



**xelectrix**  
POWER

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Company, Product & Applications

2022

DISCOVER NEW ENERGY



# COMPANY

HISTORY / VISION / UNIQUENESS / COMPONENTS



COMPANY / APPLICATIONS / PRODUCTS / REFERENCE PROJECTS

# OUR HISTORY BEGINS IN 1935

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THE HARTL FAMILY - three generations of design, development and int. distribution of specialized construction and recycling industry equipment.

- 2016** Launch of xelectrix Power GmbH by the brothers **Alexander and Dominik Hartl**
- IDEA** Environmental protection through hybridization of diesel generators
- 2018** Cousin **Christian Deutschbauer** joins the company
- 2020** **Lansdowne Investment** and **Tansanit** became part of the company
  - ▶ **BASIS FOR OUR GLOBAL GROWTH PLANS**
- 2021** **Martin Lehner** – Top-Manager and pioneer in the field of electrification of construction machinery joins as investor & strategic advisor



***Pioneer in the development of*** fully mobile and fully electrically driven crushing plants and E-CRUSHER.

***"We are particularly looking forward to leveraging our combined synergies to achieve our common vision of making xelectrix Power one of the leading global players in this fast growing industry"***, commenting founder **Dominik Hartl** on the investment in July 2020.

# VISION

## STORAGE SOLUTION

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Under the motto **DISCOVER NEW ENERGY: Energy, Optimization, Storage and Control** xelectrix Power brings new innovations and concepts to both On- and Off-Grid applications.

These include in-house developed Inverter, battery packs, Network Analysis Module, Battery and Energy Management System concepts that enable us to reach a wide range of customers in order to address one of the most pressing issues of our time:

### ENVIRONMENTAL PROTECTION



***Leading the Energy Transition***

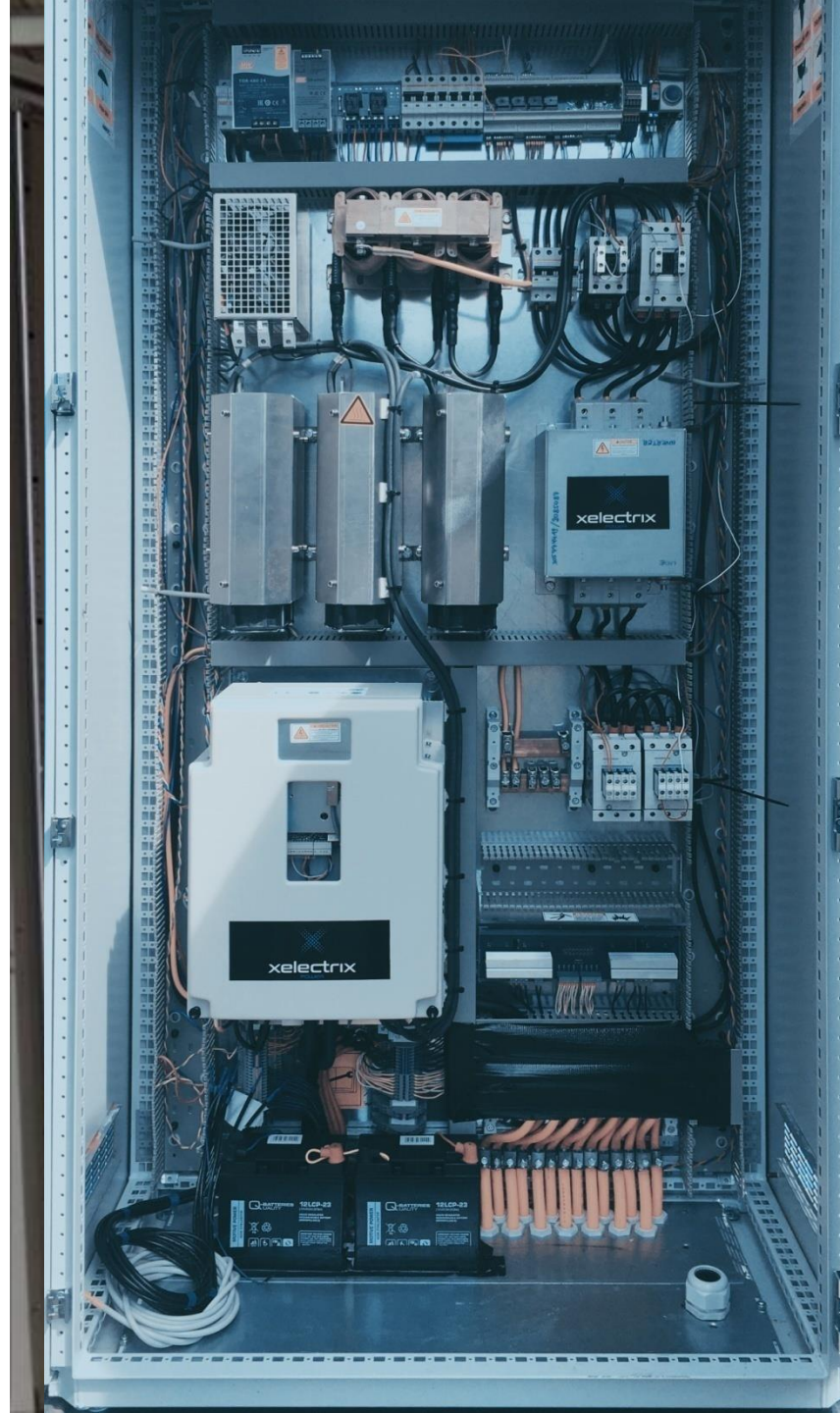
to play a major part in global climate sustainability.

POWER BOX  
UNIQUENESS

# UNIQUE POWER ELECTRONICS

- ◆ Bi-directional with full power (from 11 kW to 150 kW)
- ◆ 3-phase, 100 % unbalanced load acceptance
- ◆ Grid parallel
- ◆ Island mode / Backup power
- ◆ Multi-functional: Voltage Regulation, Peak Shaving, RE Optimization, ...

[xelectrix-power.com](http://xelectrix-power.com)



  
xelectrix  
POWER

*We are a Technology Provider  
and a High Quality  
Manufacturer.*

- Only one power unit
- Low component cost
- Unique inverter architecture

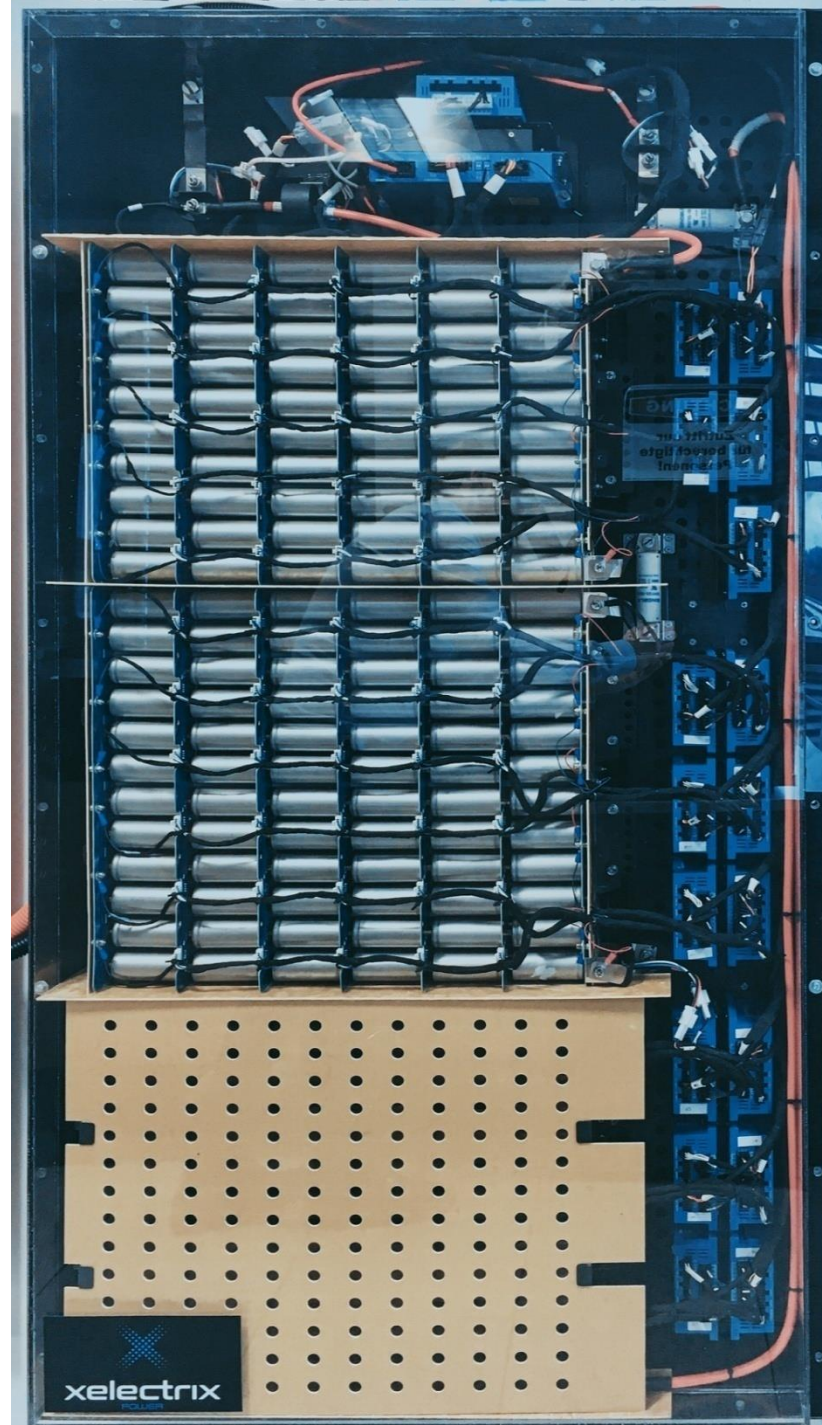


POWER BOX  
UNIQUENESS

# UNIQUE STORAGE TECHNOLOGY



- ◆ Intrinsically safe LiFePO<sub>4</sub> Cells (LFP)
- ◆ xelectrix Power Battery Management System - for long cell life and highest efficiency
- ◆ Integrated thermally triggered extinguishing system
- ◆ Innovative DC Connection Technology



  
xelectrix  
POWER

*We are a Technology Provider  
and a High Quality  
Manufacturer.*

- Flexible & modular
- Safe
- Expandable
- Energy Storage System (ESS)



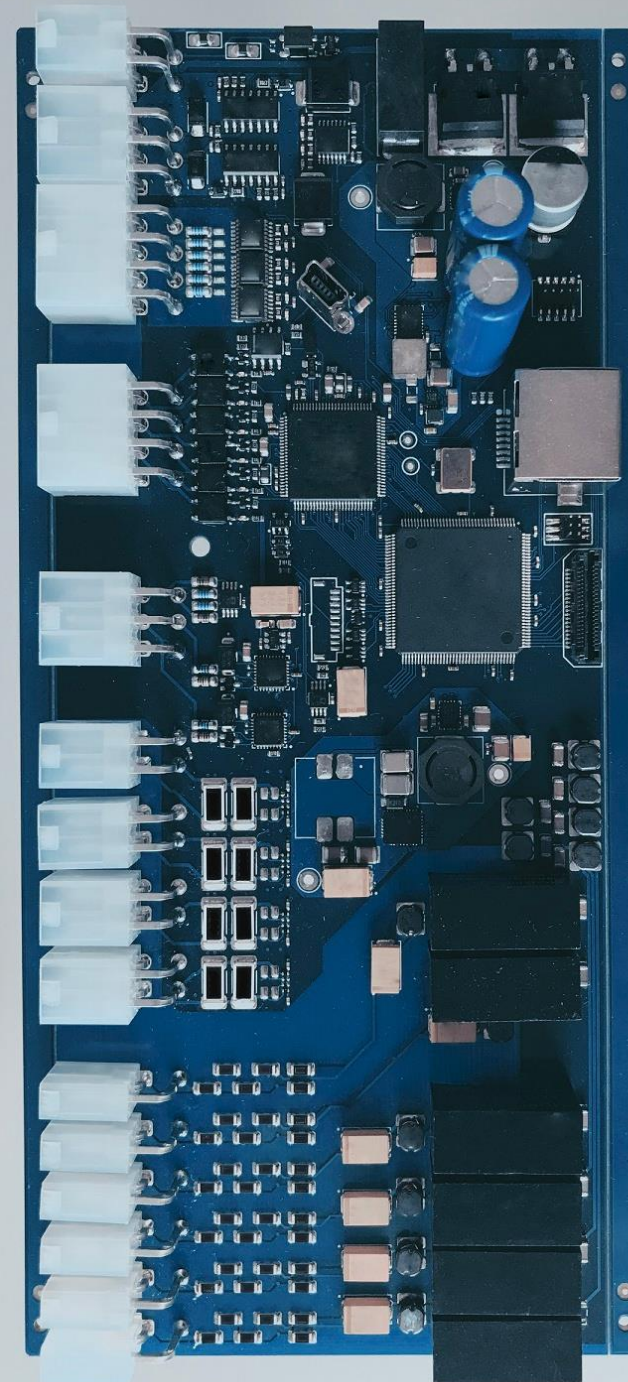
POWER BOX  
UNIQUENESS

# UNIQUE NAM (NETWORK ANALYSIS MODULE)

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- ◆ In-house development
- ◆ Precise and quick measurement
- ◆ Grid control

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*We are a Technology Provider  
and a High Quality  
Manufacturer.*

- **Compatible across all XPB units**
- **One central measurement / analysis module**



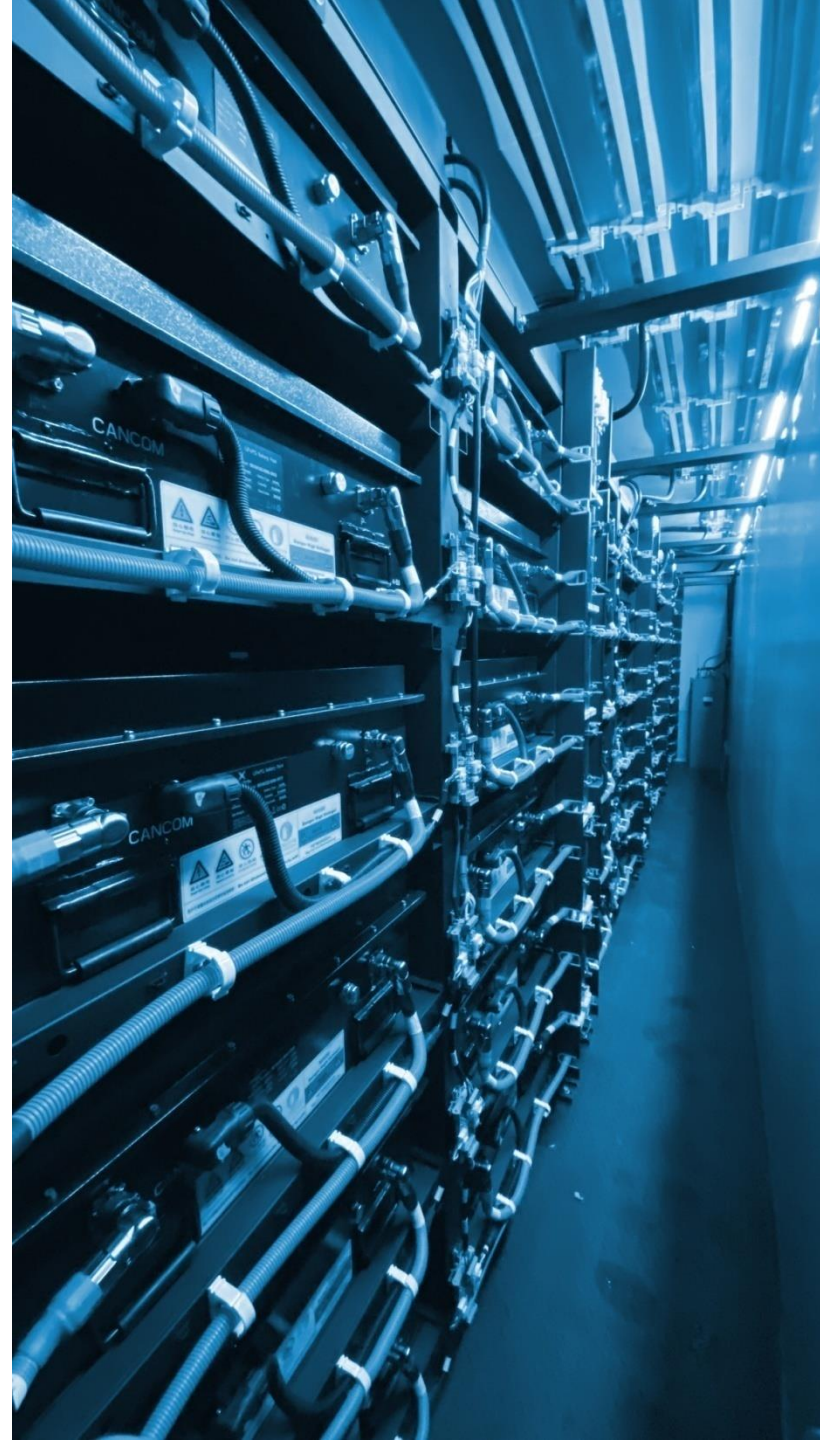
POWER BOX  
UNIQUENESS

# UNIQUE SAFETY FROM CELL TO UNIT

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- ◆ Protects lives
- ◆ Protects property
- ◆ Able to be used in harsh environments
- ◆ Able to be used in confined spaces
- ◆ Safety in transportation

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*Safety starting from CELL  
level, to MODULE level, to  
UNIT level*





POWER BOX  
COMPONENTS

INVERTER	TRANSFORMER	SWITCH FUNCTION	NAM MODULE (Network Analysis Module)	BATTERIES AND BMS
<p>Converting AC to DC and visa versa. Acts as the interface between batteries and consumer. XPB has a bi-directional inverter eliminating extra inverters and rectifiers.</p>	<p>The transformer is the static device which works on the principle of electromagnetic induction. It is used for transferring the electrical power from one circuit to another without any variation in their frequency.</p>	<p>Ability to disconnect from the Grid when the XPB is utilized as an Island supply to the consumers.</p>	<p>Measuring points that allows the XPB to react through its on-board energy measurement system providing optimum supply and battery charging functionality.</p>	<p>In-house developed battery architecture and unique xelectrix Power battery management system.</p>

No Transformer and Switch Function  
= No Backup Power / Grid Forming Ability



PLUG AND PLAY



COST SAVING



CO2



# APPLICATIONS

OFF-GRID / ON-GRID



# ON- & OFF-GRID

## SOLUTIONS FOR

- 1** | Construction Sites, Mining  
CONSTRUCTION SITE OF THE FUTURE
- 2** | Disaster Management  
PARTNERSHIP TRUST
- 3** | In Front of the Meter – Grid Operation  
ENERGY TRANSITION TOGETHER
- 4** | Behind the Meter – Residential, Agricultural,  
Commercial, Industry  
ENERGY OPTIMIZATION STORAGE CONTROL
- 5** | E-Mobility  
THE SOLUTION BEHIND THE CHARGER
- 6** | LEC / Microgrids  
INTELLEGENGE MANAGEMENT



# OFF-GRID SOLUTIONS



- ▶ **DIESEL GENERATOR HYBRIDIZATION**  
Stabilize load curves, control the DG to reduce fuel burn and emissions.
- ▶ **PEAK POWER BOOST**  
Supplement power from the on-board inverter to meet high load peaks utilizing battery power.
- ▶ **GENSET CONTROL**  
Communicate with a generator and automatically switch it on / off at pre-programmed loads.
- ▶ **RENEWABLE ENERGY OPTIMIZATION**  
Be connected without infrastructure changes to wind / and or solar sources.
- ▶ **CHARGING SOLUTIONS**  
Act as an Island Style solution for EV and construction equipment charging requirements.
- ▶ **MICROGRID**  
Supply grid independent energy supply, especially for areas that are not in conventional grid coverage.
- ▶ **LOCAL ENERGY COMMUNITY – LEC**  
Facilitate independent energy storage and supply on a community level, combining RE Prosumers (PV, Waterpower).

# ON-GRID SOLUTIONS



- ▶ **PEAK SHAVING**  
Reduce energy costs by using on-board inverter power to reduce consumer kW power peaks.
- ▶ **PEAK POWER BOOST**  
Supplement power from the on-board inverter to meet high load peaks utilizing battery power.
- ▶ **GRID STABILIZATION**  
Apply innovative voltage frequency regulation using pre-set target parameters that are then monitored.
- ▶ **LOAD SHIFTING**  
Store and discharge power at selected times allowing the shifting of power away from higher tariff periods.
- ▶ **CHARGE SHIFTING**  
Pre-programmed to charge at specific times and specific source – Grid / Genset / PV / Wind.
- ▶ **ENERGY TRADING**  
Store and discharge electricity at specific times allowing traders benefit from variable market conditions.
- ▶ **REACTIVE POWER COMPENSATION**  
Supply reactive power from on-board inverter to avoid kVAR costs.
- ▶ **GRID CONNECTION OPTIMIZATION**  
Lower GC costs by allowing a building / consumer site to move into a lower power bracket.
- ▶ **ELIMINATION OF SLEEPING BACKUP**  
Be used as On- / Off-Grid backup provider. Often replacing conventional generator systems.
- ▶ **BACKUP**  
On-board transformer and switch function
- ▶ **ISLAND STYLE CHARGING SOLUTIONS**



# PRODUCTS

USP / XPLAINED / BENEFITS

COMPANY / APPLICATIONS / PRODUCTS / REFERNECE PROJECTS



# PRODUCT RANGE 2022

XPB = xelectrix Power Box

W = WALL

B = BASIC SPLIT

P = PRO

U = UNLIMITED

1st VALUE = Inverter Power in kW

2nd VALUE = Battery Capacity in kWh

M = U Range container sizes in feet

## WALL RANGE

XPB-W11

11 kW / 40-60 kWh

XPB-W35

35 kW / 40-60 kWh



## BASIC SPLIT RANGE

XPB-B35

35 kW / 60-240 kWh

XPB-B80

80 kW / 100-240 kWh



## UNLIMITED RANGE

XPB-M10 (10ft container)

35 kW / 120-240 kWh    80 kW / 120-240 kWh  
150 kW / 180-240 kWh



## COMING SOON

XPB-PRO35

35 kW / 60-120 kWh



XPB-M20 (20ft container)

35 kW / 240-480 kWh  
80 kW / 240-480 kWh  
150 kW / 240-480 kWh



# USP'S POWER BOX



## ▶ SAFETY

Self-securing LFP cells  
Integrated extinguishing system in each battery pack (non-flammable)  
Emergency Power System  
Backup Power / formation of an emergency power system during blackouts  
Continued operation and control of PV systems during blackouts

## ▶ ENVIRONMENTAL SUSTAINABILITY

Hybridization of diesel generators / Increasing efficiency with less diesel burn  
Peak Power Boost / E.g. using smaller diesel gensets  
Increase of RE Self Consumption  
CO<sub>2</sub> Reduction

## ▶ COST SAVING

High voltage LiFePO<sub>4</sub> battery pack with screwed cells (650 V nominal voltage)  
xelectrix Power Battery Management System (BMS)  
High number of charging cycles depending on the application  
Maintenance costs / fossil fuel costs / logistic costs / grid connection costs  
Performance of battery packs: 70 % capacity after 10 years

## ▶ SYSTEM CONCEPT

3-phase AC coupled storage system  
Parallel Platform Technology / Peak Power Boost (power addition with other energy sources)  
100 % unbalanced load acceptance  
Plug & Play / connection preparation for uncomplicated installation

## ▶ MODULAR, ROBUST, EXPANDABLE

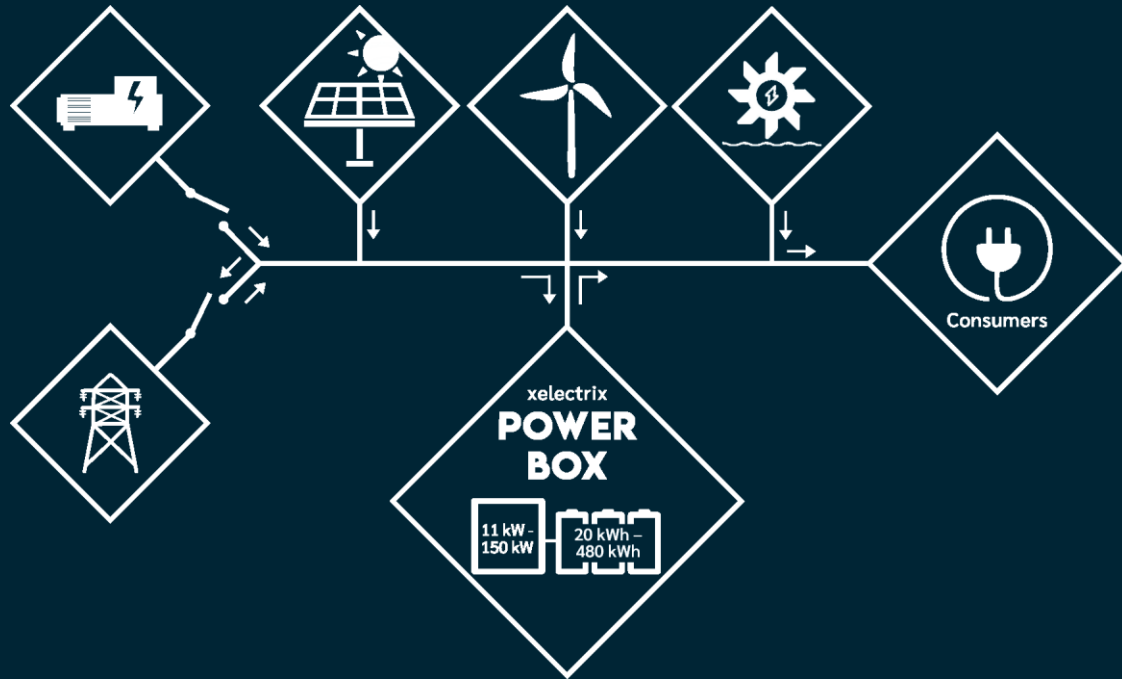
Storage capacity from 20 kWh up to 480 kWh  
Inverter power from 11 kW to 150 kW per unit

## ▶ MULTI-FUNCTIONALITY

Grid parallel (on-grid) or as independent island system (off-grid)  
Off-grid application / Diesel Hybridization, Peak Power Boost  
In front of the Meter Application / e.g. voltage control, frequency regulation  
Behind the Meter Application / e.g. Peak Shaving, RE Optimization, Reactive Power Compensation



POWER BOX  
PLUG & PLAY



PLUG AND PLAY



COST SAVING



CO2

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# XPLAINED

REAL SOLUTIONS FOR YOUR APPLICATION

**1** Construction Hybridization  
CONSTRUCTION SITE OF THE FUTURE

**2** EV Peak Power Boost  
E-MOBILITY

## DISCOVER NEW ENERGY

# CONSTRUCTION SITE OF THE FUTURE

xelectrix Power Box: Environmental Responsibility / CO<sub>2</sub>-Reduction

**Current Situation**

- On- or Off-grid
- Less power provided than consumers need
- Fluctuating load curves of the diesel generator

**Solution**

- Integrated transformer, inverter and switching function
- Flexible, expandable storage capacity

**Results**

- Electrification on the construction site of the future
- CO<sub>2</sub> reduction
- Charging solution: On- and Off-grid
- Emission free inner city power supply
- No infrastructure changes
- New rental concept

*Ability to use smaller DG's or to add equipment with higher power requirements*

## DISCOVER NEW ENERGY

# PEAK POWER BOOST

xplained: Charging from EV's - Example

**GRID CONNECTION**

Grid can deliver: 32 A / ~20 kW

**EV CHARGING STATIONS**

4 x max. 11 kW = 44 kW are needed

**POWER BOX OUTPUT**

140 kWh / (44 kW - 20 kW) = ~ 6 h supply at max. output

(1) Charging of XPB / no EVs  
(2) EV Charging

The ability of the Power Box to quickly load EV's is a stress reliever for many customers.

*Ability to utilize power-limited grid connections to meet additional requirements*

# XPLAINED

REAL SOLUTIONS FOR YOUR APPLICATION

**3** | PV during Grid Outages  
RE OPTIMIZATION & BACKUP POWER

**4** | Hydro Energy Optimization  
ENERGY OPTIMIZATION STORAGE CONTROL

## DISCOVER NEW ENERGY BACKUP AND BLACK START

xplained: Photovoltaic with a Power Box during a Blackout

**BLACKOUT**

**PHOTOVOLTAICS**

**CONSUMERS**

**xelectrix POWER BOX**

During a black out PVs stops working because the PV-inverter can no longer feed into the grid. With the Power Box you even have electricity when the grid fails!

- (1) Blackout occurs and PV shuts down.
- (2) The Power Box disconnects the Consumers from the grid. Island operation is initialized: grid formation through the Power Box.
- (3) PV-Inverter recognizes the new grid and starts working again.
- (4) If the storage of Power Box is full and consumption is low during a black out, the xelectrix Power Box reduces the power of the PV plant.
- (5) End of blackout: interruption-free re-synchronisation and re-connection to the grid through the Power Box.

14.05.2020

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*Ability to keep PV systems running during blackouts as well as regulate PV production*

## DISCOVER NEW ENERGY BLACK START

xplained: Hydropower Plant

**GRID DURING A BLACKOUT:**

**WATER PLANT:**

**CONSUMERS NEAR BY:**

**xelectrix POWER BOX**

- (1) XPB replaces diesel generators which makes a water plant free from potential CO2 emissions.
- (2) Black out occurs and shuts down water plant, consumers are not supplied with electricity any longer.
- (3) The Power Box disconnects the consumers and Water plant from the grid in milli seconds: Island operation is initialized: grid forming through the Power Box.
- (4) New grid is recognized and water plants starts (or continues) working: Consumers nearby are supplied.
- (5) End of black out: interruption-free back synchronisation and re-connection to the grid through the Power Box.

	Genset	vs.	XPB
CO2 Emission free	no		yes
Disconnection from the Grid	no		yes
Fast Reaction	no		yes
Resynchronization to the Grid	no		yes
Grid Stabilization	no		yes

Water plants are considered as green because they can produce electricity without burning fossil fuels, right? However, every water plant needs a diesel generator to provide back up. With a Power Box you not only can get rid of the Genset, you also benefit from other features!

24.03.2021

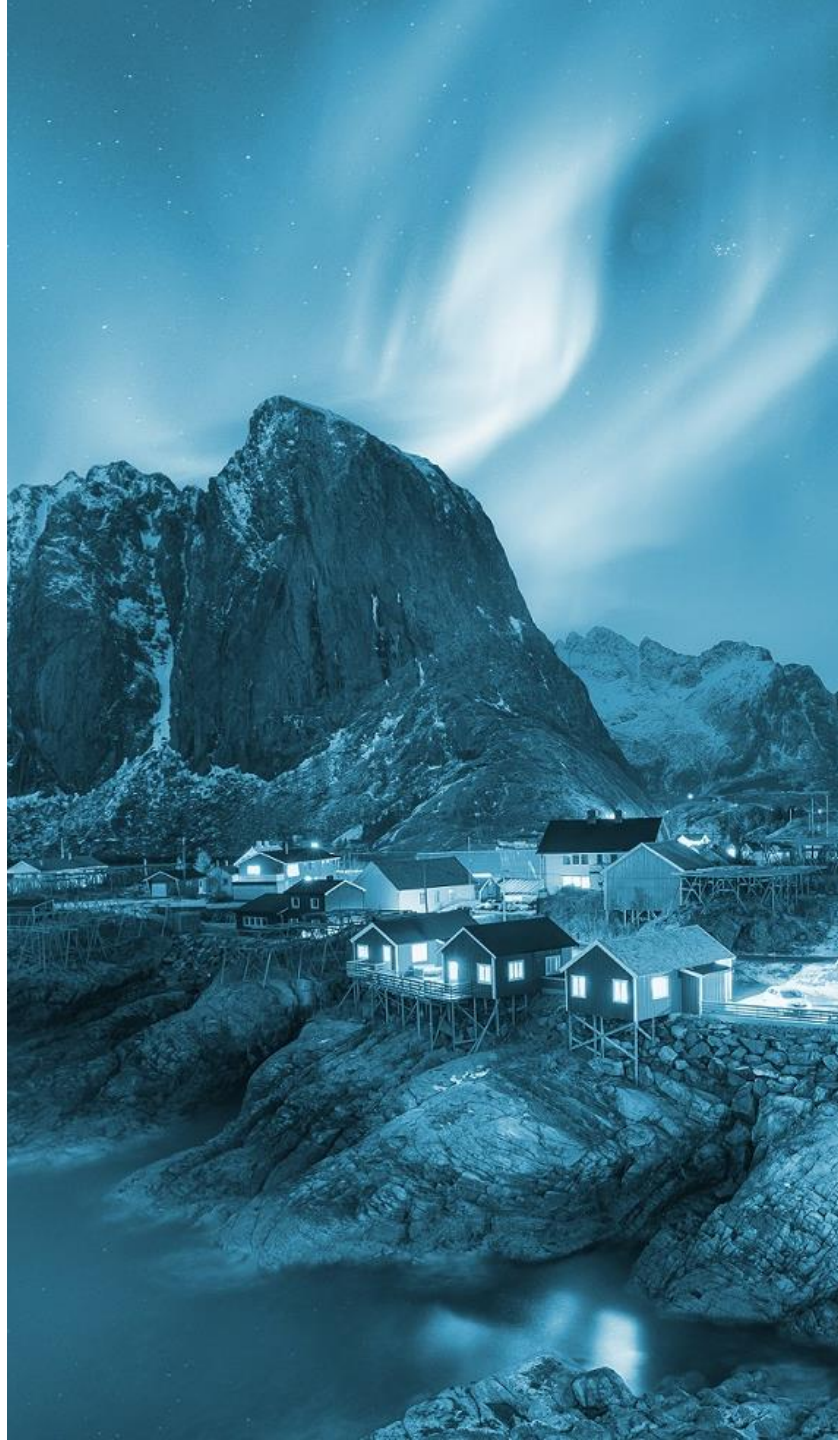
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*Ability to blackstart power plants after a grid shutdown, including forming XPB-grid and re-sync with the grid*

# BENEFITS

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- ◆ Safety
- ◆ Environmental sustainability
- ◆ Cost savings
- ◆ Plug & Play
- ◆ Modular, robust and expandable
- ◆ Multi-functional
- ◆ Working with a company passionate in leading the Energy Transition



PLUG AND PLAY



COST SAVING



CO2



# SELECTION, CONTROL AND MONITORING

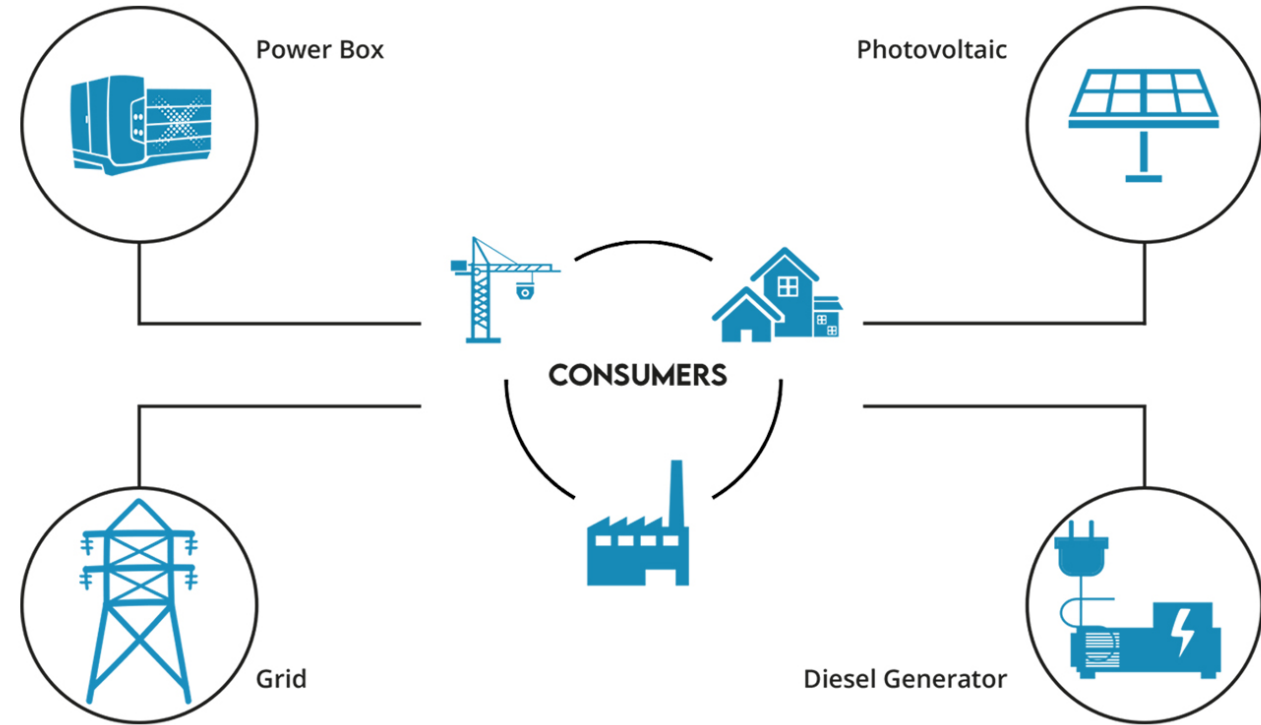
xPSel  
xPCon  
xPMon



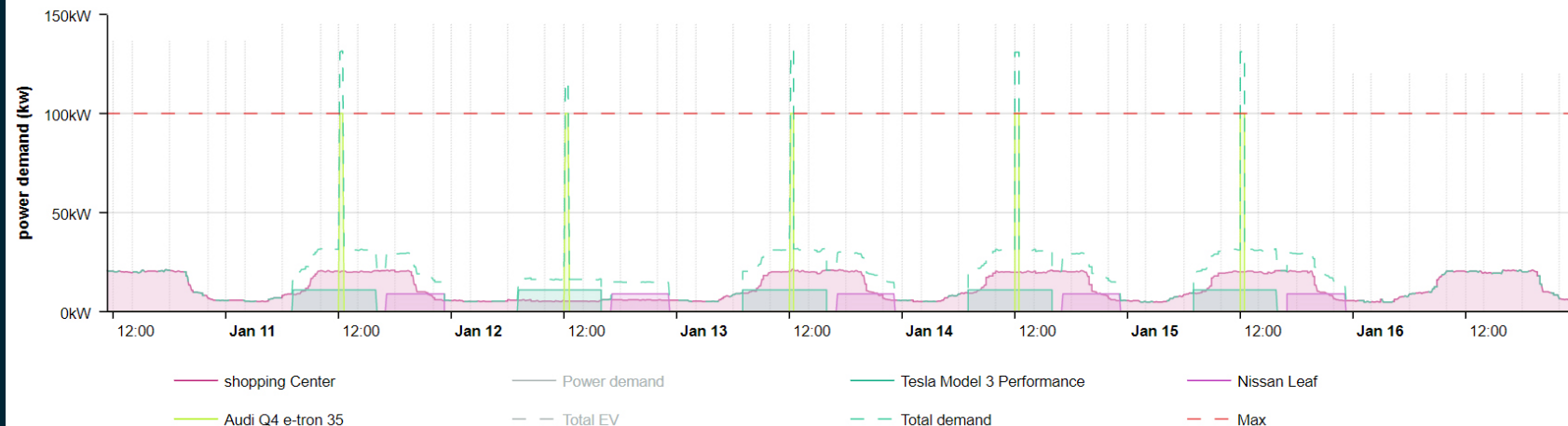
# SELECTION AND SALES TOOL

- ▶ EV Charging infrastructure planning
- ▶ EV Charging load curve generation
- ▶ Generic, Scalable Load Curves
- ▶ Real Load and Yield Curves usage
- ▶ Global Solar Yield Calculation
- ▶ Comparison and selection of optimal XPB units under different scenarios
- ▶ Recommended unit and application configuration
- ▶ Simulation Results: CO<sub>2</sub>, LCOE, ROI, Costs/Cash Flow, Battery Cycle analysis

## Business Model Optimization using Smart Simulation and Analyses



### Predicted Charging Curve



XELECTRIX POWER  
DISPLAY

xPCON

## ON-BOARD DISPLAY & CONFIGURATION

### ISLAND MODE

- ▶ Black Start
- ▶ Island Mode Power Supply

### ON-GRID MODE

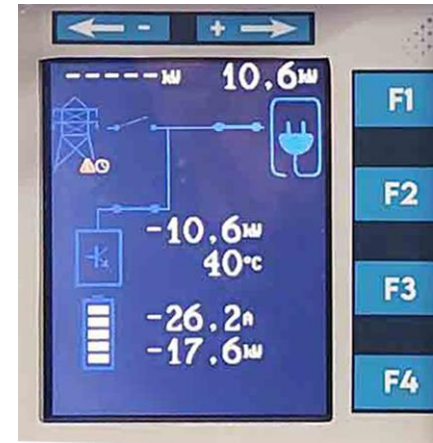
- ▶ Charge from the Grid
- ▶ Peak Power Boost
- ▶ Peak Shaving
- ▶ RE Self Consumption Optimization
- ▶ Back up

### DIESEL GENERATOR HYBRIDIZATION

- ▶ DG Sync
- ▶ DG Remote Control
- ▶ Auto Peak Power Boost
- ▶ Force Hybrid

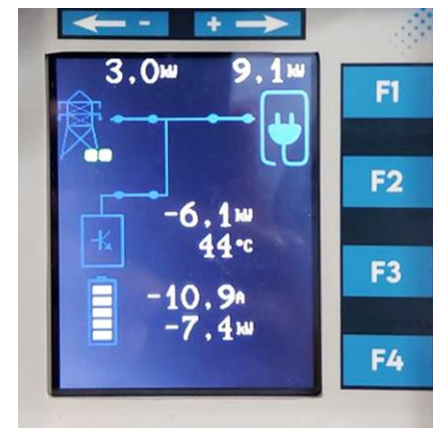
### ISLAND MODE OPERATION

The Island Mode on the xelectrix Power Box provides energy when there is no Grid or Diesel Generator available. It also supports other features like smooth start and power bank mode.



### ON-GRID MODE

On-Grid Mode on the xelectrix Power Box gives users full flexibility to implement different grid-tied applications, working in Hybrid Mode to provide numerous functions.



### DG HYBRIDIZATION MODE

Offers users the ability to optimize the diesel generator load factor which results in the maximum reduction of fuel consumption, CO<sub>2</sub> emissions, noise pollution, and diesel generator downsizing.



XELECTRIX POWER  
MONITORING

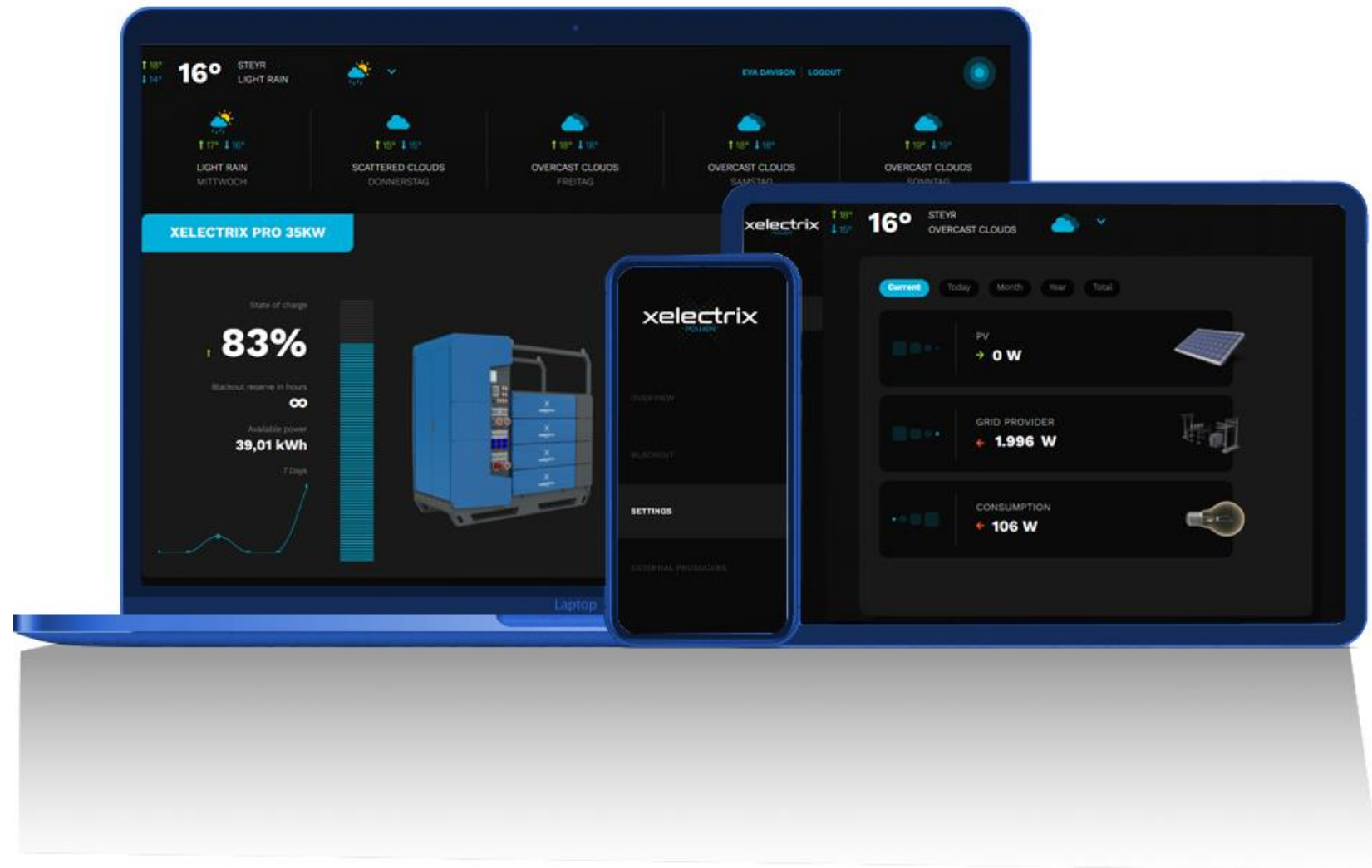
# xPMon MONITORING

## GET ONLINE ACCESS TO YOUR POWER BOX

- ▶ Register
- ▶ Login through Mobile Phone, Tablet or Computer

## MONITORING AND CONTROL

- ▶ Observe the state and functions of your XPB at any time.
- ▶ Change the settings
- ▶ Activate Backup
- ▶ Real-time and historic data review.







# SELECTED REFERENCE PROJECTS

PLUG & PLAY / OFF-GRID / ON-GRID / SOLUTIONS / BENEFITS

[COMPANY](#) / [APPLICATIONS](#) / [PRODUCTS](#) / [REFERENCE PROJECTS](#)



XELECTRIX POWER  
REFERENCE PROJECT

# CHARGING SUN POWER ONLY

## EXPO 2020 DUBAI

### APPLICATION

EV-Off-Grid-Charging with Solar  
Energy

100 % CO<sub>2</sub>-free

100 % Self-Sufficiency

### SOLUTION

Unlimited XPB-U80-200-M10

80 kW Power

200 kWh Battery Capacity

### WHY XELECTRIX?

Plug & Play

Connection of 2 PV systems

Control of the entire system

Suited for harsh environments



XELECTRIX POWER  
REFERENCE PROJECT

# PROTON MOTOR

## SELF-SUFFICIENT FUEL CELL POWER PLANT

### APPLICATION

240 kW Fuel Cell Power Plant  
Mobile hydrogen filling station  
100 % CO<sub>2</sub>-free

### SOLUTION

HyShelter 240  
Up to 240 kW Power  
Up to 240 kWh Battery Capacity

### WHY XELECTRIX?

Revolutionary complete system  
combining fuel cell and battery  
storage technologies  
Extremely fast response times



XELECTRIX POWER  
REFERENCE PROJECT

# SWEDISH PRO PREMIERE

HUGO TILLQUIST AB

## APPLICATION

Diesel Generator Hybridization

## SOLUTION

PRO XPB-P35-100

35 kW Power

100 kWh Battery Capacity

## WHY XELECTRIX?

Modular System

Plug & Play

Totally mobile



XELECTRIX POWER  
REFERENCE PROJECT

# POGUSCH

„WEINKOST“ / ALLMOBIL

## APPLICATION

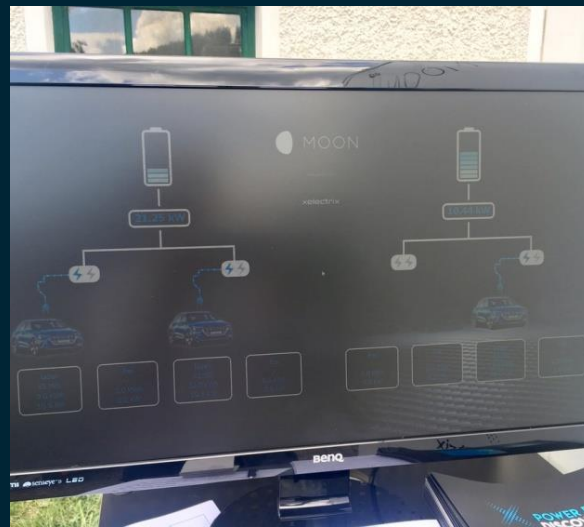
Event / Shuttle Service  
Off-Grid EV Charging

## SOLUTION

2 x XPB-B80TS-140 Rack Systems  
160 kW Power  
280 kWh Battery Capacity

## WHY XELECTRIX?

High Power  
Mobile Storage Solution  
Island System  
Plug & Play



XELECTRIX POWER  
REFERENCE PROJECT

# SOLAR PARK

HERBERT GOTTHALMSEDER

## APPLICATION

Business Park  
Renewable Energy (PV)  
EV Charging

## SOLUTION

XPB-U250-360-M40 Container  
250 kW Power  
360 kWh Battery Capacity

## WHY XELECTRIX?

High Power  
Modularity and Expandability  
Backup Power



XELECTRIX POWER  
REFERENCE PROJECT

# GREEN POWER SYSTEMS UK CONSTRUCTION

## APPLICATION

DG Hybridization  
On and Off- Grid job sites  
E-Construction Equip charging

## SOLUTION

XPB-P35-100  
35 kW Power  
100 kWh Battery Capacity

## WHY XELECTRIX?

Integrated Distribution Board  
Peak Power Boost  
Smooth Start  
Peak Shaving



**xelectrix**  
POWER

XELECTRIX POWER  
REFERENCE PROJECT

# LINZ NETZ

BESS IN PRENDT

## APPLICATION

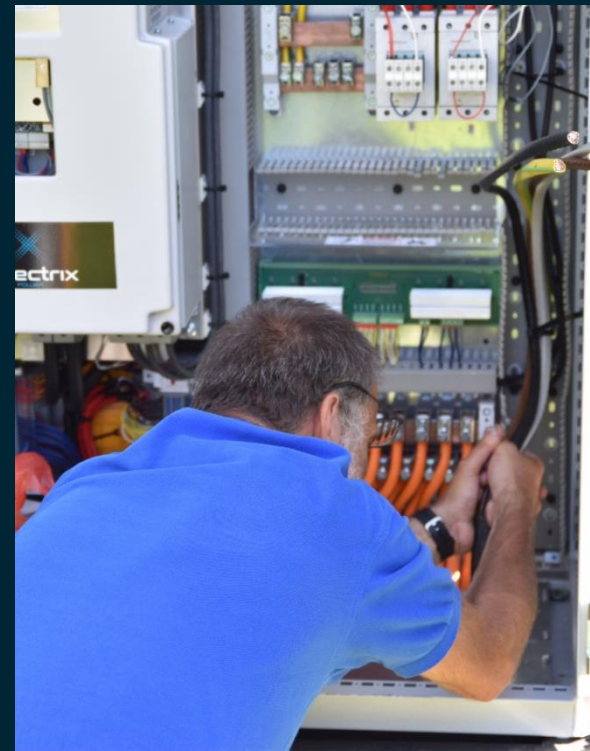
Grid stabilization (caused by  
PV load fluctuation)  
Research co-operation

## SOLUTION

XPB-B80-140 System  
80 kW Power  
140 kWh Battery Capacity

## WHY XELECTRIX?

Developer and Manufacturer  
Outdoor System  
Specific Power Electronics  
Control Software





XELECTRIX POWER  
REFERENCE PROJECT

# WALL

RESIDENTIAL / AGRICULTURAL

## APPLICATION

PV Self-Consumption Optimization

## SOLUTION

XPB-W11-20 Wall System

11 kW Power

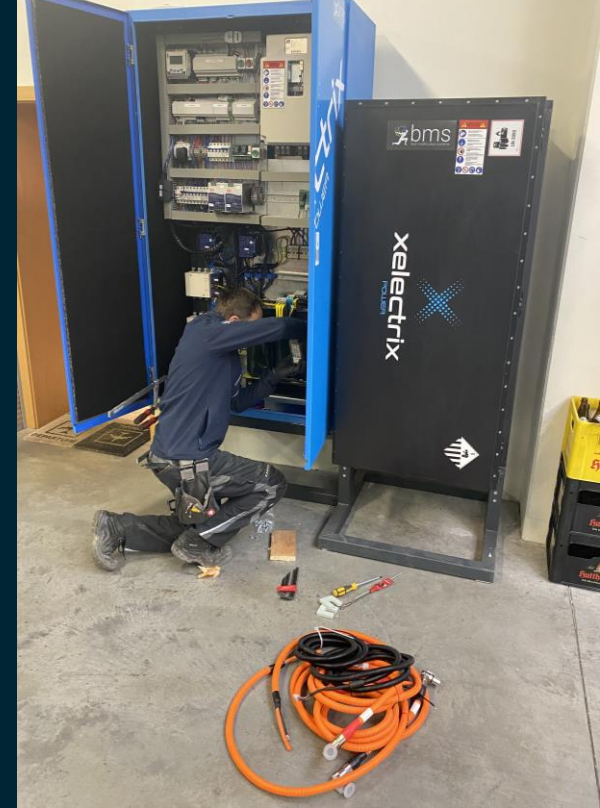
20 kWh Battery Capacity

## WHY XELECTRIX?

Backup Power

PV Operation during blackouts

RE Optimization



XELECTRIX POWER  
REFERENCE PROJECT

# KA-TE

## SEWER REHABILITATION ROBOTS

### APPLICATION

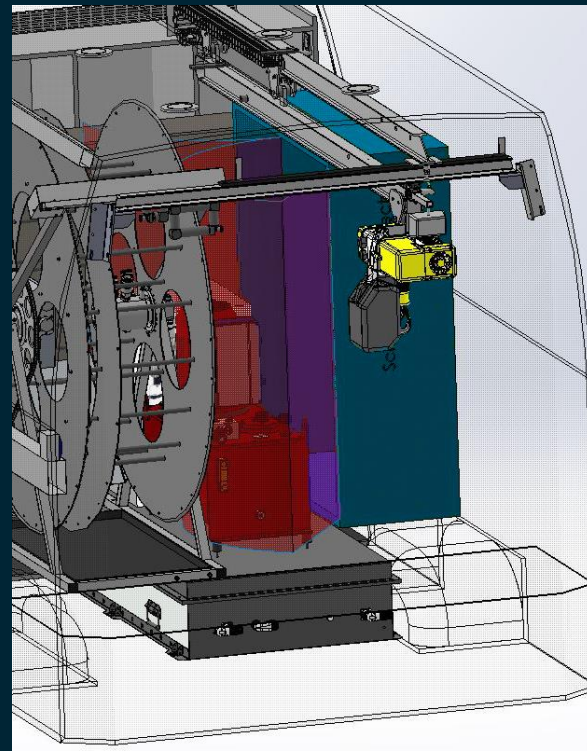
Enable clean and quiet work when DG's are not allowed to operate. Van mounted.

### SOLUTION

Customized System  
11 / 35 kW Power  
20 / 40 kWh Battery Capacity

### WHY XELECTRIX?

Developer and Manufacturer  
Robust Design  
Good price / performance ratio



XELECTRIX POWER  
REFERENCE PROJECT

**W.E.B.**  
WINDENERGIE

**APPLICATION**

Storage for Self-Consumption

**SOLUTION**

Customized System  
500 kWh Battery Capacity

**WHY XELECTRIX?**

Developer and Manufacturer  
Flexible Design  
Safe and long-life batteries  
Good price / performance ratio



XELECTRIX POWER  
REFERENCE PROJECT

# VOLVO CE

## ELECTRIC LAUNCH PARIS

### APPLICATION

Off-Grid Charging

### SOLUTION

XPB-B80-140

80 kW Power

140 kWh Battery Capacity

### WHY XELECTRIX?

Transformer

Island System

Plug & Play



XELECTRIX POWER  
COMPANY

# WE OPERATE ON A GLOBAL BASIS

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With our Head Office in Mauthausen, Austria and more than 30 employees xelectrix Power has evolved to an international focused company specialized in **Energy, Optimization, Storage and Control**.



## HEAD-OFFICE

xelectrix Power GmbH  
PEM-Str. 2  
4310 Mauthausen – Austria  
Tel: +43 7238 31515  
[info@xelectrix-power.com](mailto:info@xelectrix-power.com)  
[www.xelectrix-power.com](http://www.xelectrix-power.com)

## US-OFFICE

xelectrix Power North America LLC  
871 Coronado Center DR, Suite 200  
Henderson, NV 89052  
USA

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