blueplanet inverter family

flexible applications and solutions

Junly 2019

SIEMENS
Ingenuity for life

KACO
new energy.

KACO new energy

HQ Neckarsulm – Germany

Over 12 GW of inverter capacity installed worldwide

Applications

Inverter technology with flexible utilization

- Solar PV Inverters
- High Energy Density (SiC)
- Energy Storage Systems (ESS)
- blueplanet Hybrid & blueplanet hy-bat
- Re-active Power only (RPonly)
- What are we looking for ?

MADE IN GERMANY

The familiar blueplanet range !

blueplanet 10.0 TL3

blueplanet 15.0 TL3

blueplanet 20.0 TL3

blueplanet 50.0 TL3

Solar PV Inverters (3 Phase)

APPLICATIONS

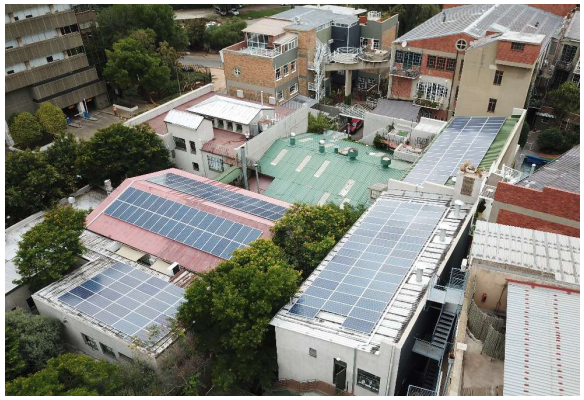
⇒ **self-consumption**
(zero feed-in / grid-limiting)

⇒ **diesel genset (fuelsave)**

⇒ **enbedded generation**
(net-meetering / feed-in)

Industrial Commercial

Solar PV power generation



Industrial Commercial

Solar PV power generation

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MADE IN GERMANY

blueplanet 87.0 & 92.0 TL3
blueplanet 125.0 TL3 (park)
blueplanet 137.0 TL3 (park)
blueplanet 150.0 TL3 (park)

EASY MOUNTING

QUICK WIRING

LOWER COSTS

INCREASED PERFORMANCE

blueplanet SiC (SiliconCarbite)

High Energy Desity

1500 V (park)

125.0
DC Input range: 875 – 1450 V
AC Voltage: 600 V
Derating: 55

137.0
DC Input range: 875 – 1450 V
AC Voltage: 600 V
Derating: 48

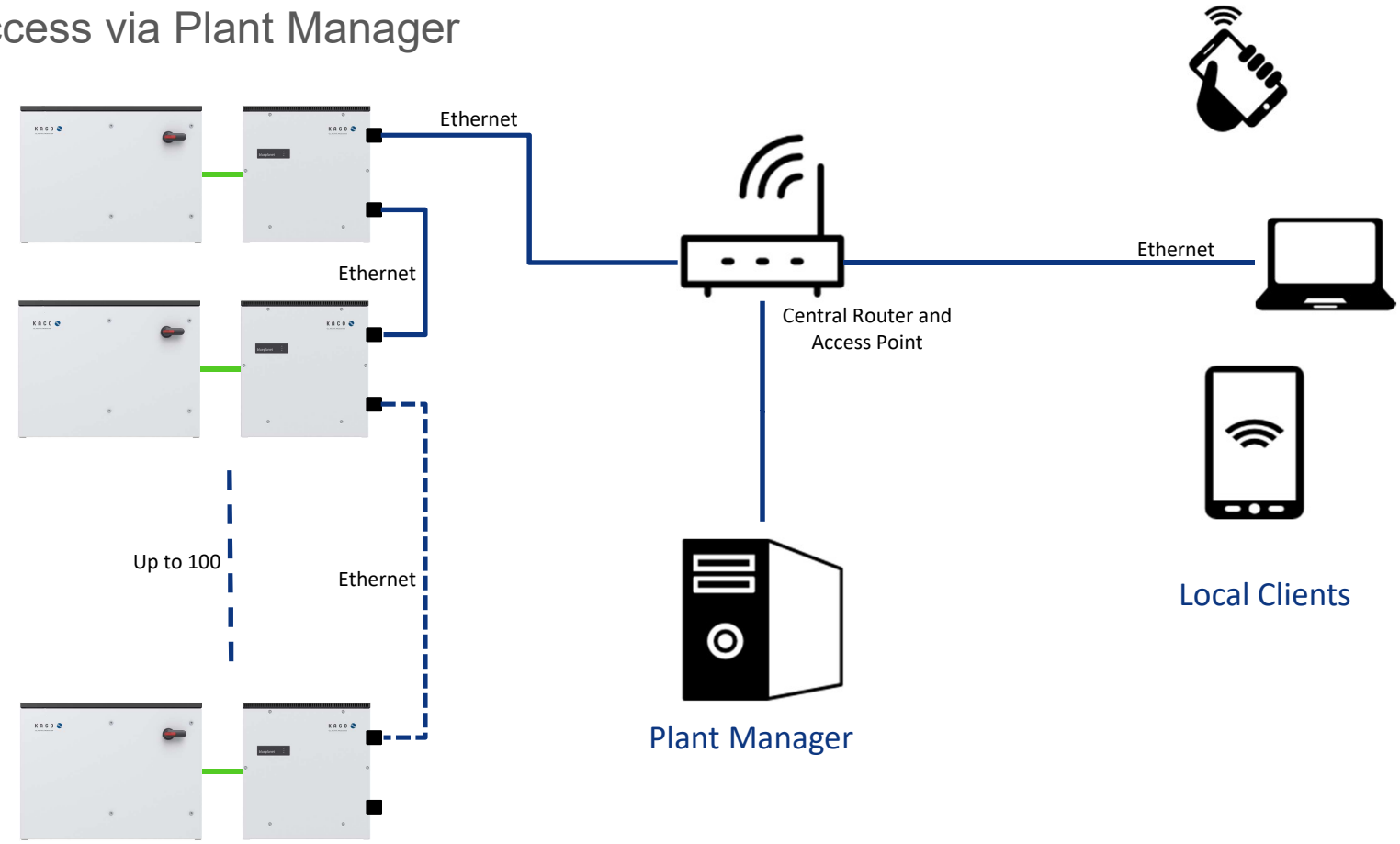
150.0
DC Input range: 960 – 1450 V
AC Voltage: 660 V
Derating: 40

1000 V

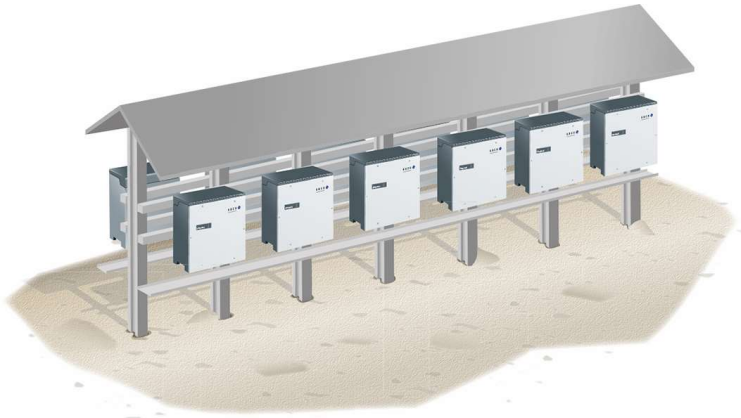
92.0
DC Input range: 591 – 1100V
AC Voltage: 400 V
Derating: 55

Bp PARK Monitoring

Access via Plant Manager



KACO new energy.



2.0 MVA — 6.0 MVA

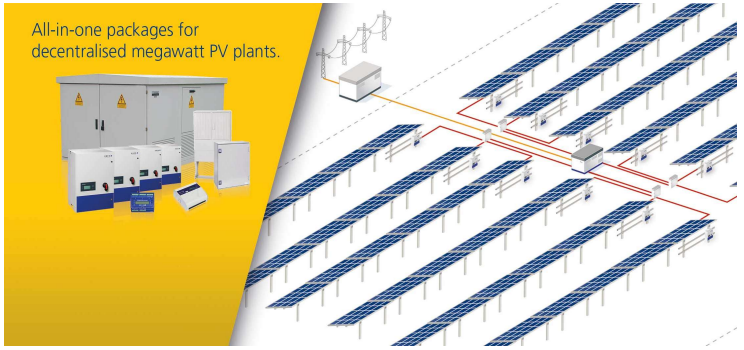
blueplanet XXXX TL3

blueblock

CENTRAL POWER STRING SOLUTION (CPSS)

Components

Decentralized Architecture



blueplanet gridsave 50.0 TL3 – S / I

bi-directional battery inverter

ESS TECHNOLOGY

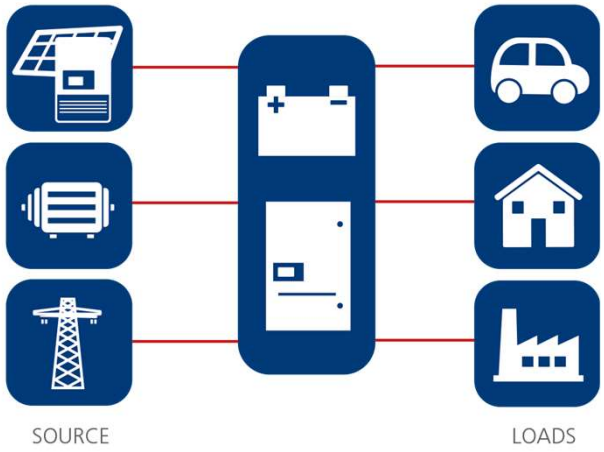
Applications

Energy Storage System (ESS) TECHNOLOGY

- Grid regulation and stability
- Support of renewable energy supply
- Boosting EV charging stations
- ToU (Tim of Use) energy arbitrage
- Reduction of MD with peak shaving
- MiniGrid / MicroGrid components

Applications

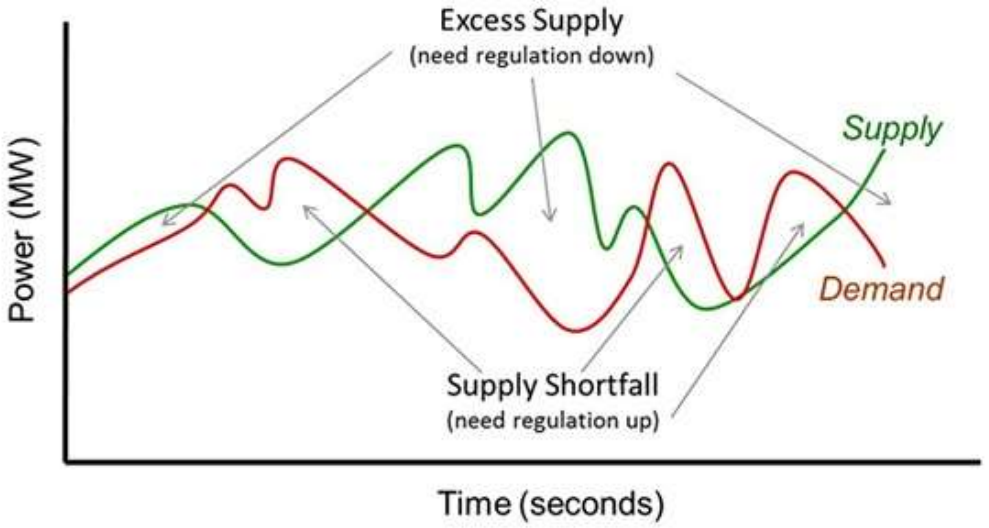
Energy Storage System (ESS) TECHNOLOGY



Application – grid regulation and stability

blueplanet gridsave 50.0 TL3 - S

- Requirement of regulation for damping momentary variations in demand and supply
- Conventional power plants suffer significant wear and tear for providing variable power
- Storage is a solution for providing this short term power regulation
- Also can be used for Frequency regulation in grid

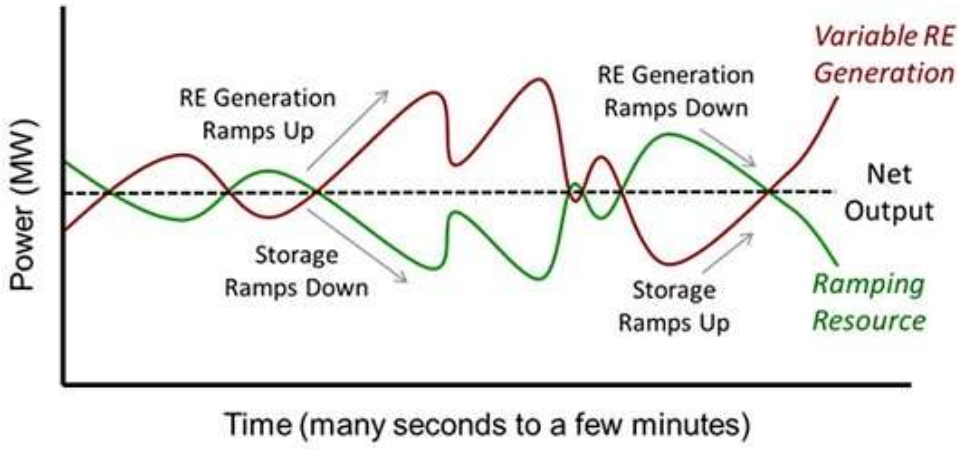


Source: E&I Consulting

Application – support of renewable energy supply

blueplanet gridsave 50.0 TL3 - S

- Variability in generation from renewables like wind and solar can be damped
- Output from storage responds to change in output from renewables closely
- Storage output is the balance between the electric supply from renewables and load
- This ensures an almost uniform net output



Source: E&I Consulting

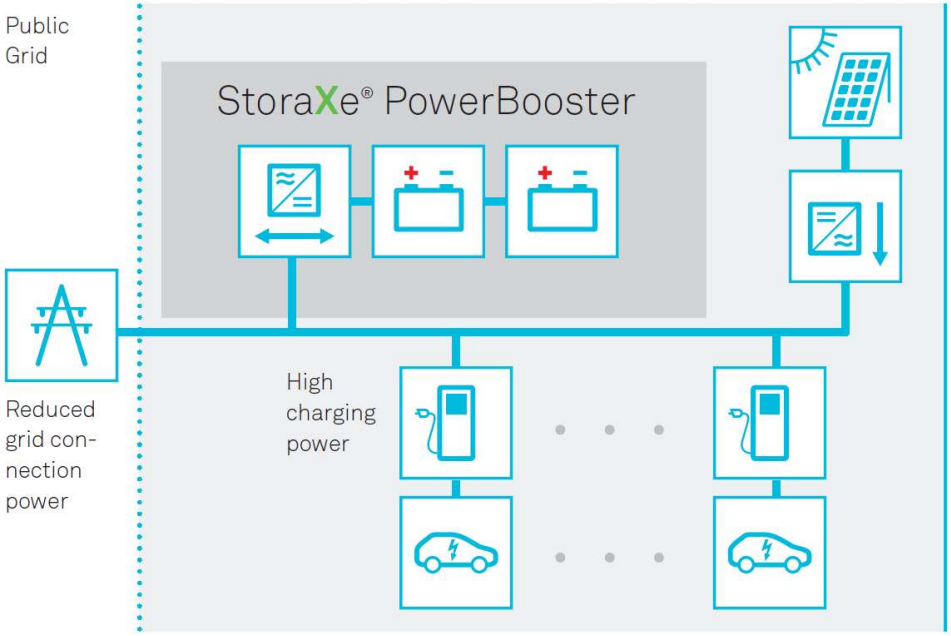
Figure 8. Variable renewable generation and storage ramping.

Application – boosting

EV charging stations

blueplanet gridsave 50.0 TL3 - S

- Power Booster
- Suitable for fast-charging stations with high capacity
- Compact outdoor solution for direct AC grid (@400V)
- Connection possible for multiple parallel systems



Application – ToU energy arbitrage

blueplanet gridsave 50.0 TL3 - S

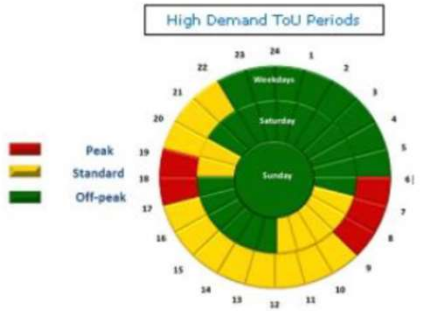
- ToU : Time of Use tariff structure depending on municipality
- Peak tariff hour of:
  3 hours in the morning
- 2 hours in the evening
- Load profile has to be analyzed carefully
- Combination with Solar PV can improve the business case

This is only possible during week days as shown in the Time-of Use circle diagrams below. Only about 14.8% of all tariff time periods falls in the Peak-time period.

For a City Power customer on ToU tariff:

High Demand Season	
Peak time tariff	330.78 c/kWh
Off Peak tariff	95.61 c/kWh
Differential	235.17 c/kWh

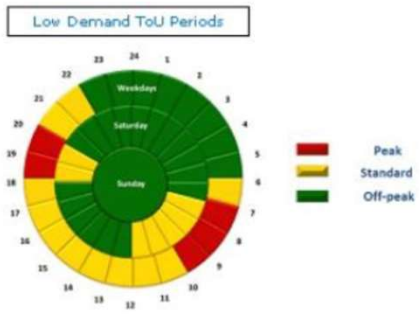
This is the scenario for 3 months per year.



For the same customer on ToU tariff:

Low Demand Season	
Peak time	143.78 c/kWh
Off Peak	89.48 c/kWh
Differential	54.3 c/kWh

This is the scenario for 9 months per year.

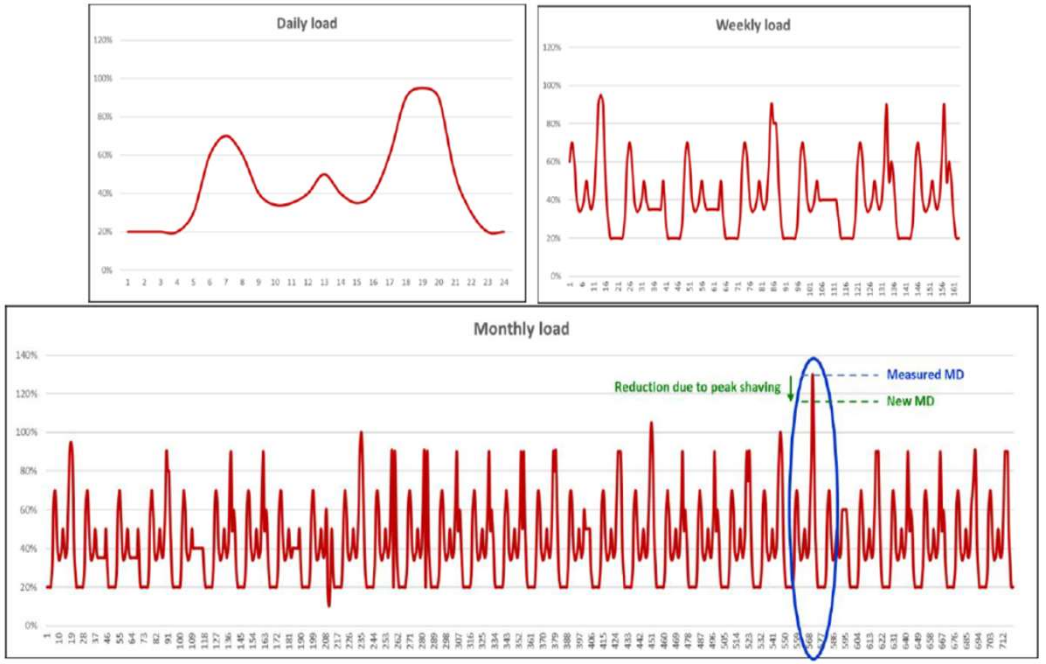


The average differential for this customer over one year is 100 c/kWh. This is regarded as "revenue" to pay for the installation of the storage system. Each Municipality's differential is unique, based on the approved NERSA tariff structure, ranging between 60c/kWh and 170 c/kWh.

Application – reduction of MD with peak saving

blueplanet gridsave 50.0 TL3 - S

- E.g. Municipality MD charges USD 13 per kWA availability p.m
- Shaving-off 50 kWA can result in a USD 7800 saving p.a.
- Load profile has to be analyzed carefully
- Combination with energy arbitrage can improve the business case further

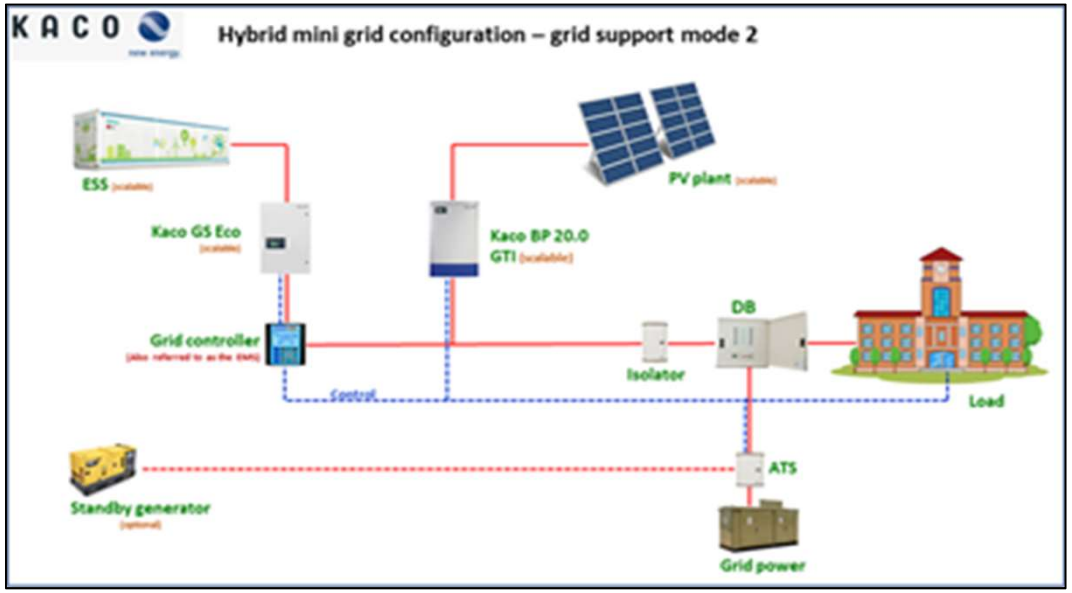


Application – MiniGrid & MicroGrid

integration of Solar PV and other sources

Commercial (< 1MW)- and utility-scale (> 1 MW) solutions

- Grid-connected Mini-/MicroGrids
- Off-grid Mini-/MicroGrids
- Reduction of diesel consumption
- Energy source diversity / redundancy
- Independency from “weak grid”
- Commercial – to utility-scale



(new) 10kW – Hybrid Inverter

blueplanet hybrid 10.0 TL3-S and blueplanet hy-bat 3.6 kWh

Introduction

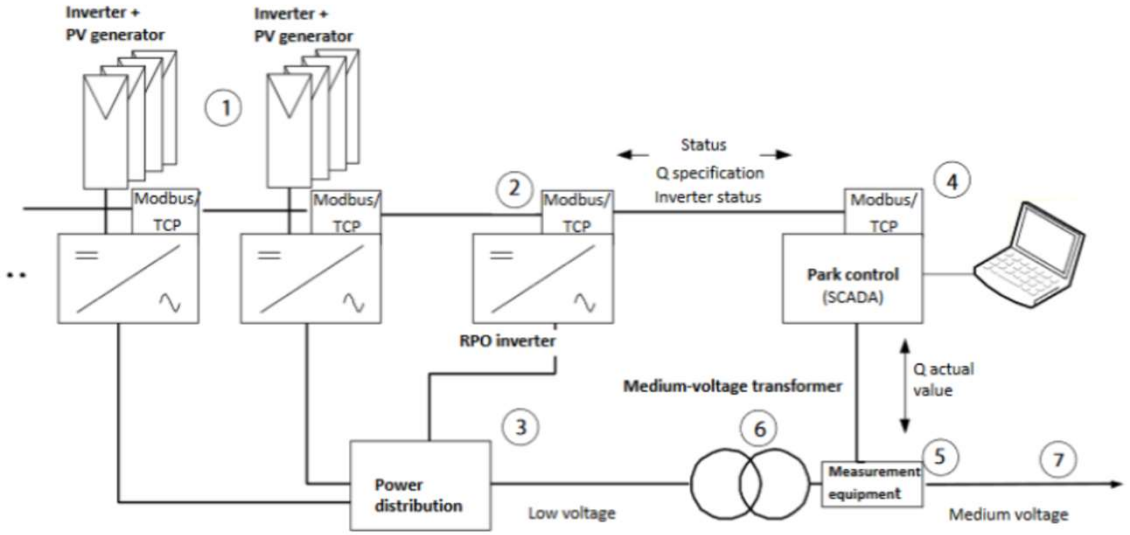
EES-AWARD-WINNING PRODUCT 2017, GERMANY

blueplanet 50.0 RPonly

50 kWar unit (reactive power correction)

Reactive Power Inverter

Block diagram I RPO only



blueplanet 50.0 TL3 RPonly

Phase shifter.

Inverter for reactive power compensation in solar PV systems and industrial plants.

Key			
1	PV generator with inverter	5	Measurement equipment
2	RPO inverter	6	Medium-voltage transformer
3	Power distribution	7	Grid connection point
4	Park control - centralised/decentralised system for monitoring the system, visualisation, control and regulation.		

What are we looking for ?

Project partners / customer ...

Commercial / Industrial

- Independency from “weak grid” reduction of diesel consumption
- Energy source diversity / redundancy
- Deduction of Diesel Cost

- Project Types: Shopping Centers, Hospitals, Universities/Schools, Factories, Mining, Agriculture, Telco-Towers, Housing Developments, Industrial Parks …

Utility-scale

- Alternative/ renewable energy generation programs (IPP)
- Energy security / grid-stability (Distributed ESS in transmission network)
- Embedded generation / energy security / grid-stability (Municipal-utilities distribution network)
- MiniGrid Projects (Rural Electrification)

KACO new energy.

Thank you for your attention!

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