THE smarter E EUROPE

RENEWABLES 24/7 – BEST PRACTICES

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RENEWABLES 24/7 – BEST PRACTICES

The new Special Exhibit Renewables 24/7, part of The smarter E Europe 2026, provides a compelling demonstration of how a fully renewable energy system can work in practice, using Germany as a real-world example. It illustrates that investments in a flexible, digital, and integrated renewable energy system – combined with intelligent storage and grid solutions – can reduce dependence on fossil fuels while lowering long-term costs.

The special exhibit focuses on practical projects from industry, commerce, residential buildings, and mobility that demonstrate successful implementation and measurable impact. Both ongoing and completed applications contribute to a comprehensive picture of current solutions for delivering a continuous and reliable energy supply.

Its core message is clear: the energy transition is technically feasible, economically viable, and socially achievable – 24/7, all year round, entirely without fossil fuels.

This booklet brings together selected best practices and key insights from the exhibit, illustrating how the transformation of the energy system is already being implemented today and how it can be scaled further.

We invite you to explore the examples and discover how a renewable 24/7 energy future is being built in practice.

OVERVIEW OF BEST PRACTICES

Industrial

Sustainable energy system in the Azores creates global blueprint (1/2)

On the Azores island of Terceira, a smart energy system has been transforming the power supply since the project's completion. Through the interaction of software from the Siemens Xcelerator portfolio and a 15-MW battery storage system, the share of renewable energy is massively increased, and the flexibility and resilience of the isolated grid are optimized. The project thus demonstrates that intelligent software-hardware combinations form the blueprint for the decarbonization of autonomous energy systems worldwide.

Partners Siemens Smart Infrastructure (in cooperation with Fluence), energy supplier EDA – Electricidade dos Açores

Location Terceira, Portugal

Contact Siemens Aktiengesellschaft
Werner-von-Siemens-Str. 1
80333 Munich, Germany

www.siemens.com

← Overview

Sustainable energy system in the Azores creates global blueprint (2/2)

Challenges
In isolated, autonomous energy systems such as the nine self-sufficient grids of the Azores, the potential for renewable energy from wind, solar, and geothermal sources is enormous. The challenge, however, lies in maintaining the balance between generation and consumption amid highly fluctuating feed-in and demand cycles. Until now, these fluctuations were considered a risk to grid stability, which is why diesel-powered generators had to run continuously as a rotating reserve. To break this reliance on fossil fuels, new ways to stabilize the grid had to be found.

Solutions
To ensure the secure integration of up to 50 percent renewable energy, the grid infrastructure was specifically digitized and buffered. At the core of the solution is the Microgrid Management System, which provides real-time monitoring and hourly or daily production and consumption forecasts based on weather and historical data. The software is coupled with a modular 15-megawatt battery storage system (Fluence Gridstack), which guarantees grid stability through grid-forming capabilities, reactive power, and short-circuit capacity. The integration was validated by long-term, dynamic system studies conducted by Siemens Power Technologies International (PTI), which confirmed the reliability and safety of the entire grid across various scenarios.

Innovation Factor
The project on Terceira implements one of Europe's largest stand-alone battery storage systems on an island and sets new standards for autonomous grids. It demonstrates that modern storage and software architecture can precisely manage fluctuating renewable resources and fully replace the traditional diesel-based spinning reserve. At the same time, the project highlights the innovation leap enabled by the Siemens Xcelerator: The combination of hardware and predictive data tools is becoming a decisive enabler for the successful market and grid integration of clean energy.

Impact & Learnings
The project refutes the assumption that isolated grids require permanent fossil fuel support to accommodate high shares of renewable energy. Terceira demonstrates that smart microgrids can ensure grid stability and supply security with virtually zero emissions, resulting in annual CO_2 savings of over 3,600 tons. The collaboration shows utilities worldwide an economically viable and grid-compliant path to decarbonization. The system's modular scalability also ensures that the infrastructure can flexibly grow alongside future increases in renewable energy capacity.

← **Overview**

Industrial

BASF Ludwigshafen: How Germany's largest PEM Electrolyzer is decarbonizing the chemical industry (1/2)

In 2025, BASF SE commissioned Germany's largest PEM hydrogen electrolyzer at its main plant in Ludwigshafen. The groundbreaking "Hy4Chem" project integrates a 54-MW plant directly into the chemical complex to provide CO_2-free hydrogen as a sustainable raw material for future production.

Partners BASF SE and Siemens Energy Global GmbH & Co. KG

Location Ludwigshafen am Rhein, Rhineland-Palatinate, Germany

Contact

BASF SE
Carl-Bosch-Str. 38
67056 Ludwigshafen, Germany

www.basf.com

Siemens Energy AG
Otto Hahn Ring 6
81739 Munich, Germany

www.siemens-energy.com

← Overview

BASF Ludwigshafen: How Germany's largest PEM Electrolyzer is decarbonizing the chemical industry (2/2)

Challenges
The chemical industry requires hydrogen as a basic feedstock, but has traditionally produced it primarily via fossil natural gas steam reforming. The challenge was to implement a large-scale, emission-free technology transition and integrate a megawatt-scale plant into a highly complex, existing production environment.

Solutions
After a two-year construction period, a 54-megawatt PEM electrolyzer was successfully commissioned. The plant, consisting of 72 modules (stacks), produces up to one ton of green hydrogen per hour (up to 8,000 tons/year) using electricity from renewable energy sources. The hydrogen is fed directly into the plant's own H_2 network and serves as a clean feedstock for ammonia, methanol, or vitamins. Additionally, plans are in place to supply regional e-mobility.

Innovation Factor
The project achieves the unique, direct integration of a large-scale electrolysis plant into the infrastructure of a chemical complex. It brings clean hydrogen production out of the niche and into industrial practice, enabling the production of basic chemicals with a radically reduced carbon footprint.

Impact & Learnings
The plant saves up to 72,000 tons of greenhouse gases annually at the site and serves as a flagship project for the European hydrogen ramp-up. Funded with 124.3 million euros by the federal and state governments and supported by 25 million euros in internal investment, BASF demonstrates how the decarbonization of industry can succeed while simultaneously securing the site and maintaining international competitiveness.

← Overview

Industrial

Large-Scale battery storage facility in Bollingstedt: How intelligent forecasting models ensure grid stability through flexible storage (1/2)

With the large-scale battery storage facility in Bollingstedt, ECO STOR is setting new standards for the integration of renewable energy into the power grid. The combination of high storage capacity and an innovative, forecast-based control approach enables grid-friendly, flexible, and cost-effective utilization of wind and solar power.

Partners ECO STOR GmbH, epw GmbH

Location Bollingstedt, Schleswig-Holstein, Germany

Contact

ECO STOR GmbH
Sonnenallee 1
85551 Kirchheim near Munich, Germany
www.eco-stor.de

Ingenieurbüro Hans Urban
www.urban-hans.de

← Overview

Large-Scale battery storage facility in Bollingstedt: How intelligent forecasting models ensure grid stability through flexible storage (2/2)

Challenges

The share of renewable energy in the German power grid now exceeds 60%. To increase this further, flexibility is needed–and, in particular, battery storage–to balance the high volatility of solar and wind energy. However, integrating high-capacity storage systems poses significant challenges for grid operators. Large load changes, in particular, push the grids to their capacity limits. Furthermore, due to a lack of grid load forecast data, available grid capacity cannot be identified and released for storage operations.

Solutions

A large-scale battery storage facility with 100 MW of power and 238 MWh of capacity was implemented at the Bollingstedt site. The facility consists of 64 containers housing lithium-ion batteries and 32 containers for inverters and transformers and is located in the immediate vicinity of a substation. It stores surplus energy from wind and solar power and feeds the renewable electricity back into the SH-Netz grid during morning and evening peak demand periods.

To operate the storage facility, a proprietary forecasting model was developed to estimate the region's weather-dependent wind and PV output and, consequently, the load on the grid. This allows the storage facility to proactively avoid grid overloads during critical phases. At the same time, these dynamic limiting parameters enable better and more economical storage operation than would be possible with rigid specifications.

Innovation Factor

When it went into operation in June 2025, the battery storage facility in Bollingstedt was the largest in Germany. It sets its own dynamic limits and proactively avoids grid bottlenecks.

Impact & Learnings

Initial operational experience shows that the developed forecasting method is well-suited to resolving the trade-off between storage profitability and grid load in the best possible way. It allows for sufficient refinancing of the storage investment without burdening electricity customers or the state budget.

Since commissioning, the operating parameters for storage operations have been further optimized in close coordination with the grid operator SH-Netz based on practical experience. The goal is to enable the necessary system services and, in particular, the buffering of renewable energy without overloading the local grids.

The project can serve as a blueprint for the deployment of large-scale battery storage in congested power grids.

← **Overview**

Grid-friendly storage: Flexibility instead of grid expansion (1/2)

Grid-friendly storage as an alternative to traditional grid expansion: Germany's first battery storage system procured by a distribution system operator under Section 11a of the Energy Industry Act (EnWG) is being built in Wutzeldorf. The 5-megawatt/25-megawatt-hour system buffers local PV surpluses, alleviates grid bottlenecks, and makes renewable energy more usable locally.

Partners	MaxSolar GmbH (implementation and operations partner), Bayernwerk Netz GmbH (distribution system operator), Sungrow (technology partner)
Location	Wutzeldorf, Germany
Contact	MaxSolar GmbH Bahnhofplatz 2a 83278 Traunstein, Germany www.maxsolar.com

← Overview

Grid-friendly storage: Flexibility instead of grid expansion (2/2)

Challenges
High local PV feed-in can lead to bottlenecks in the distribution grid, while additional flexibility is needed during periods of high load. Traditional grid expansion is not always the fastest or most cost-effective solution for this. The project addresses the question of how a battery storage system can be deployed in a regulatory-compliant, grid-friendly, and cost-effective manner to better integrate renewable energy and reduce curtailment.

Solutions
In Wutzeldorf, a battery storage system based on the Sungrow PowerTitan 2.0 is being deployed. The storage system operates within operational corridors defined by Bayernwerk Netz: it charges during periods of high PV feed-in and discharges during periods of high load. Via SCADA and EMS interfaces, the operating mode can be integrated into grid operations. MaxSolar is implementing the project on a fixed-price, turnkey basis and is responsible for operation, commissioning, and the integration of telecontrol and market operator interfaces. This means that the grid-supporting storage capacity is implemented not merely as a market asset, but as a targeted flexibility service for distribution grid operations.

Innovation Factor
The project is Germany's first grid-supporting storage system procured by a distribution system operator in accordance with Section 11a of the Energy Industry Act (EnWG). What is new is the combination of regulatory-approved procurement, distribution network operator-defined operation, and an industrially scalable storage solution. The PowerTitan 2.0 combines high energy density, an integrated battery inverter, intelligent liquid cooling, separate battery cabinets, and operation & maintenance functions such as one-click upgrades and automatic rehydration.

Impact & Learnings
The storage system provides flexibility exactly where it is needed in the grid. By absorbing local PV surpluses and discharging during high-load periods, bottlenecks can be specifically alleviated, redispatch interventions reduced, and additional renewable generation better integrated. Since Bayernwerk Netz procures storage capacity under Section 11a of the Energy Economy Act (EnWG) only if it is demonstrably grid-efficient and more cost-effective than alternatives, the project demonstrates a transferable approach for optimally utilizing existing infrastructure and partially avoiding costly grid expansion. This creates societal value through more usable solar power and potentially lower grid costs.

← Overview

Industrial

Co-location battery storage: Flexibly storing and marketing solar power (1/2)

Co-location as a model solution for flexible solar energy: In Bulgaria, Electrohold Trade and The Mobility House Energy are connecting solar parks with large-scale battery storage systems. Through a smart trading and optimization platform, approximately 2.9 gigawatt-hours (GWh) of storage capacity will be integrated into the energy market as early as the first expansion phase.

Partners The Mobility House Energy (Munich) and Electrohold Trade

Location Sofia, Bulgaria

Contact

The Mobility House GmbH
St.-Martin-Str. 57
81669 Munich, Germany

www.mobilityhouse.com

← Overview

Co-location battery storage: Flexibly storing and marketing solar power (2/2)

Challenges

In Bulgaria, high solar power generation is met with limited grid flexibility and volatile market conditions. Excess electricity cannot always be consumed immediately or fed into the grid economically. At the same time, the expansion of renewable energy is increasing demands for flexibility, controllability, and system services. The project addresses the question of how solar parks and battery storage can be combined so that renewable energy is temporarily stored locally, fed into the grid at appropriate times, and optimized for the market.

Solutions

A co-location model is being implemented, in which solar parks and large-scale battery storage are combined at a single site. The storage system absorbs excess solar power and makes it available later to the grid and market as needed. The systems are integrated via The Mobility House Energy's aggregation and trading software. This software bundles battery technologies, real-time data, and market dynamics and controls charging and discharging processes algorithmically. As a result, the energy systems are no longer primarily operated via fixed feed-in tariffs but are optimized through flexibility trading. Supply and demand are dynamically balanced, revenues are improved, and system services for the power grid are enabled. In this way, the project combines asset operation, control, and marketing into a scalable operating model.

Innovation Factor

The innovation lies in the close integration of renewable generation, storage operation, and algorithmic commercialization in a single integrated system. The battery storage system serves not only as intermediate storage but is actively used to optimize market opportunities, energy flows, and grid compatibility. The platform takes real-time data and market signals into account and makes flexibility economically viable. This creates an operating model that combines technical integration, commercial control, and grid-beneficial effects and is transferable to other European energy markets.

Impact & Learnings

With approximately 2.9 GWh of integrated storage capacity, the project is one of the largest co-location applications of its kind in Europe. It demonstrates how large-scale battery storage can be economically combined with renewable generation and integrated into various energy markets. The results provide important insights for future large-scale storage projects, particularly regarding system integration, scalability, and the commercialization of flexibility through FCR, aFRR, day-ahead, intraday, and imbalance markets. At the same time, the project highlights how battery storage can make better use of local solar generation, support grid stability, and create additional revenue streams for renewable energy plants. In doing so, it strengthens the role of storage as a key flexibility resource for a renewable energy system.

← **Overview**

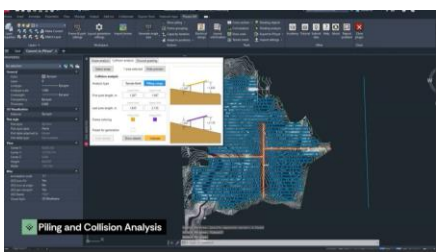
Industrial

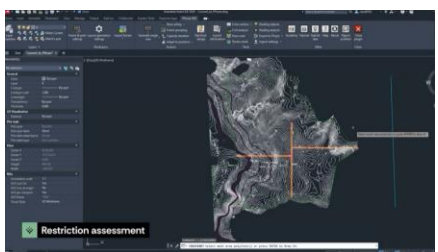
RWE & PVcase: Standardization of 100MW+ Solar Projects (1/2)

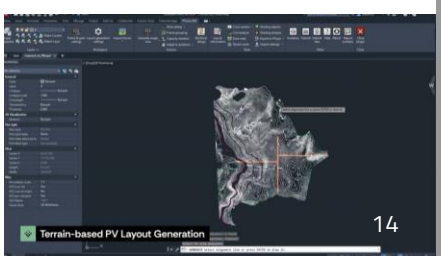
RWE and PVcase demonstrate how digital planning accelerates solar expansion. By using automated workflows, RWE manages its 100MW+ solar pipeline more efficiently than ever before. Manual layout errors have been eliminated and planning time reduced from days to hours – a best practice for the global utility-scale industry.

Partners	RWE and PVcase
Location	various locations
Contact	PVcase, UAB Bokšto str. 6, Vilnius Lithuania, LT-01126 pvcase.com

← Overview







RWE & PVcase: Standardization of 100MW+ Solar Projects (2/2)

Challenges
For projects exceeding the 100 MW mark, conventional design tools reach their capacity limits. For RWE, the challenge was to manage the enormous data complexity while simultaneously reducing the error rate in layout creation. In the past, inaccuracies in the early planning phase led to unreliable financial models and inaccurate material orders.

Solutions
By implementing PVcase Ground Mount, the process was standardized from the initial site assessment to the final design. The software calculates shading losses, optimizes land use (GCR), and performs integrated collision analyses for the site. When system components are changed – such as switching the tracker type – the program automatically recalculates the layout and the corresponding bill of materials (BOM).

Innovation Factor
The project sets new standards in scalability: For the first time, massive solar parks can not only be planned statically but also adapted in real time to changing market factors (e.g., a change in module supplier). The seamless handling of 100MW+ projects in a single, automated environment is a technological first for the industry.

Impact & Learnings
With the switch to PVcase, RWE now covers 100% of its solar ground-mount pipeline. Layout creation is now many times faster (hours instead of days). A key takeaway: Early digital precision reduces financial risks, as material requirements and civil engineering costs are already determined before the first excavator rolls in. Automation is thus the key to achieving ambitious growth targets in the solar sector.

← Overview

Industrial

PV-FFA + WEMA Storage: How a smart industrial self-supply system cuts peak loads and reduces energy costs (1/2)

With this industrial project, WEMA Erneuerbare Energien GmbH and trawa demonstrate how a smart combination of solar power and large-scale storage can make small and medium-sized businesses energy-independent. A 1.8 MWp ground-mounted PV system and a 1 MWh container-based storage unit effectively protect the Siepe GmbH & Co. KG plant from high energy costs and expensive grid fees.

Partners WEMA Renewable Energies GmbH, trawa – Future Energy Services GmbH

Location Hallenberg, North Rhine-Westphalia, Germany

Contact

WEMA Renewable Energy GmbH
Hüttenstraße 54
40215 Düsseldorf, Germany

www.wema-pv.de

← Overview

PV-FFA + WEMA Storage: How a smart industrial self-supply system cuts peak loads and reduces energy costs (2/2)

Challenges
With an annual consumption of over 800,000 kWh, the industrial site faced the challenge of massive energy costs and high peak loads on the grid. Additionally, a technological solution was needed to address the issue of missing feed-in tariffs when electricity prices on the trading exchanges were negative.

Solutions
Design and phased implementation of a perfectly coordinated integrated system. A 1.8 MWp ground-mounted PV system with an east-west orientation optimized for yield was installed, coupled with a 1 MW / 1 MWh container-based storage unit. The control system automatically optimizes the plant's self-consumption and cuts off expensive peak loads before they impact the grid.

Innovation Factor
The project stands out for its intelligent integration of the existing grid connection point. Additionally, innovative 800V AC storage technology was installed–a highly efficient technological approach that is otherwise used almost exclusively in large utility-scale power plants and not in decentralized industrial projects.

Impact & Learnings
Since its commissioning in January 2026, the project has achieved an impressive energy self-sufficiency rate of over 75%. It provides tangible proof that medium-sized industrial companies with high load profiles can drastically reduce their energy costs through a customized self-supply solution while simultaneously contributing to grid stability.

← Overview

Industrial

Halenbeck-Rohlsdorf Solar Park: Subsidy-free solar power for industry and the region (1/2)

XXL solar power without subsidies: The Halenbeck-Rohlsdorf Solar Park combines approximately 230 megawatts peak (MWp) of PV capacity with long-term PPAs, community-owned power, and planned storage integration. 75 percent of the generated power goes to Shell and is intended to support green hydrogen production from renewables in Germany in the future.

Partners Solarkraftwerk Halenbeck-Rohlsdorf I/II; implementation by pvx Energy; financing partners include DKB, the DAL/Sparkassen Group, and Shell as the PPA buyer

Location Halenbeck-Rohlsdorf, Brandenburg, Germany

Contact

Solar Power Plant Halenbeck-Rohlsdorf GmbH
Wittstocker Damm 11
16495 Halenbeck-Rohlsdorf, Germany

www.sonnenpark-halenbeck-rohlsdorf.de

Remmers Solar GmbH
Wiltbergstr. 70
13125 Berlin, Germany

www.remmers.solar

← Overview

Halenbeck-Rohlsdorf Solar Park: Subsidy-free solar power for industry and the region (2/2)

Challenges

Large volumes of renewable electricity must be marketed in a way that makes them economically viable without subsidies while also ensuring predictable availability for industrial consumers. Added to this are grid connection, storage integration, and local acceptance: A solar park of this scale must visibly combine municipal benefits, citizen participation, and nature conservation.

Solutions

A solar park with a capacity of approximately 230 MWp is being constructed, with its electricity largely secured through long-term PPAs: 75 percent of the generation was purchased by Shell, another 12.5 percent by the Sparkassen Group; the remainder is sold on the open market, including for a community electricity tariff. In this way, the project combines subsidy-free generation with industrial demand, potentially also for Shell's REFHYNE-2 electrolyzer. Flexible integration is achieved through direct marketing and balancing groups, allowing solar power to be utilized industrially, regionally, or on the open market as needed. The plant is also prepared for storage: Initially, 2 x 7.14 megawatt-hours (MWh) of storage will secure nighttime power and community-based electricity. An expansion of approximately 480 MWh of storage is in the works to make solar power available on an XXL scale and also at night.

Innovation Factor

What is innovative is the combination of subsidy-free solar power generation, industrial XXL-scale consumption, regional community power, and prepared large-scale storage in a scalable model. The solar park demonstrates how a large PV site can be operated economically without traditional subsidies, coupled with hydrogen production, and simultaneously implemented as a municipal participation and biodiversity project. What is new here is not so much a single technology as the integrated architecture comprising a PPA, storage options, community benefits, and natural space.

Impact & Learnings

The solar park brings together industrial decarbonization and regional value creation. Shell secures 75 percent of the solar power generation for green hydrogen, while the municipality benefits from annual revenue of around 460,000 euros, business tax prospects, a community energy tariff, and a solar roof initiative. The DKB crowdfunding campaign raising 4.5 million euros, along with a local community savings program, demonstrate a high level of willingness to participate. The project also sets ecological standards: The facility is being implemented as a biodiversity solar park featuring wide row spacing, a maintenance plan, internal ecological balancing, and a perimeter hedge spanning approximately ten kilometers with 29,000 plants. This creates a model that combines bankable large-scale PV plants, community participation, biodiversity, and storage capacity.

← **Overview**

Industrial

Zerbst hybrid power plant: Sector alliance for maximum grid service on an industrial scale (1/2)

Flexibility on an XXL scale: The Zerbst hybrid power plant combines 46.4 MWp of solar capacity with a 57-MWh large-scale storage facility on a former gravel pit. Developed by Statkraft and implemented by SUNOTEC, the project is Germany's largest EEG-subsidized hybrid power plant and demonstrates how integrated systems stabilize the grids.

Partners Statkraft, SUNOTEC

Location Zerbst, Saxony-Anhalt, Germany

Contact SUNOTEC Group
Gisela-Stein-Str. 21
81671 Munich, Germany

www.sunotec-group.com

← Overview

Zerbst hybrid power plant: Sector alliance for maximum grid service on an industrial scale (2/2)

Challenges
Integrating fluctuating solar power into transmission grids requires new flexibility solutions to prevent outages. When implementing large-scale projects, there is also a risk of significant interface risks and time losses between engineering, construction, and operation. An additional hurdle was the revitalization of a 41-hectare gravel pit, which had to be transformed into a productive, sustainable infrastructure under strict environmental and permitting requirements.

Solutions
The Zerbst hybrid power plant was designed as a ready-to-use, integrated system. To achieve this, SUNOTEC consolidated the entire value chain – from geotechnical assessments and design through to operational management – under one roof. Approximately 73,000 solar modules with a total capacity of 46.4 MWp were installed on the 41-hectare conversion site. Directly connected to the plant is a 57-MWh battery energy storage system (BESS) that absorbs generation peaks and feeds electricity into the grid as needed. The system delivers approximately 50,000 MWh of clean electricity per year. The technical implementation was carried out in accordance with a strict environmental concept that enhances the ecological value of the formerly industrial brownfield site in the long term through targeted biotope restoration and the creation of new breeding grounds.

Innovation Factor
The combination of maximum grid flexibility, reduced project complexity, and proactive species conservation is innovative. As Germany's largest EEG-subsidized hybrid power plant, Zerbst demonstrates how large-scale batteries and PV systems must merge technologically. A novel approach is the minimization of interface risks through the selection of a single general contractor, as well as the integrated plant design, which views biodiversity not as a compensatory measure but as a fundamental building block.

Impact & Learnings
The project impressively demonstrates the benefits of integrated hybrid systems: With 50,000 MWh of green electricity, approximately 14,000 households are supplied annually and 32,000 tons of CO_2 are avoided. The key lesson for the future lies in the successful transformation of an industrial brownfield site: Through close collaboration with environmental biologists, new habitats were created for protected amphibian, reptile, and bird species. Zerbst proves that an accelerated energy transition in the multi-megawatt range succeeds when technical system integration, lean organizational structures, and ecological sustainability are planned as a unified whole from the very beginning.

← Overview

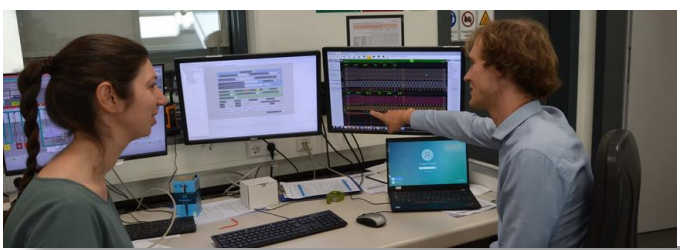
Industrial

SUREVIVE Project: Grid stabilization through grid-forming battery storage (1/2)

System-critical pilot projects: A 55-megawatt-hour battery storage park in Föhren is serving as a blueprint for the application of grid-forming technology using grid-forming inverters. At the storage park and in the multi-megawatt laboratory, the fundamentals for the widespread deployment of this technology to ensure system stability in the distribution grid are being researched and tested.

Partners	Operated by a consortium. Research in the multi-megawatt laboratory is conducted at Fraunhofer ISE in Freiburg.
Location	Föhren, Germany
Contact	Fraunhofer ISE Heidenhofstr. 2 79110 Freiburg, Germany www.ise.fraunhofer.de

← Overview



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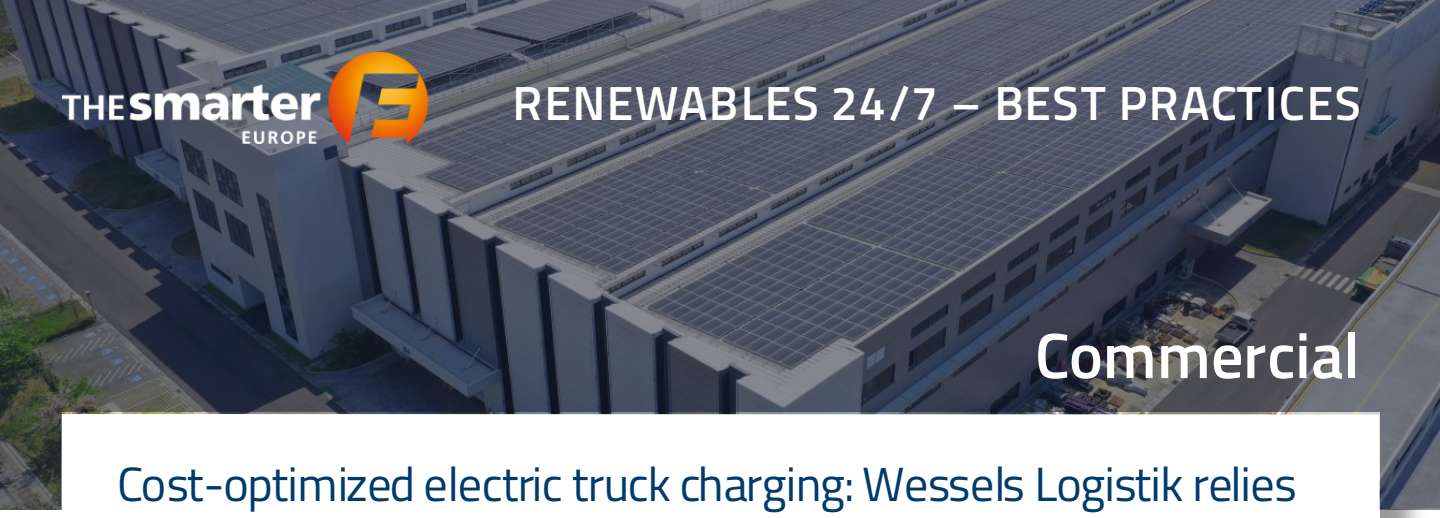


Commercial

Cost-optimized electric truck charging: Wessels Logistik relies on PV, storage, and coneva (1/2)

Intelligent charging management despite grid bottlenecks: Wessels Logistik and coneva manage an electric truck fleet on a limited grid connection (500 kW) with 1,600 kW of installed charging capacity. The coneva Flex energy management system optimizes the interaction between 521 kWp of PV capacity, a 1,288 kWh storage system, and dynamic electricity prices.

Partners August Wessels GmbH, coneva GmbH

Location Rhede, North Rhine-Westphalia, Germany

Contact

coneva GmbH
Walter-Gropius-Str. 15
80807 Munich, Germany

www.coneva.com

← Overview

Cost-optimized electric truck charging: Wessels Logistik relies on PV, storage, and coneva (2/2)

Challenges
The ramp-up of e-mobility in the logistics sector often fails due to grid capacity constraints. At Wessels, a high charging capacity of 1,600 kW for 12 electric trucks is matched by a grid connection of only 500 kW. The challenge lies in guaranteeing the fleet's full operational readiness while simultaneously balancing a complex system comprising on-site PV generation (521 kWp), a large battery storage system (1,288 kWh), and highly fluctuating, dynamic electricity market prices–both economically and operationally.

Solutions
At the heart of the implementation is a local energy management system with an edge controller from coneva. The system controls the PV system, battery storage, and charging points fully automatically and based on forecasts. Through intelligent peak shaving, the grid capacity limit of 500 kW is strictly adhered to without restricting logistics operations. Charging processes are specifically shifted to periods of low market prices or outside peak load windows through load shifting to optimally utilize atypical grid usage (§19 StromNEV). The battery storage system (1,288 kWh) acts as a flexible buffer: It temporarily stores midday PV electricity (521 kWp) and makes it available with a time delay for truck charging operations. This maximizes self-consumption and supplies the fleet in a demand-responsive manner while minimizing the load on the grid.

Innovation Factor
The innovation lies in the software-based integration of isolated subsystems into a smart overall network. Instead of operating the charging infrastructure in isolation, coneva Flex proactively manages grid procurement, the electricity market, PV generation, and the storage system within a single integrated system. What sets this apart is the multi-use approach of the battery storage system, which is simultaneously utilized for peak shaving, maximizing self-consumption, minimizing grid fees, and taking advantage of dynamic electricity tariffs, thereby offering maximum system flexibility.

Impact & Learnings
The project demonstrates that fleet electrification in heavy-duty transport is possible without expensive grid expansion. Intelligent control during peak load windows (atypical grid usage) reduces grid fees by up to 80 percent. At the same time, dynamic electricity tariffs and price-optimized grid procurement reduce electricity costs by up to 30 percent. The reliable supply to all trucks demonstrates that intelligent energy management can compensate for grid infrastructure deficits while simultaneously generating significant economic and environmental benefits for the industry.

← **Overview**

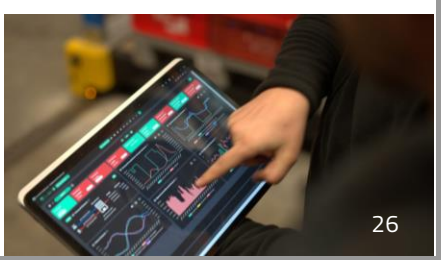
Commercial

Logistics company Peter Bade GmbH: Intelligent AI control reduces energy costs by up to 30% (1/2)

Before implementing flexOn, the cooling logistics provider Peter Bade GmbH lacked detailed insight into its many individual energy flows. encentive's intelligent platform now automatically connects and controls the refrigeration system, heat pump, and PV systems. Through peak shaving and the use of low electricity prices on the spot market, costs are significantly reduced.

Partners	Encentive GmbH, Peter Bade GmbH
Location	Neumünster, Schleswig-Holstein, Germany
Contact	encentive GmbH Memellandstraße 2 24537 Neumünster, Germany www.encentive.de

← Overview



Logistics company Peter Bade GmbH: Intelligent AI control reduces energy costs by up to 30% (2/2)

Challenges
The ramp-up of e-mobility in the logistics sector often fails due to grid capacity constraints. At Wessels, a high charging capacity of 1,600 kW for 12 electric trucks is matched by a grid connection of only 500 kW. The challenge lies in guaranteeing the fleet's full operational readiness while simultaneously balancing a complex system comprising on-site PV generation (521 kWp), a large battery storage system (1,288 kWh), and highly fluctuating, dynamic electricity market prices–both economically and operationally.

Solutions
At the heart of the implementation is a local energy management system with an edge controller from coneva. The system controls the PV system, battery storage, and charging points fully automatically and based on forecasts. Through intelligent peak shaving, the grid capacity limit of 500 kW is strictly adhered to without restricting logistics operations. Charging processes are specifically shifted to periods of low market prices or outside peak load windows through load shifting to optimally utilize atypical grid usage (§19 StromNEV). The battery storage system (1,288 kWh) acts as a flexible buffer: It temporarily stores midday PV electricity (521 kWp) and makes it available with a time delay for truck charging operations. This maximizes self-consumption and supplies the fleet in a demand-responsive manner while minimizing the load on the grid.

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← **Overview**

Commercial

Therme Bad Wörishofen: How smart system integration makes the wellness facility self-sufficient (1/2)

With the comprehensive modernization of its energy supply, Therme Bad Wörishofen is implementing a pioneering model for sustainable wellness operations. The project combines a large-scale photovoltaic parking deck, large-scale industrial storage systems, and smart sector coupling into a networked integrated system for maximum self-sufficiency and cost-effectiveness.

Partners FENECON, Therme Bad Wörishofen, Timeless Planet

Location Bad Wörishofen, Germany

Contact Timeless Planet GmbH & Co. KG
Felix-Wankel-Straße 8
86825 Bad Wörishofen, Germany

www.timeless-planet.com

← Overview

Therme Bad Wörishofen: How smart system integration makes the wellness facility self-sufficient (2/2)

Challenges
A modern wellness facility like Therme Bad Wörishofen is inherently extremely energy-intensive. Faced with fluctuating energy markets and rising environmental requirements, the company was tasked with establishing a long-term, cost-effective, and crisis-resistant energy supply. The goal was to find a solution that maximizes on-site decentralized generation, reduces external grid consumption, and intelligently networks the generation and consumption components in daily operations.

Solutions
As part of the project, the existing infrastructure was converted into a smart, largely self-sufficient energy system. At its heart is a 1.34-megawatt (MW) photovoltaic system installed as a large-scale parking lot roof. To temporarily store solar power as needed and absorb generation peaks, three large-scale industrial storage units with a total capacity of 3,864 kWh were integrated. A dedicated new substation ensures seamless system integration. The facility is complemented by 28 EV charging points on the premises. While combined heat and power plants and boilers provide the thermal foundation, the overall system is already flexibly designed for the future integration of a large-scale heat pump.

Innovation Factor
For the first time on this scale in the larger commercial sector, the project demonstrates how an energy-intensive leisure facility can achieve complete self-sufficiency in energy on sunny days. In full sunshine, electricity production reaches up to 180% of the actual total demand. The spa is thus evolving from a traditional consumer into an intelligently controlled smart grid player that integrates decentralized generation, industrial storage capacity, and e-mobility across sectors.

Impact & Lessons Learned
The project optimizes the self-consumption rate of the Bad Wörishofen thermal spa and drastically reduces external grid procurement, which significantly increases the economic efficiency and long-term cost predictability of operations. The project serves as a European blueprint for the tourism and service sectors: It demonstrates that climate protection and securing a location's future can go hand in hand, and how previously sealed infrastructure areas (such as parking lots) can become a cornerstone of a future-proof energy supply through consistent system integration.

← Overview

Commercial

Large-scale PV plant supplies balancing energy in Poland (1/2)

In Poland, the Zwartowo large-scale PV plant has been participating in the balancing energy market since 2026. To this end, it reliably provides balancing energy through innovative solutions in active power control as well as data and forecasting tools. The project thus demonstrates that solar energy can assume system responsibility and ensure grid stability.

Partners Goldbeck Solar

Location Zwartowo, Poland

Contact GOLDBECK SOLAR GmbH
Goldbeckstraße 7
69493 Hirschberg a. d. Bergstraße, Germany

www.goldbecksolar.com

← Overview

Large-scale PV plant supplies balancing energy in Poland (2/2)

Challenges
In energy systems with increasing shares of renewable energy, the synchronous generators of fossil-fuel power plants are no longer able to fulfill their function of maintaining a stable grid frequency and consistent grid voltage. These system services, which provide balancing power to stabilize the grid, must be supplied by renewable generators in the future. Until now, fluctuations in renewable generation have been seen as a challenge in this regard. However, by optimizing the operation of the PV plant, system services can be provided with increasing reliability: In the case of the Zwartowo large-scale PV plant, this involves balancing power.

Solutions
To participate in the balancing energy market, the solar plant was specifically designed to meet high grid requirements. These include precise active power control, fast response times, and continuous availability, ensuring the plant reliably follows control signals even under changing weather conditions. This is based on high-resolution data, real-time monitoring, and robust production forecasts. In addition, a remote load-frequency control (LFC) node as well as robust control and communication systems were implemented to precisely ensure operational planning, control, and monitoring. The operational qualification included extensive tests compliant with transmission system operator standards, regulatory validations, and coordination with grid operators and authorities over a period of 14 months. This demonstrated that the PV plant can provide balancing power with a reliability comparable to that of conventional power plants.

Innovation Factor
Zwartowo is the first large-scale photovoltaic plant in Poland to be qualified for balancing power and to meet the high technical, regulatory, and operational requirements of the balancing power market. The project demonstrates that solar PV can be precisely controlled despite weather-related fluctuations, provides high-quality real-time data, and can reliably act as an active system service provider. At the same time, Zwartowo illustrates that high EPC quality and professional plant management are crucial for market access, balancing services, and additional value streams.

Impact & Lessons Learned
The project refutes the traditional view of solar energy as an unreliable energy source and demonstrates that renewable energies can ensure grid stability and assume system responsibility. Zwartowo offers a glimpse into a system that can be fully powered by renewables: relevant system services are provided by solar energy in a way that is economically viable, reliable, and compliant with grid operations. This enables a sustainable infrastructure for renewable energy. In this context, the revenue stream from balancing energy supports a viable business model for large-scale PV plants, ensures long-term stable profits, and strengthens the plants against market volatility and market-independent constraints.

← **Overview**

Commercial

PV+BESS Project: MAW Eckartshausen – Smart hybrid solution for maximum self-sufficiency (1/2)

Smart sector coupling in the commercial sector: MAW Eckartshausen is implementing a hybrid project with ingenia comprising 256 kWp of PV and 215 kWh of storage. At its heart is the VDE-certified EZA controller blue'Log XC. It combines a manufacturer-independent hybrid EMS with flexible feed-in control in the control cabinet for integrated direct marketing.

Partners MAW Metallbau-Anlagenbau-Werkstätten GmbH, ingenia projects GmbH & Co. KG, HUAWEI TECHNOLOGIES Deutschland GmbH, meteo control GmbH

Location Ilshofen, Eckartshausen, Baden-Württemberg, Germany

Contact ingenia projects GmbH & Co. KG
Rudolf-Diesel-Str. 5
74592 Kirchberg an der Jagst, Germany

www.ingenia-projects.com

← Overview

PV+BESS Project: MAW Eckartshausen – Smart hybrid solution for maximum self-sufficiency (2/2)

Challenges
Small and medium-sized enterprises face the challenge of integrating volatile renewable energy sources cost-effectively into their processes. MAW Eckartshausen required maximum self-sufficiency to reduce energy costs. Technically, this called for a VDE-certified hybrid power controller to reliably manage self-consumption and surplus feed-in. In addition to complex networking, coordinating the numerous parties involved in project management was the central task.

Solutions
A smart hybrid system was implemented that combines 256 kWp of PV capacity with a 215 kWh battery energy storage system (BESS). At the heart of the technical implementation is a standardized hybrid EMS solution based on the EZA blue'Log XC controller. This manufacturer-independent and flexibly scalable control system was delivered ready for operation in a control cabinet, including an integrated direct marketing interface. Following preliminary project planning, a time-saving remote commissioning was carried out. In daily operation, the professional cloud-based monitoring software VCOM ensures central control and yield monitoring of the PV system and storage. This makes the system's complexity fully manageable and guarantees smooth, automated operation.

Innovation Factor
The innovation potential lies in the elimination of custom engineering: The energy management system used is based on the standardized blue'Log PPC controller, which is VDE-certified from the factory. This makes expensive and complex programmable logic controllers (PLCs) obsolete. The approach demonstrates that complex commercial hybrid systems can be implemented economically, quickly, and with technological future-proofing through the use of configurable standard components.

Impact & Lessons Learned
The hybrid model provides proof of the high economic efficiency of decentralized sector coupling. During ongoing operations, nearly 13 MWh of clean solar power has already been flexibly stored in the battery and used within the plant. This reduced external electricity procurement from the public grid by a good quarter (26 percent) to 37 MWh. The project exemplifies how standardized EMS solutions break down barriers, sustainably reduce energy costs for small and medium-sized enterprises, and accelerate regional energy self-sufficiency.

← Overview

Commercial

FEAG Energy Hub - Hybrid substation: Sector coupling via integrated compact substations (1/2)

Cross-sector energy distribution in urban areas: FEAG implements a ready-to-use transformer and transfer substation that combines renewable energy, electric mobility, and commercial power supply. The system integrates a >2,000 kWp rooftop PV system with charging infrastructure for cars and trucks and ensures intelligent, highly efficient energy distribution.

Partners Project planning and implementation by the FEAG Group in cooperation with Drei Tau GmbH

Location Hamburg, Germany

Contact FEAG Holding GmbH
Fritz-Hartmann-Str. 6
91083 Baiersdorf, Germany

www.feag.de

← Overview

FEAG Energy Hub - Hybrid substation: Sector coupling via integrated compact substations (2/2)

Challenges

The combination of PV systems with high-performance e-mobility requires highly complex grid connection concepts. In Hamburg, a PV system of over 2,000 kWp, passenger car/truck charging points, and commercial grid consumption had to be integrated. The challenge was to integrate all system components into a single compact substation, implement a VDE-VNB-compliant protection concept for maximum supply reliability, and synchronize EZA control, load management, and the connection to the utility's control center.

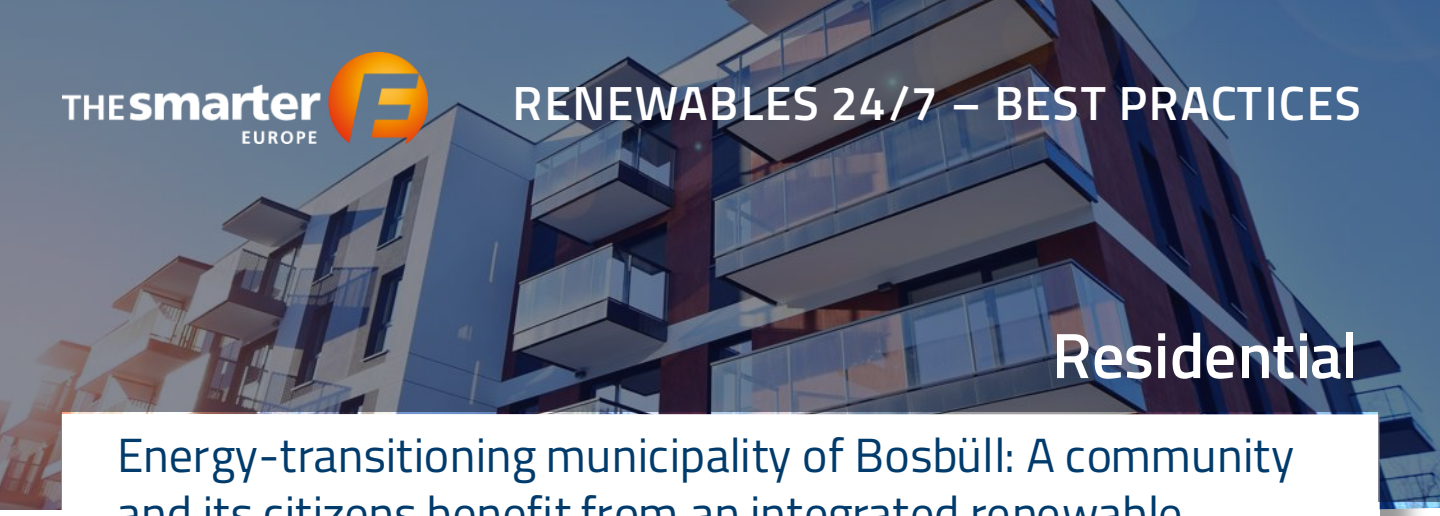
Solutions

FEAG implemented an innovative, non-accessible sheet steel compact transformer station with a hot-dip galvanized base and powder-coated surface for maximum durability. Inside, two low-voltage distribution systems, including modular protection and measurement technology, were installed in accordance with the strict guidelines of technical regulations (VDE/TAB/IEC), ensuring safe mixed operation. A specially adapted, intelligent control system precisely manages energy flows between self-consumption, charging points, and grid feed-in. Integrated, dynamic load management, combined with the higher-level energy management system, ensures compliance with all grid connection requirements (TAB) and guarantees an uninterrupted power supply to the hub while optimizing the utilization of locally generated solar power.

Impact & Learnings

The project demonstrates the high efficiency of centralized sector coupling. By consolidating all applications into a central transfer station, operating and maintenance costs are reduced while energy efficiency is maximized. Preconfigured, standardized components resulted in massive time savings during the planning, coordination, and construction phases. A key lesson learned is the high value of the modular system: it provides the operator with maximum flexibility and ensures that future expansions of the passenger car/truck charging infrastructure or the integration of a battery storage system can be scaled at any time with minimal effort.

← Overview



Residential

Energy-transitioning municipality of Bosbüll: A community and its citizens benefit from an integrated renewable energy system (1/2)

The energy transition community of Bosbüll demonstrates how rural regions can shape the energy transition themselves: With solar and wind farms, a local heating network, and hydrogen production, the community has created an integrated energy system that intelligently utilizes local generation and involves citizens financially.

Partners GP JOULE, Bosbüll Energie GmbH

Location Municipality of Bosbüll, Schleswig-Holstein, Germany

Contact GP JOULE GmbH
Cecilienkoog 16
25821 Reußenköge, Germany

www.gp-joule.com

← Overview

Energy-transitioning municipality of Bosbüll: A community and its citizens benefit from an integrated renewable energy system (2/2)

Challenges

Generating electricity from renewable energy sources in rural areas poses challenges for local grids. These are often underdeveloped, and at the same time, there is a lack of large consumers. The goal in Bosbüll was therefore to find a solution that makes sensible use of the electricity produced there locally and strengthens local value creation. To build acceptance and prevent resistance, citizens were involved at an early stage.

Solutions

Bosbüll began construction of its first solar park as early as 2012, and the third community solar park went into operation at the end of 2025. Two wind farms – the first of which was built in the 1990s – complement local electricity generation. Using power-to-heat technology, the renewable electricity is converted into heat via a 240-kW heat pump and fed into a local district heating network. When there is a surplus of electricity in the public grid, a heating element uses the otherwise curtailed wind and solar power to generate additional heat, which is stored in a generously sized buffer storage tank.

In addition, a production facility for green hydrogen has been established, whose electrolysis capacity is currently being expanded to 2 MW. It also utilizes the renewable electricity generated on-site and can feed its process heat into the Bosbüll district heating network. The hydrogen produced serves, among other things, as an energy carrier for fuel cell buses in regional public transportation.

Innovation Factor

The project combines renewable electricity generation with heat supply and hydrogen production. The targeted use of surplus electricity creates a flexible, cross-sector energy system.

The interplay of community energy, local infrastructure, and scalable technology creates a flagship project for an integrated, renewable energy system. Direct citizen participation promotes acceptance of energy transition measures.

Impact & Lessons Learned

Bosbüll benefits directly from the energy transition: revenue from the facilities is invested in community development – including a new community center, a playground, and the renovation of streets and paths. Daycare and nursery spots are subsidized, and families also receive a "Christmas child allowance." In 2023, the property tax rate was significantly reduced from 340 to 100 percent.

A key lesson is the importance of flexible systems for utilizing surplus electricity, as well as the active involvement of the municipality for long-term success.

The project demonstrates that renewable energy not only reduces emissions but also improves the local quality of life. The key lies in combining technical solutions, local participation, and a long-term perspective.

← **Overview**

Residential

Optimizing Self-Supply: Sector Coupling and Facade PV for Maximum Home Portability (1/2)

Sector coupling in residential construction: The Lehmann family is optimizing their existing PV system in Stephansposching with a 15-kWh storage unit and intelligent wallbox charging management. Combined with a planned 6-kWp facade PV system, the self-sufficiency rate of the two-family home – including the electric car – is increased from under 10% to an impressive 87%.

Partners Prolux Solutions (c/o Kermi GmbH) and Nopper Solar

Location Stephansposching, Bavaria, Germany

Contact Prolux Solutions c/o Kermi GmbH
Pankofen – Bahnhof 1
94447 Plattling, Germany

www.prolux-solutions.com

← Overview

Optimizing Self-Supply: Sector Coupling and Facade PV for Maximum Home Portability (2/2)

Challenges
An existing 9.88 kWp rooftop PV system is insufficient for a two-family home with an electric car to achieve consistently high levels of self-sufficiency. The goal of 87% self-sufficiency and a reliable emergency power supply requires solutions for the evening consumption peak during cooking and charging, as well as for the typical winter generation shortfall when the rooftop system is blocked by snow or in the shade.

Solutions
To achieve this goal, the system was expanded in early 2026 to include a 15-kWh storage unit and a future-proof 12-kW inverter. An intelligent charging management system controls the wallbox via clear prioritization (home before storage, before electric car, before grid feed-in) and charges the vehicle during the day at reduced power (3.7 kW) to conserve the storage system when clouds pass during the day. The key factor is the planned addition of a vertical 6-kWp facade-mounted PV system on the west side. This system supplies power precisely when the roof-mounted system is at its lowest output and captures the low winter sun at the ideal angle. The electricity generated thus increases from 9,364 kWh (2025), while the flexible system architecture lays the foundation for a future, fully off-grid solution.

Innovation Factor
What is innovative is the intelligent combination of selective retrofitting and architectural sector coupling. The system uses vertical facade PV as a strategic tool to counter the winter and evening output shortfalls of traditional rooftop systems. A key innovation here is the consistent, algorithmic control of electric mobility as a variable buffer: rather than maximizing charging power, the system operates in a way that benefits the grid and conserves battery life, enabling the overall system to achieve maximum energy resilience even without massive rooftop areas.

Impact & Lessons Learned
The project demonstrates how existing systems in private residential buildings can be made future-proof through storage and sector coupling. Through optimization, the effectively utilized self-generated electricity quadruples from 879 kWh to 3,932 kWh per year. As a result, the self-sufficiency rate jumps from an insufficient 9.39% to a remarkable 87%. The key takeaway: electric mobility and high household consumption can be managed even with limited roof space if storage capacity and consumer prioritization are precisely aligned. The combination of an intelligent charging strategy and complementary module areas (west facade to south/east roof) perfectly smooths out the yield curves and provides a scalable practical model for the energy transition in the home.

← Overview

Residential

University of East London: An Urban Campus as a Blueprint for Net Zero (1/2)

Siemens and the University of East London (UEL) demonstrate how a modern urban campus can become climate-neutral by 2030. Through a combination of smart building technology, photovoltaics, and a "Living Lab," the university is becoming a model for urban sustainability and a training ground for sustainability experts.

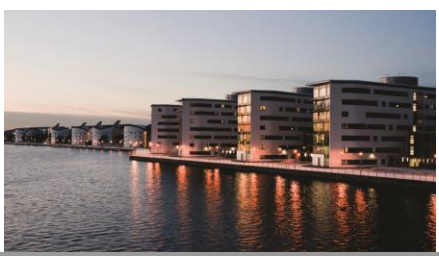
Partners University of East London & Siemens

Location London, United Kingdom

Contact Siemens Aktiengesellschaft
Werner-von Siemens-Straße 1
80333 Munich, Germany

www.siemens.com

← Overview



University of East London: An Urban Campus as a Blueprint for Net Zero (2/2)

Challenges
Located in the heart of a densely populated area with no room for new green spaces, UEL had to find solutions to drastically reduce its carbon footprint. The task was to retrofit the existing buildings for energy efficiency, decentralize the energy supply, and simultaneously integrate the educational mission into the climate strategy.

Solutions
By modernizing the building technology and installing 11,000 LEDs, consumption was immediately reduced. At the same time, a 2-MW solar plant covers a significant portion of the electricity demand directly on-site. A comprehensive network of electric vehicle charging stations supports the transition to sustainable mobility. All collected data flows into a "Living Lab," which is available to students and partners worldwide for research.

Innovation Factor
The partnership goes beyond technical solutions: sustainability is embedded in the curriculum. The combination of industrial expertise and academic training creates a "talent pipeline." The campus serves as a real-world testing ground for technologies that can later be deployed in cities worldwide.

Impact & Lessons Learned
Emissions dropped by 470 tons in the very first year. With annual energy cost savings of over £500,000, it has been proven that ecology and economy go hand in hand. The most important lesson: The success of urban sustainability transformation depends heavily on data availability and community engagement.

← Overview

Mobility

Bidirectional Flexibility Through Fleet Power Plants in and Around Companies (1/2)

The BiFlex-Industrie project integrates vehicle fleets and commuter vehicles into companies' energy supply as storage units via bidirectional charging. At seven locations with approximately 40 vehicles, bidirectional charging systems, standardized interfaces, and viable business models are being tested in real-world conditions.

Partners Ambibox GmbH, Chargebyte GmbH, German Commission for Electrical, Electronic & Information Technologies (DIN and VDE), ENIT Energy IT Systems GmbH, Fraunhofer IAO, Fraunhofer IOSB-AST, Karlsruhe University of Applied Sciences, LADE GmbH, Mahle chargeBIG GmbH, Marquardt GmbH, Physikalisch-Technische Bundesanstalt, SMART/LAB Innovationsgesellschaft mbH, Thüga Aktiengesellschaft, University of Duisburg-Essen

Location 7 locations in Germany

Contact Fraunhofer ISE
Heidenhofstr. 2
79110 Freiburg, Germany

www.ise.fraunhofer.de

← Overview

Bidirectional Flexibility Through Fleet Power Plants in and Around Companies (2/2)

Challenges
Although vehicle batteries are ideal for short-term load balancing in the energy system, there is currently a lack of market-ready solutions for bidirectional charging. The challenges are complex: There is a lack of production-ready, bidirectional charging systems as well as seamless software-based integration of charging infrastructures and data platforms. Furthermore, the absence of standardized communication interfaces and the current regulatory and normative framework complicate billing and marketing in real-world operations.

Solutions
The project will implement demonstrators with approximately 40 vehicles capable of feeding power back into the grid (AC and DC technology) at seven company locations. At the core of the solution is the development of open, standardized communication interfaces for orchestrating the fleets. Using innovative concepts and methods, the flexibility potential of company and employee vehicles is precisely forecasted. The hardware and software systems are linked in such a way that the mobile storage units are fully automatically integrated into the companies' existing energy and IT platforms. This enables the testing of concrete, forward-looking use cases for sector coupling of photovoltaics and mobility.

Innovation Factor
The innovation factor lies in the shift from isolated solutions to a holistic "fleet power plant." For the first time, the project brings together the technical development of open standards, real-world software-based system integration, and the testing of concrete business models in an industrial setting. It thus creates the blueprint for large-scale, market-ready integration of mobile storage into the broader power grid.

Impact & Learnings
The project (running until September 2026) demonstrates the direct economic benefits of bidirectional vehicle fleets. The most important finding is that commuter and company vehicles can successfully contribute to operational optimization by serving as flexible energy storage units through intelligent management. By directly linking PV generation and e-mobility, the self-consumption rate at the sites is optimized. In addition, the project provides essential insights into which regulatory and technical hurdles still need to be overcome for a nationwide, market-ready scaling of fleet power plants.

← Overview

Mobility

Future-proof logistics in Vilshofen (1/2)

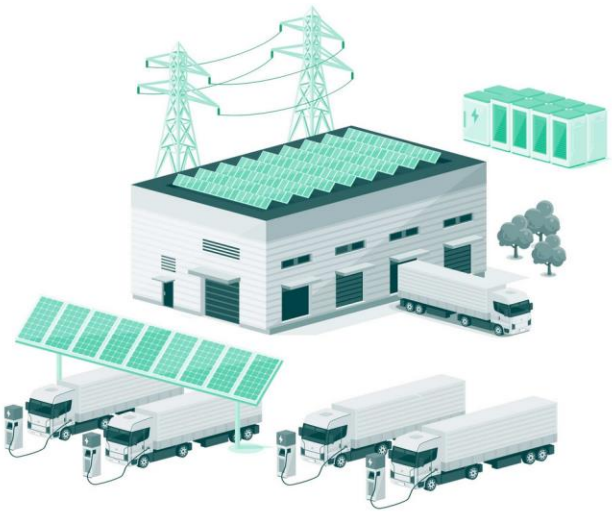
A new, scalable energy ecosystem sustainably supplies the site and its truck charging infrastructure with energy. At its heart are a 1,015 kWp PV system and a 510 kWh battery storage unit. Four 150 kW DC charging stations charge electric commercial vehicles. AI-supported energy management optimizes operations during day-to-day business.

Partners Paul Nutzfahrzeuge, Energy Partners, MaxSolar, Sungrow

Location Vilshofen, Bavaria, Germany

Contact Energy Partners GmbH
Bahnhofplatz 2a
83278 Traunstein, Germany

www.energypartners.de



← Overview

Future-proof logistics in Vilshofen (2/2)

Challenges
The central constraint of the project was a strict grid feed-in limit of 500 kW. To reliably comply with this, intelligent, predictive control of all energy sources and consumers was essential. The challenge was to find a continuous balance between grid feed-in, self-consumption, and the high charging demands of the trucks during ongoing operations, all in harmony with daily logistics processes.

Solutions
A future-proof, scalable energy concept was implemented. An AI-supported energy management system (EMS) serves as the central orchestration unit, providing holistic, weather-optimized control of the PV system, the battery storage, and the four 150-kW truck charging points. The EMS operates on a forecast-based system, maximizes PV-optimized self-consumption, and regulates the charging and discharging of the storage system so that the grid feed-in limit is not exceeded even during parallel charging processes.

Innovation Factor
The innovation factor lies in the holistic system orchestration. Instead of isolated individual solutions, generation, storage, and the high-performance charging infrastructure for commercial vehicles are consolidated into a single system. Thanks to AI-supported, forecast- and weather-based management, the system operates proactively and flexibly.

Impact & Learnings
The ongoing project is already demonstrating how cost-effective and grid-friendly operation go hand in hand. Intelligent control of the 1,015 kWp PV capacity and the 510 kWh battery storage system is expected to result in a significant reduction in operating costs: electricity costs at the site are projected to be reduced by up to 35%. The most important lesson here: Even with a limited grid connection, a high-performance electric truck charging infrastructure can be operated with absolute stability thanks to intelligent, AI-based orchestration.

← Overview

Mobility

OctoFlexBW: Micro-flexibility ready for real-world grid deployment (1/2)

TransnetBW and Octopus Energy collaborated to test how electric vehicles can stabilize the power grid. The completed OctoFlexBW pilot project successfully demonstrated that micro-flexibility from over 700 electric vehicles can be reliably utilized for Redispatch 3.0 – a win for both the grid and drivers.

Partners Octopus Energy & TransnetBW

Location Baden-Württemberg, Germany

Contact Octopus Energy Germany GmbH
August-Everding-Str. 25
81671 Munich, Germany

www.octopusenergy.de

← Overview

OctoFlexBW: Micro-flexibility ready for real-world grid deployment (2/2)

Challenges
As the first pilot project of its kind in Germany, OctoFlexBW faced the task of proving that redispatch using micro-flexibility from over 700 electric vehicles is already feasible today. The biggest challenge was to implement the theoretical processes completely end-to-end. In doing so, the extremely high practical and regulatory requirements of existing energy industry processes had to be met without exception.

Solutions
Nearly fully scalable end-to-end processes were implemented, from system management down to the technical unit. When a redispatch requirement arises, the system management of the main switching line sets the call signals directly on TransnetBW's own cloud-based data platform, DA/RE. From there, the signals are transmitted to the Octopus KrakenFlex platform via standardized and secure protocols. KrakenFlex then precisely controls the charging processes of the participating customers' battery electric vehicles (BEVs).

Innovation Factor
What makes OctoFlexBW unique is its absolute practical relevance at this scale: Redispatch 3.0 has never before been demonstrated with such a large fleet in real-world grid operations in Germany. The secure communication channels and automated processes created in the project function so seamlessly that they could theoretically be scaled immediately and directly implemented into nationwide grid operations.

Impact & Learnings
With a fleet of 700 vehicles, a daily call-up volume of 2 MWh was achieved. Based on this, it is estimated that approximately one million electric cars could already cover about 5 percent of Germany's total redispatch demand, thereby saving significant costs in the power system. Another key learning relates to acceptance: Over the entire two-year duration, there was not a single piece of negative feedback from the participating electric car owners. Charging in the service of grid stability does not restrict daily life, but it does reduce charging costs.

← Overview

Mobility

Kuehne+Nagel & Siemens: How to achieve zero-emission heavy-duty long-haul transport on European routes (1/2)

Siemens and Kuehne+Nagel are demonstrating, with a fully electric heavy-duty long-haul solution, that zero-emission transport can cover continental distances without compromising delivery times. The project sets new standards for the decarbonization of international supply chains.

Partners Siemens, Kuehne+Nagel

Location Route: Halle, Germany - Corroios, Portugal

Contact

Siemens Aktiengesellschaft
Werner-von-Siemens-Str. 1
80333 Munich, Germany

www.siemens.com

Kühne + Nagel (AG & Co.) KG
Wilhelm-Kaisen-Brücke 1
28195 Bremen, Germany

www.kuehne-nagel.com

← Overview

Kuehne+Nagel & Siemens: How to achieve zero-emission heavy-duty long-haul transport on European routes (2/2)

Challenges
Decarbonizing international routes requires a good balance between vehicle range and time management. Over a distance of 5,500 km, charging times, driving breaks, route planning, and load requirements had to be coordinated in such a way that there were no delays in the supply chain compared to diesel trucks.

Solutions
Leveraging Kuehne+Nagel's logistics expertise, a heavy-duty electric truck was successfully integrated into regular factory transport. The charging stops along the European transit route were integrated into the drivers' regular break times. Siemens provided the technological backbone and exertise for charging solutions.

Innovation Factor
The project demonstrates the full long-haul capability of heavy-duty electric trucks on a 5,500-kilometer journey across Europe. It combines highly efficient logistics planning with a holistic e-mobility ecosystem and shows that sustainable transformation works in everyday industrial operations without compromising performance.

Impact & Learnings
Each round trip saves 3.8 tons of CO_2 compared to diesel operation without extending the usual delivery time. The project validates Siemens' holistic sustainability approach and provides the transportation industry with practical proof of the feasibility of emission-free cross-border corridors, paving the way for the complete electrification of the route.

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Mobility

Siemens x Nanno Janssen freight forwarding: How integrated charging infrastructure is electrifying European heavy-duty transport (1/2)

The Nanno Janssen logistics company, in collaboration with Siemens, is demonstrating that the decarbonization of European heavy-duty transport can become a reality. By combining a fully electric fleet of 500 hp trucks, a 3 MW Siemens charging infrastructure, and its own photovoltaic system, the company is creating a pioneering, decentralized energy and logistics depot.

Partners Nanno Janssen GmbH, Siemens AG (infrastructure partner)

Location Leer (East Frisia), Germany

Contact

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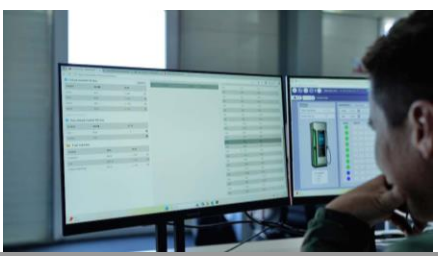
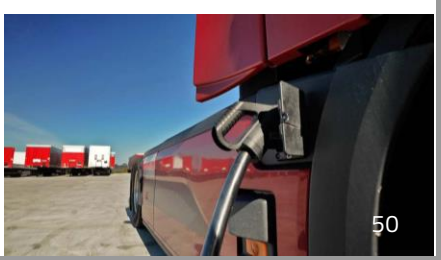
Werner-von-Siemens-Str. 1
80333 Munich, Germany

www.siemens.com

Nanno Janssen GmbH
Zinnstraße 19-21
26789 Leer, Germany

www.nanno-janssen.de

← Overview

Siemens x Nanno Janssen freight forwarding: How integrated charging infrastructure is electrifying European heavy-duty transport (2/2)

Challenges
Long-haul transport requires enormous drive power and reliable range. To eliminate CO_2 emissions and become independent of fossil fuel suppliers, the logistics company sought a scalable end-to-end solution that enables the simultaneous charging of dozens of electric trucks without overloading local power grids.

Solutions
A complete, single-source charging infrastructure was implemented at the logistics hub. Siemens supplied a 4 MW transformer station as well as ten SICHARGE D charging stations (300 kW each) with a total of 20 charging points. The system is coupled with an on-site 800 kW photovoltaic system and a 1.2 MW battery storage unit. The overall system intelligently manages the charging processes. The fleet is undergoing a systematic transformation: By the end of the year, 50 of the 80 trucks will be electric, with the rest of the fleet following by 2030. The vehicles, with a range of up to 600 km, are efficiently charged during the regular driving breaks.

Innovation Factor
The project breaks with testing conventions and demonstrates in regular day-to-day operations that around 90 percent of all routes in European long-haul transport—as far as Sweden, Italy, or Portugal—can be covered entirely with electric power. Through sector coupling, the freight company is transforming from a pure consumer into an energy-self-sufficient electricity trader that uses Siemens software to manage generation peaks in a way that benefits the grid.

Impact & Learnings
Nanno Janssen provides a real-world blueprint for the transportation sector and demonstrates that a sustainable fleet transition is already economically viable today when subsidies are optimally utilized. The project underscores the importance of ready-to-use infrastructure from a single source to simplify complex transition processes. A positive side effect: The quiet electric trucks not only reduce environmental impact but also demonstrably improve the driving experience and the drivers' peace of mind in the demanding day-to-day logistics routine.

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Mobility

Utrecht Energized: How urban V2G car sharing stabilizes the grid (1/2)

Utrecht Energized marks the launch of Europe's first comprehensive vehicle-to-grid car-sharing system in the Netherlands. The project combines electric mobility, bidirectional charging, and renewable energy into a smart solution for urban mobility and grid stability.

Partners Renault Group, We Drive Solar, MyWheels, City of Utrecht

Location Utrecht, The Netherlands

Contact We Drive Solar
Europalaan 202
7559SC Hengelo, The Netherlands

www.wedrivesolar.com

← Overview

Utrecht Energized: How urban V2G car sharing stabilizes the grid (2/2)

Challenges
As the share of renewable energy increases, so do the demands on the stability of local power grids. At the same time, cities need sustainable and affordable mobility options. Therefore, a solution was sought that intelligently combines electric mobility, solar power, and grid flexibility and functions reliably in everyday life.

Solutions
As part of Utrecht Energized, Europe's first large-scale Vehicle-to-Grid car-sharing system was established. Since June 2025, an initial fleet of 50 bidirectionally chargeable Renault 5 E-Tech electric vehicles has been in operation and has since expanded to 300 vehicles. The vehicles can draw power from the grid and feed it back into the grid during periods of high demand. The system is supplemented by a dense network of V2G-capable charging points from We Drive Solar, which are connected to local photovoltaic systems. This allows excess solar power to be temporarily stored and used as needed. The plan is to expand the fleet to up to 500 vehicles in the future. The concept has since been expanded to Eindhoven. There, 28 V2G-capable Renault models are currently in use, with plans to grow the fleet to 100 vehicles. Additionally, 50 bidirectional charging points are being installed in the city.

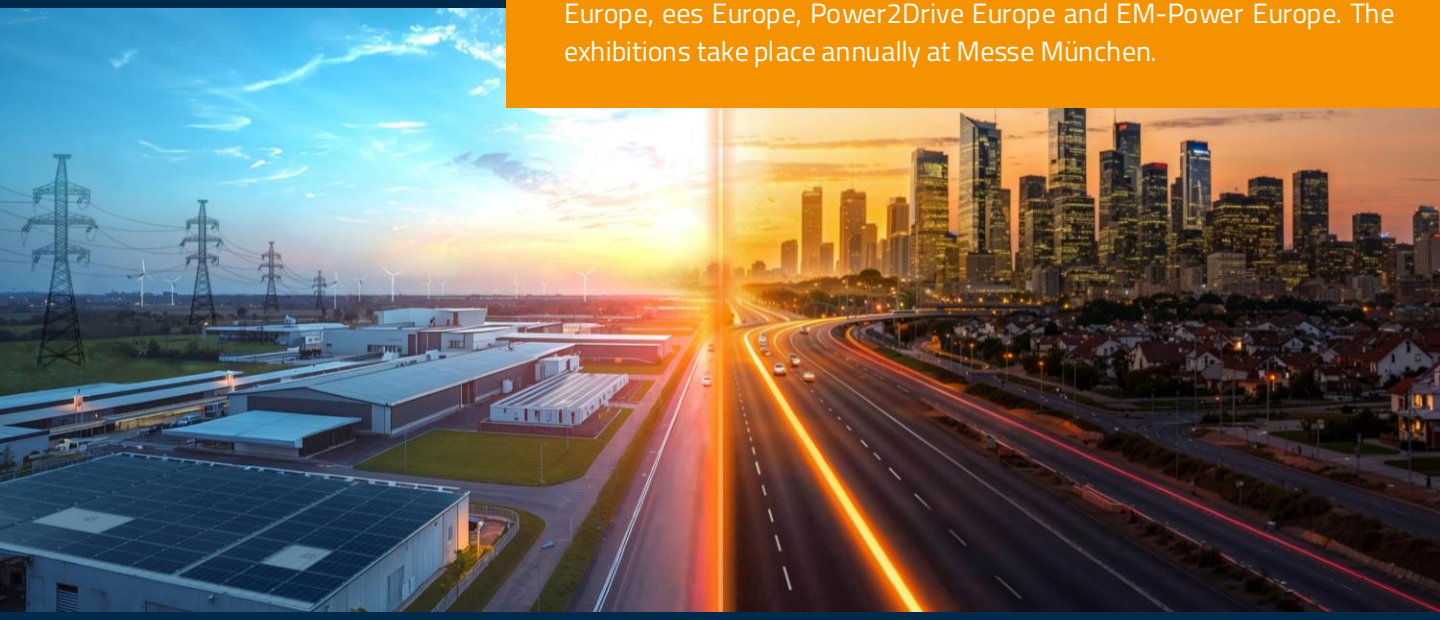
Innovation Factor
The project demonstrates for the first time in Europe how bidirectional charging works in regular urban car-sharing operations. Vehicles serve not only as a mobility solution but also as flexible energy storage for the power grid. The close integration of carsharing, charging infrastructure, and renewable energy creates a scalable model for smart cities.

Impact & Learnings
Utrecht Energized improves the integration of renewable energy and stabilizes local power grids through flexible storage capacity. At the same time, the project increases the economic viability of car-sharing fleets, as vehicles can also provide grid services. The project serves as a blueprint for European cities and demonstrates that mobility and energy must be considered together in a systemic way in the future. The importance of close cooperation between municipalities, mobility providers, infrastructure operators, and energy stakeholders became particularly clear.

← Overview

THE smarter E EUROPE

"Accelerating Integrated Energy Solutions" – that is the goal of The smarter E Europe, Europe's largest alliance of exhibitions for the energy industry. The aim is to create a future- oriented energy world by shining a spotlight on renewable energies, decentralization and digitalization as well as cross-industry solutions from the electricity, heat and transport sectors for a sustainable 24/7 energy supply. The smarter E Europe brings together the four exhibitions Intersolar Europe, ees Europe, Power2Drive Europe and EM-Power Europe. The exhibitions take place annually at Messe München.



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