

SOLAR ELECTRIC

KOSTAL

# KOSTAL hybrid inverters

The new standard – always the right match



Smart connections.



# KOSTAL competence – using energy the smart way. Convincing

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# KOSTAL family –

## Success founded on history and over 100 years of experience



- Locations, customers and partnerships around the world make KOSTAL a **global company**.
- KOSTAL adheres to the automotive supplier's "**zero-error approach**" to deliver the ultimate quality for automotive, industrial and photovoltaic products.
- KOSTAL wins over its customers with a **broad understanding of the industry**, enabling numerous **smart connections** to be made.
- In 1995, **KOSTAL Industrie Elektrik** was founded for the industrial drive technology sector. With its long tradition in power electronics and close collaboration with its customers, this company can ideally respond to the needs of the market.
- **KOSTAL Solar Electric**, founded in 2006, is a leading provider of innovative string inverters and storage systems for the private and small commercial sector.
- Through all its business divisions, KOSTAL works to shape the **future** right here and now, to be a stable and secure business you can continue to rely on for many years to come.
- KOSTAL is a partner you can count on, thanks to innovative solutions, finely honed **expertise in both development and technology**, and lasting, reliable quality.
- As a **4th generation family-owned company**, here at KOSTAL we know our roots, our capabilities, our desires, our links to each other and what is important to us: our **partnership** with you.

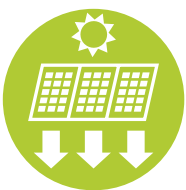
# PLENTICORE plus – the 3-phase standard: Simple. Versatile. Smart.

## An inverter for every PV system

KOSTAL Solar Electric is a specialist in innovative solar inverters and storage solutions for the home. The inverter lies at the very heart of your photovoltaic system. Not only does it convert the power generated by the solar modules, it also provides you with numerous ways of using energy smartly. Our latest products are setting a new standard: the PV hybrid inverters are simply always the right match for every PV system and every requirement.

Combined with the BYD battery box H11.5, the PLENTICORE plus 5.5 delivers maximum system efficiency. This has been confirmed scientifically by the “2018 power storage system inspection” study undertaken by Berlin University of Applied Sciences (HTW). The DC-coupled storage solution came out top with a System Performance Index (SPI) of 91.4%.

As the PLENTICORE plus name suggests, it offers numerous possible uses and options, with the “PLENTI” part coming from the English “plenty” and “CORE” illustrating its simple handling, as all important functions are combined in just one device.



### Use photovoltaics to smartly generate power

As a pure solar inverter with up to 3 PV inputs, the PLENTICORE plus guarantees optimum yields even in challenging shadow situations.



### Enjoy more energy self-sufficiency with the direct integration of leading high-voltage batteries

You decide whether to connect up the battery at the time of installation or retrofit it later on. The third input can also be optionally connect to leading high-voltage batteries from BYD or BMZ\*.



### Using energy the smart way

The PLENTICORE plus allows you to not only charge the battery directly from your own photovoltaic system, but also offers additional battery charging from another AC power source\*, such as CHP, wind power or a solar system. What's more, the PLENTICORE can also be connected to an existing solar system on the AC side as a pure battery inverter\*.

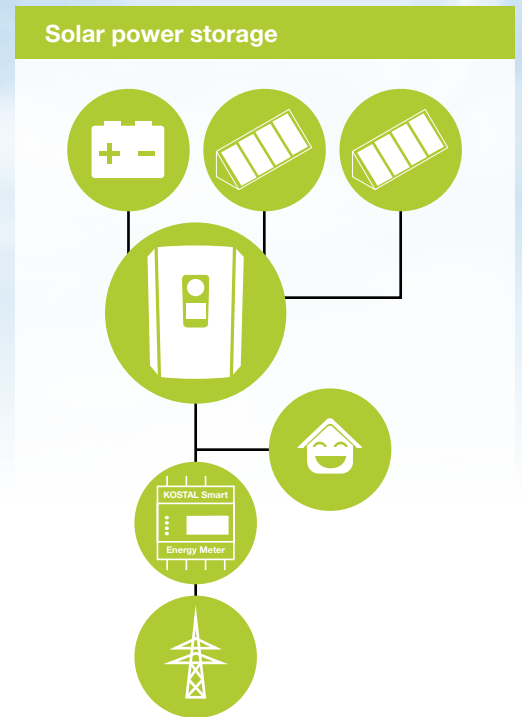
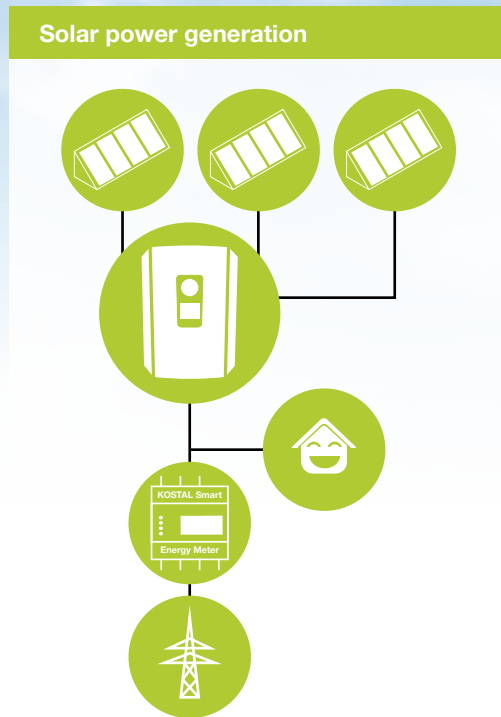


### Easy repowering

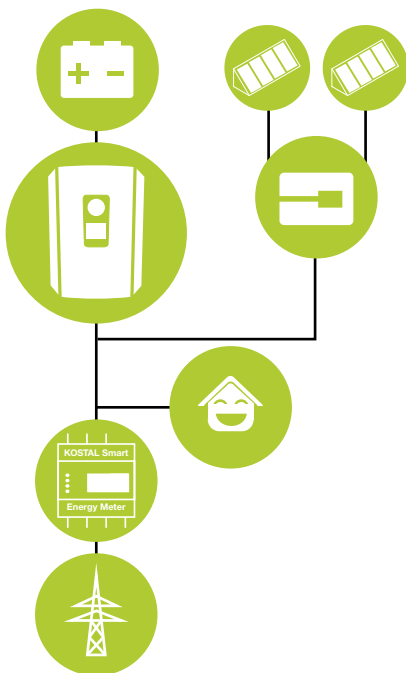
Thanks to its versatility (up to 3 PV inputs), the PLENTICORE plus is the perfect replacement for your old inverter.



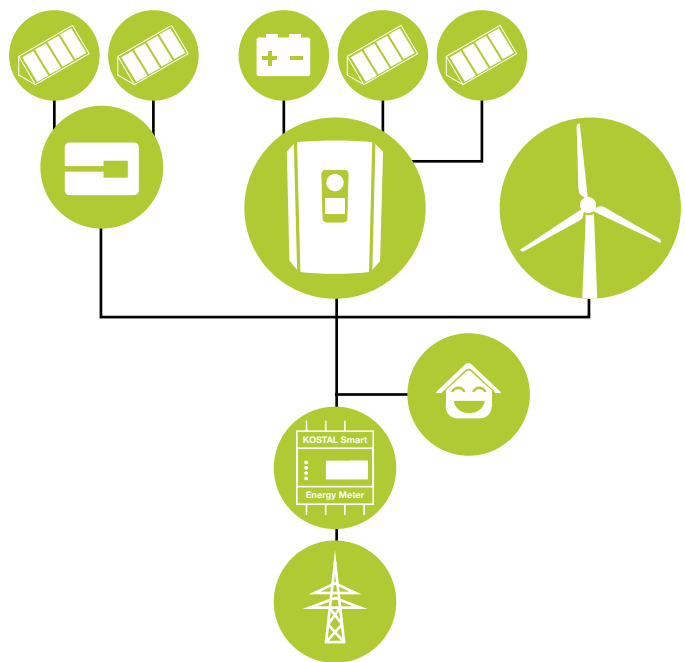
... So many options from just one device



### AC energy storage\*



### Store power from photovoltaics and AC power sources



\* available at a later date

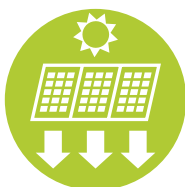
# PIKO MP plus – the 1-phase standard: combine with the KOSTAL Smart Energy Meter to produce a hybrid inverter\*



## An inverter for every PV system

The PIKO MP plus is extremely adaptable thanks to its power classes of between 1.5–4.6kW, making it ideally suited to small photovoltaic systems on detached homes, and ready for use with just three modules or more. The single-phase inverter delivers extremely stable yields and its wide input voltage range provides numerous wiring options for the PV modules.

Combined with the KOSTAL Smart Energy Meter, the PIKO MP plus is transformed from a pure solar inverter to a hybrid inverter\* and can be put to many different uses.



### Use photovoltaics to smartly generate power

The PIKO MP plus is ideally suited to small roofs and delivers the best yields with one or two MPP trackers.



### For greater energy self-sufficiency

The KOSTAL Smart Energy Meter can be used to connect a battery and therefore store energy.



### Storing energy the smart way

The PIKO MP plus can also be connected to an existing PV system on the AC side\*, where it is used to store energy.

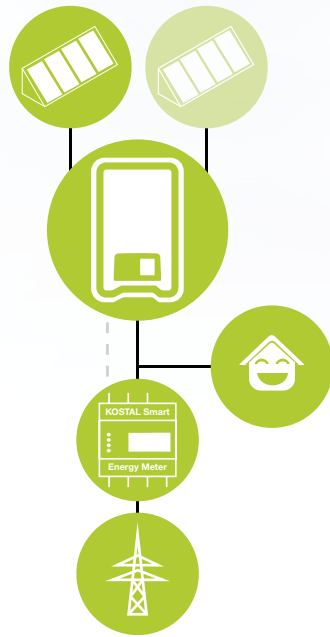


### Easy repowering

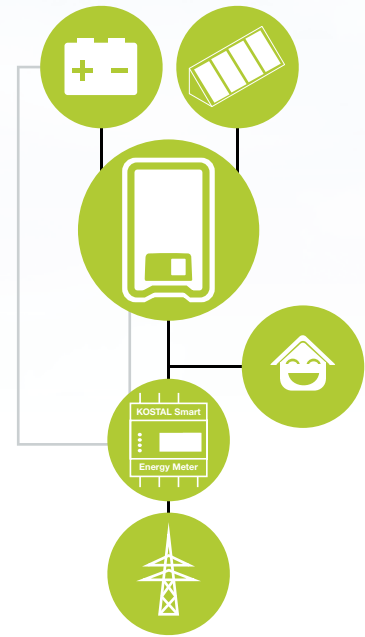
The numerous opportunities provided by a hybrid inverter make the PIKO MP plus the perfect replacement for your old single-phase inverter.

... Plenty of options for 1-phase usage too

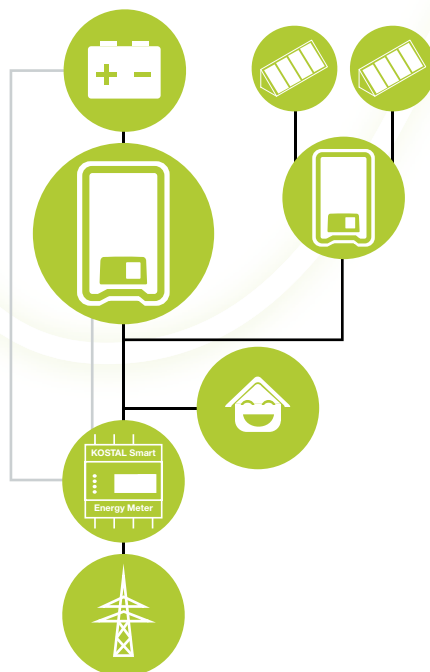
### Solar power generation



### Solar power storage\*

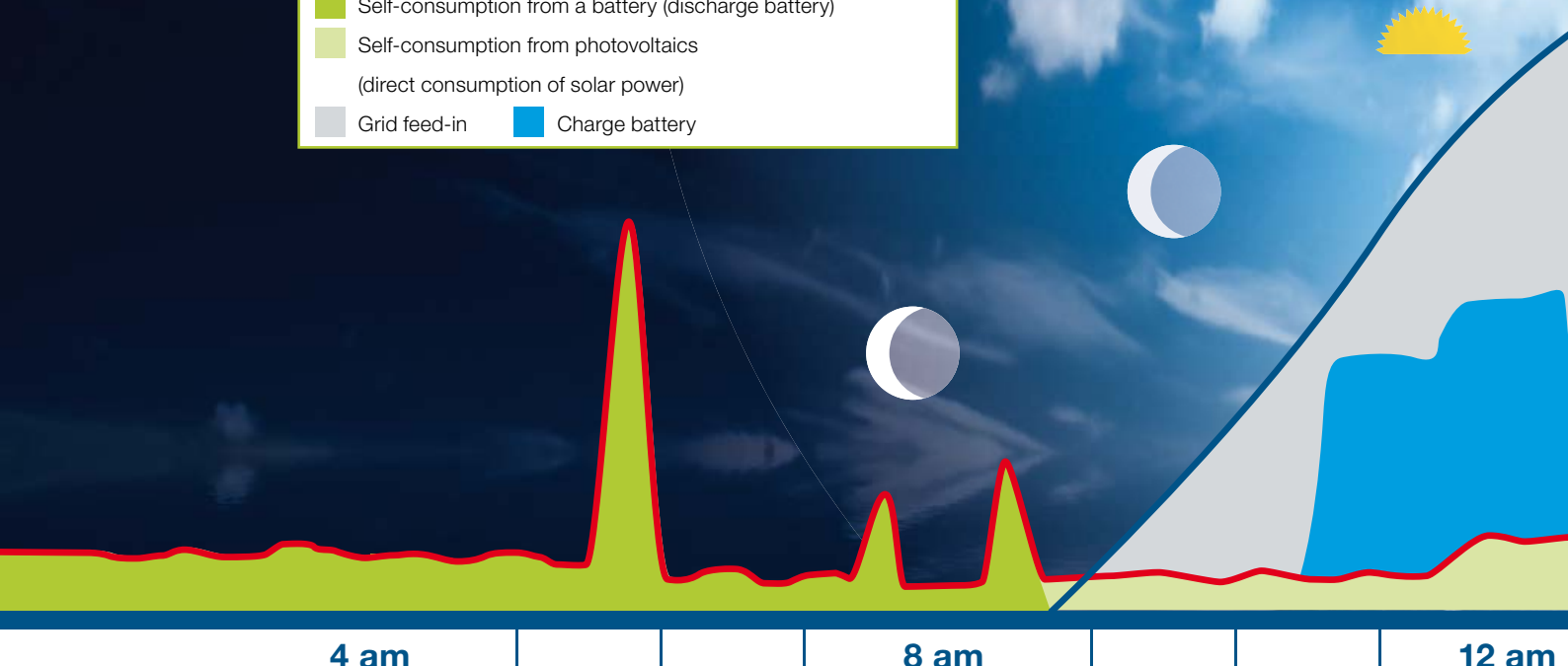
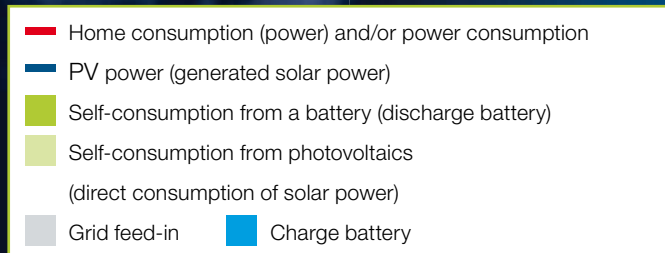


### AC energy storage\*



\* available at a later date via software update

# For greater energy self-sufficiency with hybrid inverters with battery storage – solar power around the clock



4 am

8 am

12 am

## Morning

When the sun comes up in the morning, the first solar power of the day is produced. So you can make your coffee from power you have generated yourself, for example. If you don't have enough power to do this, you can draw more from your battery or the grid.

## Mid-morning

When all occupants have left the house in the morning, the power not needed in the household is fed to the battery and saved there for the evening.

## What is energy self-sufficiency?

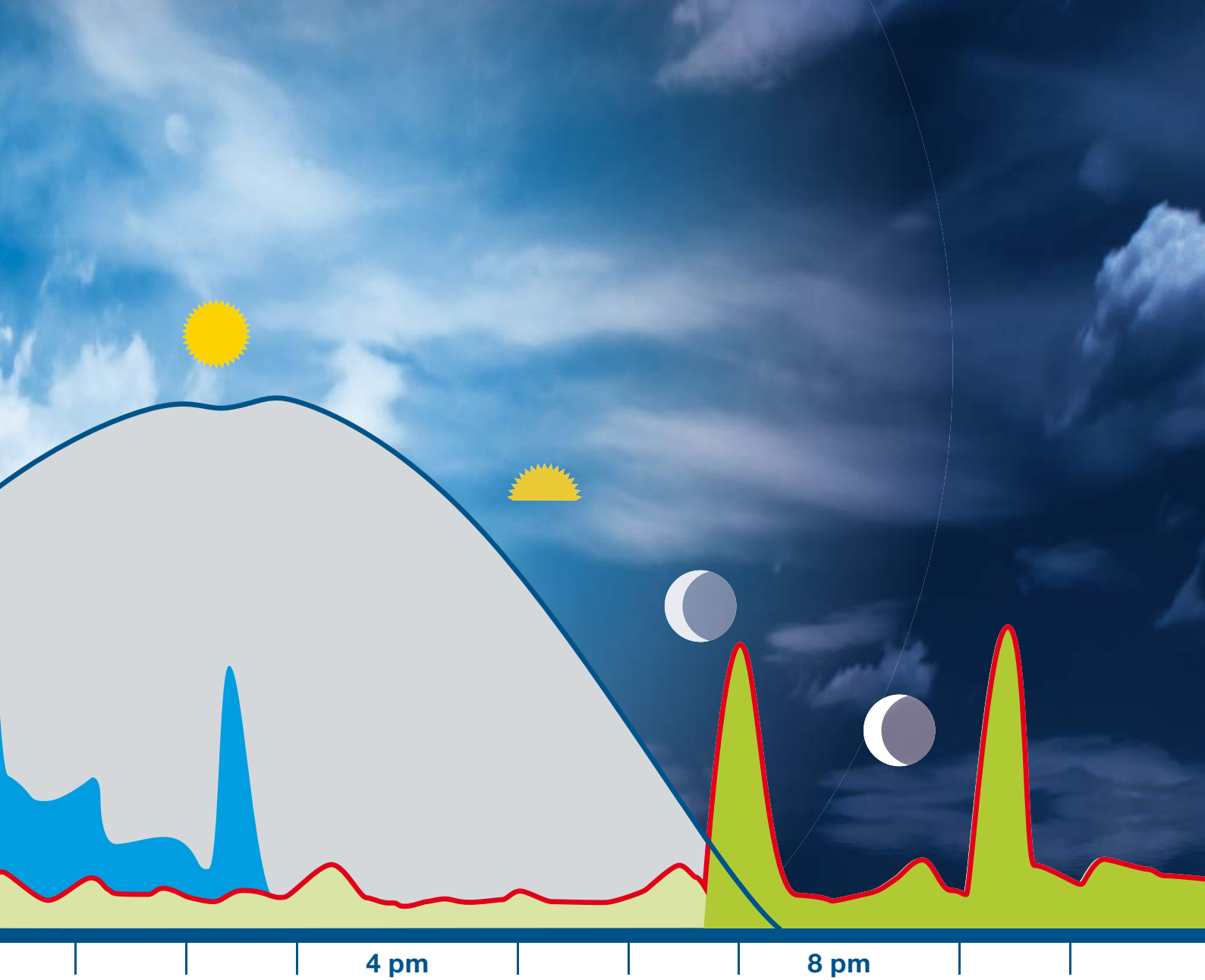
Energy self-sufficiency means supplying all your energy needs yourself so that you no longer have to purchase any power from the grid operator. By using a photovoltaic system and battery storage, you can increase your self-consumption and also use the energy you have generated yourself at night. This gives you independence from your energy provider. In this way, you can cover

up to 60% or more of your annual power requirement from a PV system (depending on your individual power consumption).

## What is self-consumption?

The energy generated by a photovoltaic system is first fed into the home network. This energy is used directly by consumers in the house (e.g. by electrical appliances). This is called self-consumption.





### Midday

At midday when a lot of solar power is being produced, the excess power, which can neither be used nor stored, is fed into the public power grid. This means that you also secure the legally guaranteed feed-in compensation for this solar electricity for the next 20 years.

### Afternoon

In the afternoon when a lot of power is being consumed, the increased demand can be covered by the power generated on your own roof, and at the same time by the power stored in your battery, fully automatically, without you having to do anything. Smart consumer management helps you to ensure a high self-consumption rate.

### Night

Only at night when no solar power can be produced and if the battery is empty does electricity need to be drawn from the public grid.

### What is feed-in management?

The mains grid operator often sets a feed-in restriction (e.g. restricting to 70% of the PV energy generated). If this is the case, the inverter first covers self-consumption and then reduces output to the maximum current feed-in permitted by the grid operator. In some countries, no photovoltaic power whatsoever may be fed into the grid.

This is called zero feed-in. And this can also be achieved with the PLENTICORE plus and the PIKO MP plus, meaning that the requirements of the grid operator are satisfied with ease.

# Smart diversity – the simple approach to your own PV system, yet the widest range imaginable

## **I'm interested in a photovoltaic system. But it is worth it on my roof?**

Since the PLENTICORE plus is available in five power classes between 4.2kW and 10kW, we have a perfectly matched solution for virtually every size of home. And it doesn't matter which way your roof faces – east-west, south or a combination of all directions – as the PV hybrid interchanger has up to 3 MPP trackers, allowing a wide range of roof types to be fitted with the solar modules most suited to their individual circumstances.

## **And what if my roof is only very small?**

If you have a small roof area, PIKO MP plus is also the right solution for you. Our single-phase inverters of between 1.5 and 4.6 kW are equipped with one or two MPP trackers, making them highly flexible. Thanks to its IP 65 protection class, the PIKO MP plus is suitable for outdoor use and can be operated both inside and out.



# ... for smart power generation

## **And what if some of my roof is in the shade?**

Thanks to the fast and self-learning shadow management function available with the PLENTICORE plus, which adapts individually to the installation site, high yields can be obtained despite shading. The PIKO MP plus also has shadow management, meaning that small PV systems can also generate good yields despite shading.

## **Can I add battery storage to my PV system at a later date?**

No problem, as a hybrid inverter the PLENTICORE plus has 3 MPP trackers, one of which can also be used as a battery connection at a later date.

And with the KOSTAL Smart Energy Meter, your PIKO MP can store electricity too\*.

## **Does this extra function not make the inverter more expensive?**

No, because you only pay for this add-on if you want it. And it's really easy to do, simply purchase the necessary activation code when you need it from our online shop.

## **What kind of battery do I need?**

The combination of BYD battery box H11.5 and PLENTICORE plus 5.5 is the most efficient storage system on the market. This was confirmed scientifically by the "2018 power storage system inspection" study undertaken by HTW Berlin. Thanks to the modular structure of the BYD battery box, this form of storage is also ideal in conjunction with the PIKO MP plus. But we are also qualifying an increasing number of other manufacturers, such as BMZ\*, so that you can select your own battery.

## **How can I optimise my self-consumption?**

The KOSTAL Smart Energy Meter permits optimum use of energy in the home thanks to its 3-phase energy measurement in real time and 24-hour home-consumption measurement. This enables you to optimise your self-consumption and significantly cut your electricity bills. Use the KOSTAL Smart Energy Meter in combination with the PIKO MP plus to make your inverter a hybrid one\*. The storage option allows you to increase your self-consumption. This smart energy meter is available as an accessory in our online shop.

## **Can I also incorporate my photovoltaic system into my Smart Home?**

Through various interfaces, such as EEBus or Sunspec, the PLENTICORE plus can also be integrated into a Smart Home, allowing you to increase your self-consumption and minimise energy costs. Using the smart consumption control feature, consumers in the house, such as the washing machine, can be switched on when there is surplus energy, e.g. at midday – this is done automatically or you can do it yourself at any time, even if you are not at home.

## **Smart partnerships, which connect**

**E-mobility:** innogy, Hardy Barth, Mennekes

### **Smart Home/energy management:**

Phoenix Contact, Loxone, TQ Group, MyPV, Kiwigrd, DAfi

### **Energy storage / cloud solution:**

Innogy, Mark-E, LichtBlick, BYD, BMZ\*, Varta, SolarWatt

**System monitoring:** Solarfox, smartblue, skytron, meteocontrol, PowerDog, Solare Datensysteme, Solytic

\*available at a later date via software update



Smart repowering –  
give your existing PV system a boost





### **I already have a PV system. What will I gain from replacing the inverter?**

Continual technical developments mean that new inverters are more efficient. So replacing your old inverter will deliver much higher yields. Do a quick check: go to [www.kostal-solar-repower-check.com](http://www.kostal-solar-repower-check.com) to find the right inverter for you.

### **The inverter (including those from other manufacturers) in my PV system has developed a defect after years of use. Can I upgrade to a KOSTAL hybrid inverter?**

Yes, given its flexibility and versatility, you can replace your old inverter with a KOSTAL hybrid inverter and you can even retrofit a battery at any time too. Simply purchase the activation code for this from our online shop. This will give you the option of retrofitting a battery once funding from the Renewable Energies Act is no longer available.

### **My roof is partially in the shade. So I'm automatically going to suffer from lost yield – even if I replace the inverter ...**

The PLENTICORE plus has a solution for this: using the smart and self-learning shadow management function, you can enjoy high yields despite shading.

If you've got a smaller PV system, some of which is shaded, you can use the PIKO MP plus because even the single-phase device has the shadow management function, so you can enjoy good yields even with small PV systems.

### **Will it cost me to convert the PV system when I replace the inverter?**

No, the new PLENTICORE plus is designed so flexibly that it can easily replace the existing inverter like for like in most cases. For example, it has an optimum voltage range, a huge variety of interfaces and is available in five power classes. You can connect between 5 and 22 PV modules per string. In a nutshell: the PLENTICORE plus is always the right match.

The inverter can be replaced with great ease even in small PV systems. The extended MPP range makes the PIKO MP plus ideal for repowering. What's more, its wide input voltage range provides numerous wiring options for the PV modules.

### **Do I need extra space for the device with a higher output?**

No, thanks to their compact design, the PLENTICORE plus and PIKO MP plus don't take up a lot of space and in fact require less room than previous generations of inverters.

### **In the past, I've not used batteries for storage, but now I want to increase my self-consumption ...**

This is easily done with the PLENTICORE plus. Alongside two PV inputs, the PV hybrid inverter has a combi input, which can be used as a battery connection too. You can retrofit a battery to smaller systems too: combined with the KOSTAL Smart Energy Meter, the PIKO MP plus with two MPP trackers provides efficient DC-coupling of high-voltage batteries\*. And all this can be retrofitted at any time – by simply buying an activation code from our online shop and thereby releasing the devices for the battery function.

\*available at a later date via software update

Smart energy –  
the perfect solution for  
all energy experts



# ... or people who want to become one

## **I already own a photovoltaic system. Now I want to add a battery to increase my self-consumption. Can I do that?**

Yes, thanks to the AC coupling on the PLENTICORE plus, not only can you extend your existing PV system, but also store energy from the old and new system in the battery, allowing you to easily increase your self-consumption.

You can however also connect the PIKO MP plus on the AC side\* as battery inverters and thereby simply add the ability to store power to your existing PV system. This option will soon also be available in another version of the PLENTICORE.

## **Could I also store the power from my combined heat and power (CHP) unit?**

Yes, the PLENTICORE plus allows you to store in the battery both photovoltaic power and also energy generated by a CHP. So you benefit from different sources of power, which complement one another perfectly and enable the best possible self-consumption.

## **And can I do all that with a combination of wind and photovoltaics?**

Yes, solar-wind hybrid systems combined with a battery storage system are very well suited to increasing self-consumption. The PLENTICORE plus can store both the energy from the PV system and from the wind turbine in the battery. You can become almost fully self-sufficient.

## **How can I further optimise my PV battery system?**

By activating consumers in a targeted fashion, there are many ways of increasing your self-consumption. For instance, you can use a heat pump or air-conditioning unit when the energy is available. This will enable you to maximise your self-consumption and lower your electricity bills. Alternatively, you can use solar power to charge your electric vehicle. A perfect add-on is a Smart Home solution, which controls your consumption smartly, saves energy and is also easy to operate.

## **And what if I don't want to feed any energy into the grid?**

That's also possible because you can reduce the PLENTICORE plus and PIKO MP plus down to a 0% grid feed-in. This allows you to tap into the benefits of solar power generation while also meeting the zero feed-in requirement of some countries.



\*available at a later date via software update



# Smart system monitoring – simple and versatile

## Where can I see the yield of my PV system?

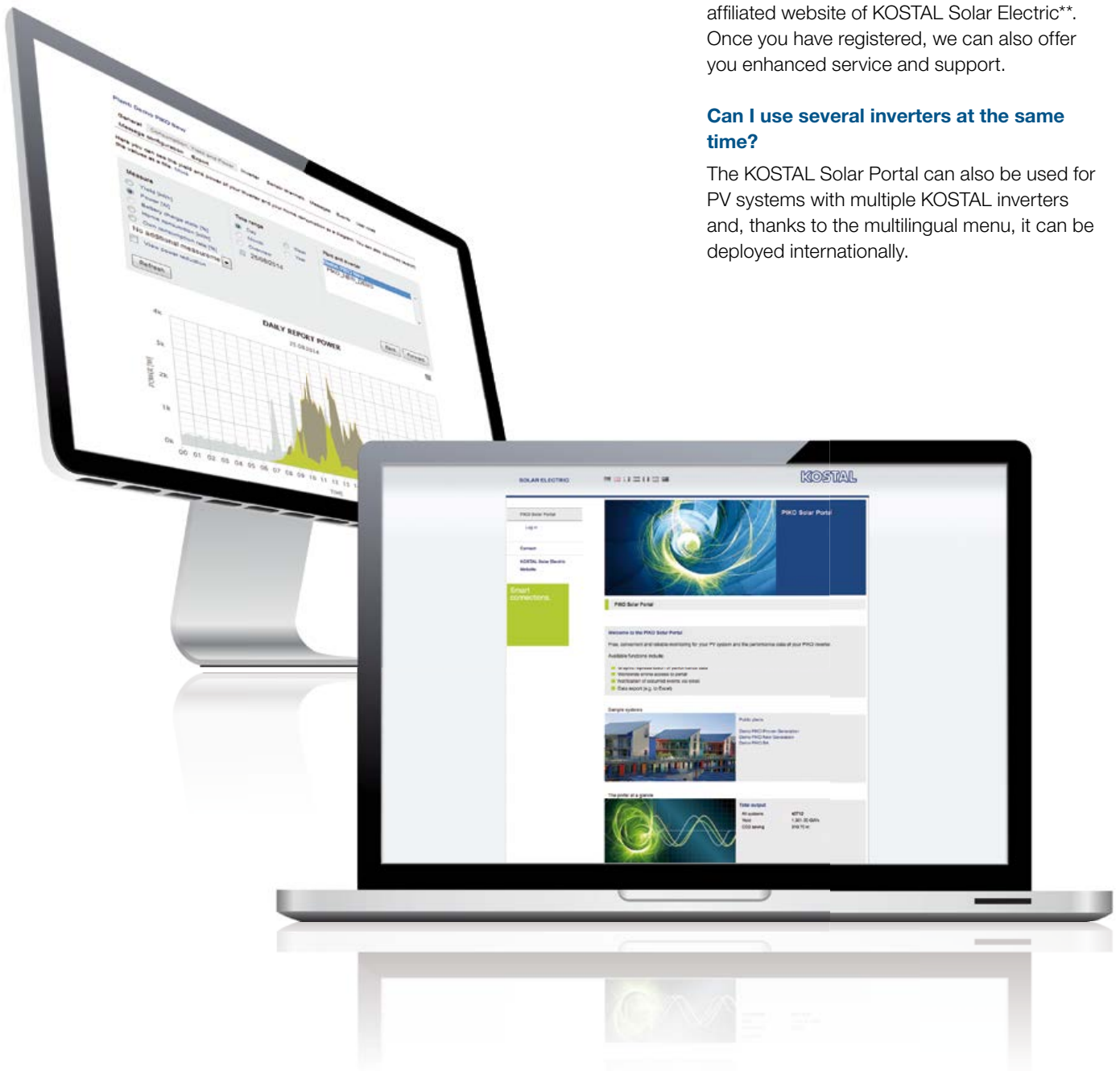
You can use the KOSTAL Solar Portal, KOSTAL Solar App or integrated Webserver to read off the yield of your PV system at any time. Find out how much electricity you are consuming at any given time of day and how much of the energy you need can be provided by your system.

## How do I stand to benefit from the KOSTAL Solar Portal?

Registering your PV system in the KOSTAL Solar Portal allows you to monitor it whenever and wherever you want. You can easily read off the DC single string power, system power and yield data from the graphic depiction. Home consumption\* (24h) is also displayed so you can optimise self-consumption. And it protects your investment in a PV system against yield loss, e.g. through active e-mail alerts of events. You can register for free via the affiliated website of KOSTAL Solar Electric\*\*. Once you have registered, we can also offer you enhanced service and support.

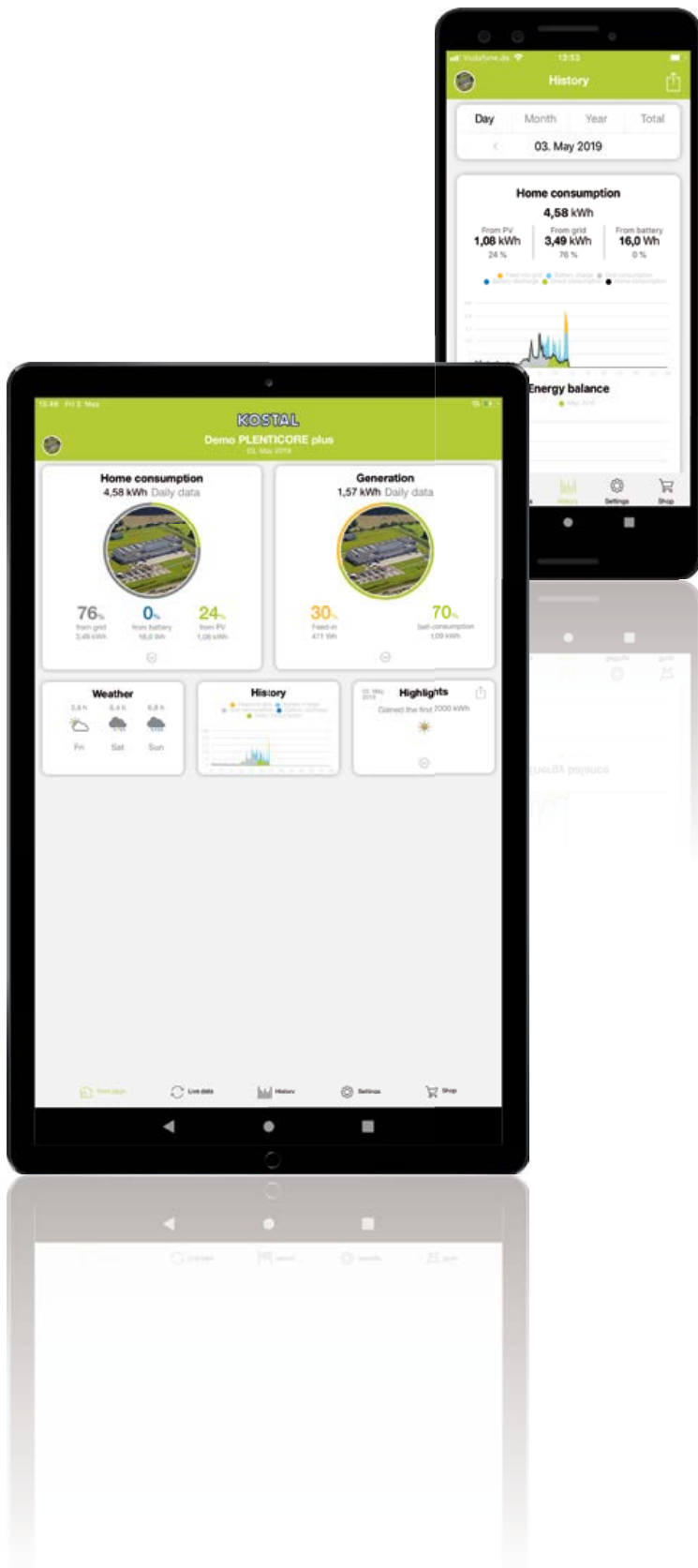
## Can I use several inverters at the same time?

The KOSTAL Solar Portal can also be used for PV systems with multiple KOSTAL inverters and, thanks to the multilingual menu, it can be deployed internationally.





# ... online, any time. Worldwide



## Can I receive the data on my smartphone or tablet?

The new KOSTAL Solar App makes the process of monitoring the yields from your photovoltaic system even easier, even more convenient and even smarter – and you do this on your smartphone or tablet no matter where you are.

It allows you to display the consumption and generation data over various time periods, such as day, week, month and year and to access the historical data of your system.

Complete PV monitoring from the KOSTAL Solar App allows you to see how much energy is stored in the battery and how much of the energy you are consuming is coming from PV and the battery, for example.

Have you not yet fitted a battery but are thinking about storage options? Then try out the virtual battery. Simply select your desired capacity and it will calculate an individual forecast for you. The app also provides an overview of how many kilometres you could drive an electric vehicle or how long a shower you could take using a heat pump run on the energy you have generated.

The free app is available for the Android and iOS operating systems.

## How does the Webserver work?

The Webserver integrated in every inverter informs you at a glance of the key system data, such as current performance data, daily and total yields and shows you your home consumption\*. What's more, inverter settings and adjustments, such as portal access or IP address, can be made simply and easily via a browser using a PC or tablet.

\* only in conjunction with an energy meter

\*\* [www.kostal-solar-portal.com](http://www.kostal-solar-portal.com)

# Do more with your system – with intelligent accessories

## What accessories are available for my PLENTICORE plus?

### ■ KOSTAL Smart Energy Meter

The KOSTAL Smart Energy Meter allows you to make optimum use of energy in your home. The energy meter takes 3-phase energy measurements in real time. It uses standard interfaces to transmit the measurement data and so efficiently supports the energy management of our PLENTICORE plus with the overall goal of maximising solar self-consumption.

### ■ Activation code

You can use the “Battery” activation code to release your PLENTICORE plus PV hybrid inverter for use with a battery such as the BYD battery box H. We are adding qualified manufacturers to our list all the time.

## Is this accessory available for my PIKO MP plus too?

### ■ KOSTAL Smart Energy Meter

When combined with the PIKO MP plus, the KOSTAL Smart Energy Meter can do even more. As well as optimum energy use in your home, the smart energy meter allows you to use your single-phase inverter to store solar energy\* too. You can either store the solar energy produced directly in a battery\* or you can connect your PIKO MP plus to an existing PV system on the AC side\*.

One of the major benefits of the KOSTAL Smart Energy Meter is that it is pre-configured for the PLENTICORE plus and PIKO MP plus as standard. So direct installation is possible without the need to adapt parameters or undertake other settings.

### ■ Activation code\*

If used in combination with the KOSTAL Smart Energy Meter, you can enter an activation code so that your PIKO MP plus can store electricity too, thereby increasing your self-consumption.

## And where can I get the accessories from?

You can easily order accessories, like the KOSTAL Smart Energy Meter or activation code for the battery, from our online shop\*\*.



\* available at a later date via software update

\*\* [shop.kostal-solar-electric.com](http://shop.kostal-solar-electric.com)

# KOSTAL service – Guaranteed. Tailor-made. Keeping the customer satisfied.

## How long is the warranty for the key part of the PV system?

The statutory warranty is 2 years. But you can benefit from our Smart Warranty: By registering with our online shop\*\*, you get a free extension to 5 years of warranty. You can also buy a warranty extension for 5, 10 or 15 years.

## Do I have to regularly update my inverter?

If your KOSTAL inverter is registered with the KOSTAL Solar Portal and the auto update function is activated, with PLENTICORE plus you can benefit from automatic updates\*. Your PLENTICORE plus is then always up-to-date without you having to do a single thing.

## And what if something goes wrong?

Each inverter is a quality product manufactured within the KOSTAL Group and subject to the same strict quality standards as, for example, our products for the automotive industry. Our hybrid inverters come with comprehensive warranties and services. So take service literally, give us a call!

KOSTAL service employees are available by phone and can answer all your questions before and after your purchase, for example:



You can reach the KOSTAL service hotline on:

**Telephone +49 761 47744-222**

(Mon.–Fri. from 8:00 a.m. to 5:00 p.m.) or by

e-mail at **service-solar@kostal.com**

You can send us queries or messages at any time, even outside hotline operating hours, using the service portal at

**www.kostal-solar-electric.com/service-support**. Queries are treated as a priority.

## 5 steps to receiving KOSTAL Smart Warranty – it's simple:

- 1 Log into your user account
- 2 Select KOSTAL Smart Warranty
- 3 Enter serial number, date of purchase, system data and system location
- 4 Add KOSTAL Smart Warranty to your basket
- 5 Confirm and receive your free 5-year extended warranty



- General technical advice
- Support with system planning using the KOSTAL Solar Plan configuration software
- Adaptation of grid parameters using the PARAKO software / with the integrated Webserver
- Help with start-up
- Support with system analysis
- Advice on configuring system monitoring
- Warranty processing

If you want even faster service, there will soon also be the option of allowing our service team to access your PLENTICORE plus remotely once you have given your consent for this (Remote Support)\*.

More information is available at:

[www.kostal-solar-electric.com/service-support](http://www.kostal-solar-electric.com/service-support)

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