Consumers invest in photovoltaics and energy storage to gain maximum savings in their energy costs. Currently this is accompanied with a lot of bureaucracy due to self-consumption laws, feed-in tariffs, value-added tax, income tax and more. For electric utilities and grid operators on the other side, this investment means that their customers' energy consumption will reduce to one third - the remainder being non-projectable and uncontrolled. In the energy partner model we are reuniting both parties: the electric utility can offer attractive tariffs to its customers and use the flexibility of the storage system, while the consumer can finally run his system without bureaucracy and achieve large savings at his energy costs.

Local & Global Player

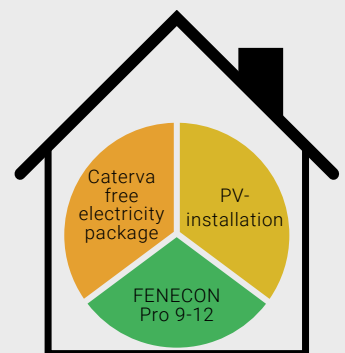
Our solutions for energy partners range from straightforward, without further ado implementable sales models to complex energy market systems including the installation and management of virtual power plants to support the participation in energy and power control markets. In diverse projects together with small public service utilities and up to multinational electric utilities we were able to gain experiences and realize successful references.

Sales channels & partnerships

For two very exciting business models based on our energy storage systems we decided to actively offer them to our customers in Germany:

Caterva free electricity package 7500

We are offering our smart professional storage Pro 9-12 optionally with „Caterva Freistrompaket 7500“. By this the storage system gets included in the virtual power plant run by Caterva and generates revenue in a combination of PV self-consumption, primary control power and energy market trading. Participants are enabled to consume all their self-produced electricity (up to 7,500 kWh per year) themselves while - depending on stable revenues through primary control - receiving an additional community bonus of 300 € per year.



FENECON Energy Management System



FEMS is the central control unit of each FENECON energy storage system. At the interface between local power station, loads and public grid it holds detailed data of the entire energy flow in your house or company. This information is used by „FEMS Apps“ zu charge or discharge the battery and to control further devices.

Via a webinterface at FEMS you can conveniently access the current state of the system from your laptop or smartphone.

Together with developments in home and industrial automation the energy market of the future is going to bring many challenges and opportunities. Our maxim is that operators of our energy storage systems should be prepared for this future in the best possible way. This is why under the umbrella of the open-source project OpenEMS, FENECON develops - similar to Android for smartphones - a comprehensive energy management operating system as entirely free software.

For more information and the source code visit www.openems.io



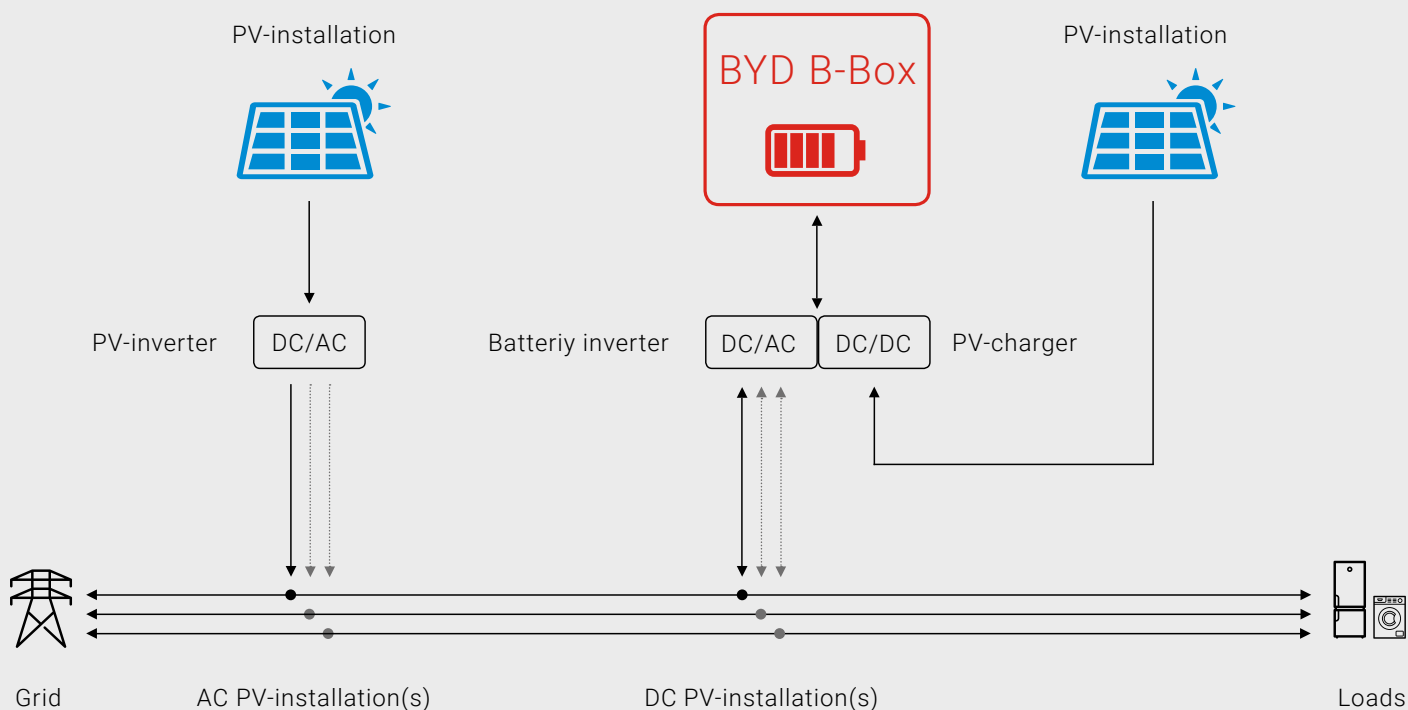
Combined applications

| | | | |
|-------------------------------|---|--------------------------------|-------------------------------------|
| Self-consumption optimization | Emergency power supply | Peak shaving | Heating element control |
| AC-island (solar recharging) | Electric vehicle load management | „Smart-Grid-Ready“ heat-pump | Intraday market |
| Night/weekend tariff | Visualization | Data exploration | Central control system connectivity |
| Virtual power plant | Control power | Ramp-rate-control | Reactive power management |
| Phase balancing | Block-heating station/ diesel generator control | Generator and loads management | Feed-in power reduction |

Features

| | | | |
|---|----------------------|-----------------|--------------------------------------|
| Individually projected hard- and software | Open-soruce software | Open interfaces | Regular security and feature updates |
|---|----------------------|-----------------|--------------------------------------|

With the B-Box BYD offers an extremely modular and powerful lithium-iron-phosphate battery system that is enabling tailored solutions. Together with each battery a suitable battery inverter or pv-charger is required, which can be designed for single- or three-phase as well as on- or off-grid applications. As such the system architecture is different depending on the manufacturer and the application.





BYD B-Box LV 2.5 - 10.0

- flexibly extendible with B-Plus 2.5 modules

| | | |
|----------------|----------|-----------|
| B-Box Pro 2.5 | 2,56 kW | 2,56 kWh |
| B-Box Pro 5.0 | 5,12 kW | 5,12 kWh |
| B-Box Pro 7.5 | 7,68 kW | 7,68 kWh |
| B-Box Pro 10.0 | 10,24 kW | 10,24 kWh |

- in parallel connection up to 81,92 kW/81,92 kWh with 8 battery cabinets

- LiFePO₄ battery technology
- approved for battery inverters by SMA, Studer, GoodWe, Victron and Solax

BYD B-Box LV 13.8

- 13,8 kW charging and discharging power
- 13,8 kWh net storage capacity
- in parallel connection up to 442 kW/442 kWh with 32 battery cabinets
- LiFePO₄ battery technology
- approved for battery inverters by SMA, Studer, GoodWe, Victron and Solax

BYD B-Box HV

- flexibly extendible with B-Plus-H modules

| | | |
|--------------|----------|-----------|
| B-Box H 6.4 | 6,40 kW | 6,40 kWh |
| B-Box H 7.7 | 7,68 kW | 7,68 kWh |
| B-Box H 9.0 | 8,96 kW | 8,96 kWh |
| B-Box H 10.2 | 10,24 kW | 10,24 kWh |
| B-Box H 11.5 | 11,52 kW | 11,52 kWh |

- in parallel connection up to 5 identical systems combinable (max. 57,60 kWh)
- LiFePO₄ battery technology
- approved for high-voltage battery inverters by SMA and Kostal

References

Agriculture: fully autarchic

The biologic farm Hirschvogel runs its chicken coop fully autarkic in off-grid. A PV installation on the rooftop provides the energy; a „FENECON by BYD PRO Hybrid“ - predecessor model of „FENECON Pro 9-12“ - with 9 kW power and 20 kWh battery capacity ensures the energy supply. „This is the future“ says Georg Hirschvogel, „I know where my electricity is coming from and what's happening with it.“



Low-energy house with state subsidy

Together with an energy consultant the technical expenditures and the costs for a low-energy house were minimized. With own electricity generation and the grid services enabled FENECON Pro 9-12, the family fulfils all requirements of the innovative bavarian 10,000 houses program and is rewarded with an energy efficiency bonus (up to 9,000 €) and a technics bonus (4,500 €).



Tenant electricity project in Konstanz-Dettingen

Public service utility and municipal housing society realise forward-looking living: four buildings with in total 24 apartments are supplied by 88 kWp PV installations, distributed on 4 rooftops. Two FENECON Pro 9-12 store solar energy for the night. A mixed calculation makes „own“ electricity 2 € cents cheaper than from the grid. Energy storage just reached tenants!



Self-consumption & emergency power supply

The FENECON Commercial with 40 kW and 40 kWh increases PV self-consumption in an agricultural educational, research and experts center and provides emergency power supply at grid failures. A PTO generator is integrated for additional service security.





„Smart City“ students dormitory

In einem Projekt der Stadt Wien zusammen mit Aspern Smart City Reserach, werden 300 Apartments in einem Studentenwohnheim mit erneuerbaren Energien versorgt. Die 240 kWp PV-Anlage auf dem Dach des Gebäudes arbeitet mit einem Batteriesystem in der Tiefgarage zusammen. Der 150 kW/170 kWh Speicher von FENECON wird durch Siemens in die Gebäudeleittechnik integriert.

Single-family home & passive house

The nature-orientated passive house is supplied by 16 kWp PV in east-west-direction and a solar thermal installation. In combination with a FENECON Mini energy storage system and FEMS heater element control it achieves an autarky of 80 to 90 %.



Secure supply far from the grid

The mountain cabana „Pfälzer Berghütte“ in Rätikon on 2,108 m has no connection to a public grid. A cluster of SMA battery inverters and 4 x BYD B-Box 12.8 batteries ensures secure power supply when the sun is not shining.



Peak shaving and primary control power

At a chocolate factory two FENECON Commercial storage systems with together 80 kW power and 80 kWh usable capacity have the primary task to reduce peaks on weekdays between 5 and 7 p.m. in order to reduce peak demands. In the remaining times both systems provide primary control power to stabilise the grid frequency.



References

Grid storage

In Seestadt Aspern in Wien there are five storage systems with 100 kW/120 kWh each in use. On behalf of the grid operator they were installed in transformer stations and connected as a virtual power plant via FEMS to the central control system. Their task is to reduce peak loads in exchange with the upstream grid as well as phase balancing.



Bridging power outages in Zambia

For the system integrator BayWa re Solar Projects we are delivering four FENECON Commercial 40-40 to Zambia. The systems are used to bridge power outages of 2 x 2 to 6 hours per day. A functional power supply is needed to provide electricity to an agricultural irrigation system in order to ensure maximum crop.

Central control system connected storage

For a utility we deliver two FENECON Commercial 40-40 systems which are used in combination with a 120 kWp PV installation. The storage systems combine applications for self-consumption optimization, feed-in power reduction, emergency power supply and solar recharging.



Feilmeier warehouse

A Commercial 40-40 with DC connected 60 kWp PV installation achieves 90 % supply of the annual electricity demand. Excess electricity is not fed into the grid; this also avoided extending the grid for the PV installation. Instead intelligent energy management is controlling several loads, including a gratis public charging station for electric cars..

Partners



Photovoltaics and LED

Generating electricity without combustion, pollution and operating costs simply from the sun - the ground-breaking photovoltaics technology is just revolutionizing the global energy landscape.

Even at FENECON we started with projecting pv installations. In the meantime we provide BYD solar modules to installers and projectors worldwide. Besides glass-foil modules especially the innovative glass-glass modules are in great demand.



As one of the first manufacturers BYD replaced EVA in modules with silicone and handles the entire complex process in its fully automated gigawatt production lines. Feel free to contact us for the inexpensive standard modules as well as the particularly durable and efficient „Module 2.0“ glass-glass modules.

FENECON LED products are especially suitable for commercial, industrial or municipal buildings. In those places lighting installation is often responsible for considerable expenses. Many times more than 50 % of the entire electricity costs are spent on illumination; while savings by replacement with LED tubes are often more than 80 %.



G24

Retrofit for office and sales rooms



Tubes

Retrofit for office, salesrooms, warehouses and production



High-bay lights

New installation for warehouses, production and outdoor areas



Floodlights

New installation for warehouses, production and outdoor areas



Industrial panels

New installation for warehouses and production

The benefits of our LED products:

- energy efficient lighting (possible savings > 80 %)
- very long lifespan > 50,000 hours
- high cycle resistance > 100,000 times turning on and off
- short payback period
- no toxics
- natural color reproduction
- strong shock and vibration resistance
- no flickering and humming
- immediate 100 % brightness (no warm-up necessary)

How to get a FENECON energy storage system?

Regional partner

via our regional partners - contact us and we will bring you together with one of our certified, regional installation partners.

Solar/electric installer

via your solar or electric installer. Any specialized company can buy our storage systems directly from us or our wholesale partners. During our technical trainings we explain the installation in detail and settle open questions.

Electric utility

via your electric utility. Many utilities offer our energy storage systems including turn-key installation for a fixed price; those offers can often be combined with free electricity packages or other bonuses based on the energy transition friendly usage of the storage system.

Financing

You can finance your energy storage system via Süd-West-Kreditbank Finanzierung GmbH (SWK Bank) at special conditions. Favourable interest rates by KfW are forwarded 1:1 to you.

The SWK Bank is TÜV certified for web security and customer service. The credit institution specialized on giving loans and accepting deposits via the internet.

You can fill a credit application directly on our web page. Within a few seconds you will receive your non-binding result. Afterwards the contract documents are sent to you via post. Based on this system SWK Bank is offering a modern system for financing of photovoltaics installations and energy storage systems.

Well financed the investment in energy storage is profitable from the first day on.

