EU-SOLAR

Napelem optimalizálás dilemma

www.eu-solar.hu

Growart mérete és súlya harmada a versenytársakhoz képest

- Fronius,
- ABB,
- SolarEdge
- JFY-Tech (AstraSun)

Elektronikában a kis méret a fejlettséget jelenti

CEO & Co founder @ EU-SOLAR Ltd.

Fronius vs Growatt (3kW)

Like • Comment • Share • 52 24

Show previous comments

Omer Kaya size doesnt matter. 28d
Like

Ken Zhang which one is better? 28d
Like

PRADEEP SRIKANTHAN hi Andras, Can you explain why is there a difference in size and what is the advantage with Fronius. 27d
Like

MJ Joshi pl share more information on mjjoshi@hotmail.com 27d
Like • 1

Lucy -Zhong pl share more information on lucy@wanhos.com tks 27d
Like

Elöd Albert It is really very handy. In service case this Growatt could definitely be dismounted with more convenience compared to older Growatt models and … show more 26d
Like

Rajan Jariwala hey there,please share on rajan@khanaksystem.com. 26d
Like

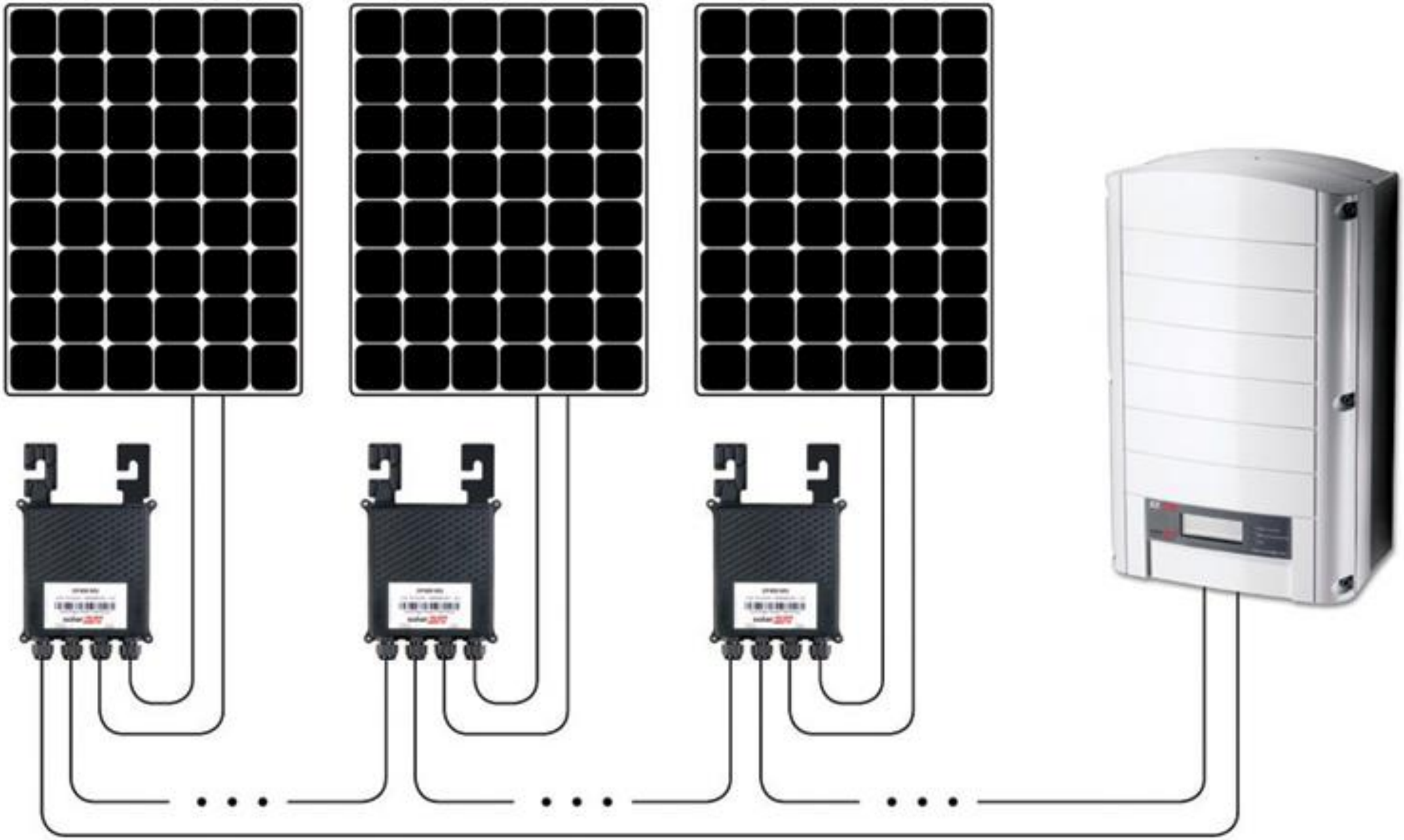
Gerald Schmitt The Fronius Inverter is IP 66 and uses Snap-In technology which gives you the possibility to replace the complete unit by only loosening 6 screw… show more 25d

https://www.linkedin.com/hp/update/6125444098867363840

A GROWATT

25%-al többet termel mint a bármely napelemes optimalizáló

SolarEdge System



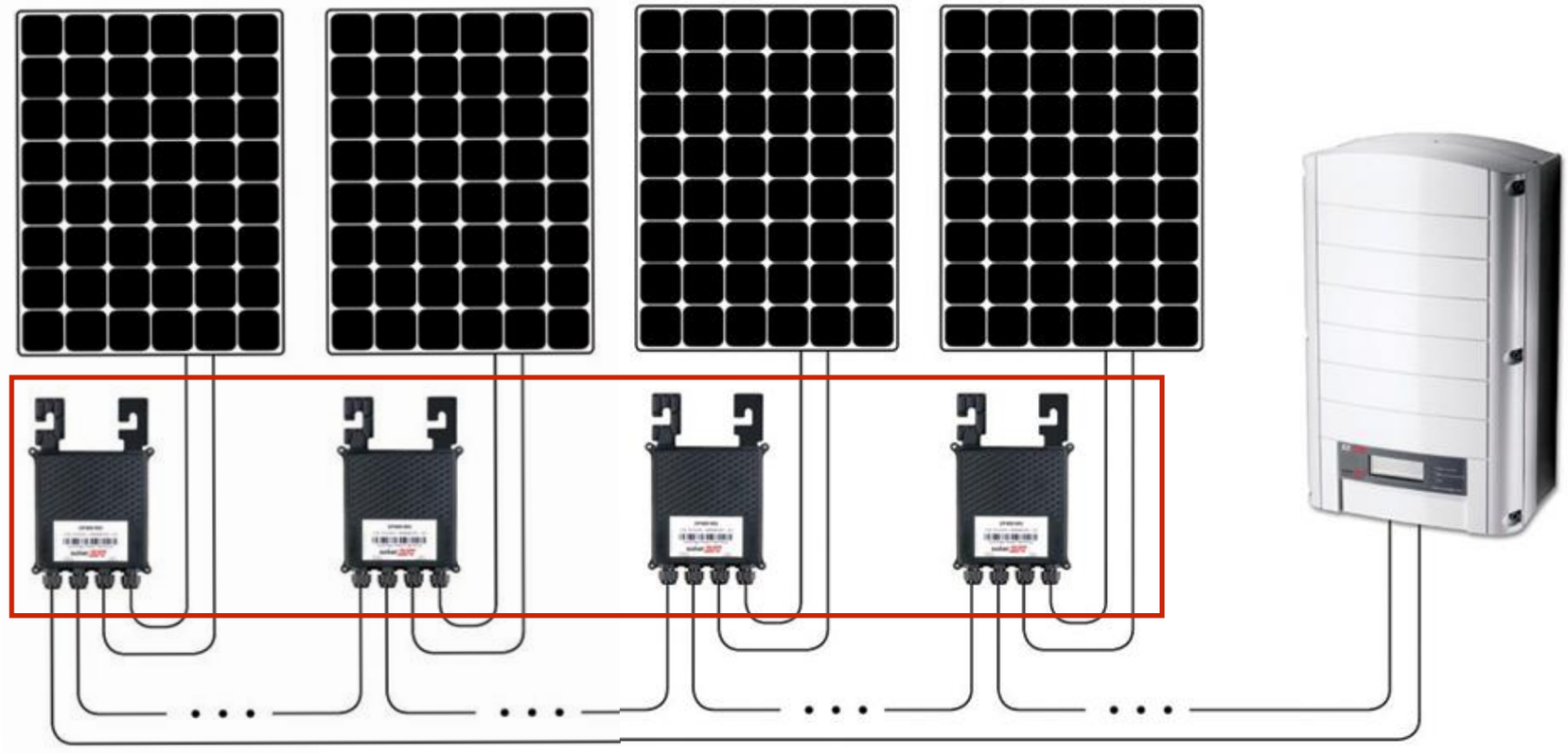
Power Optimizer

Inverter


TO INSTALL [PRESS HERE]
TO REMOVE-TURN 1/4 TURN SCREWDRIVER IN EACH HOLE
ZEP COMPATIBLE
ZEP COMPATIBLE
Do not disconnect
09/21/11 12:23 144522
AmerSol by AmerCable TUV PV1-F 1 X 6

Solar Edge system

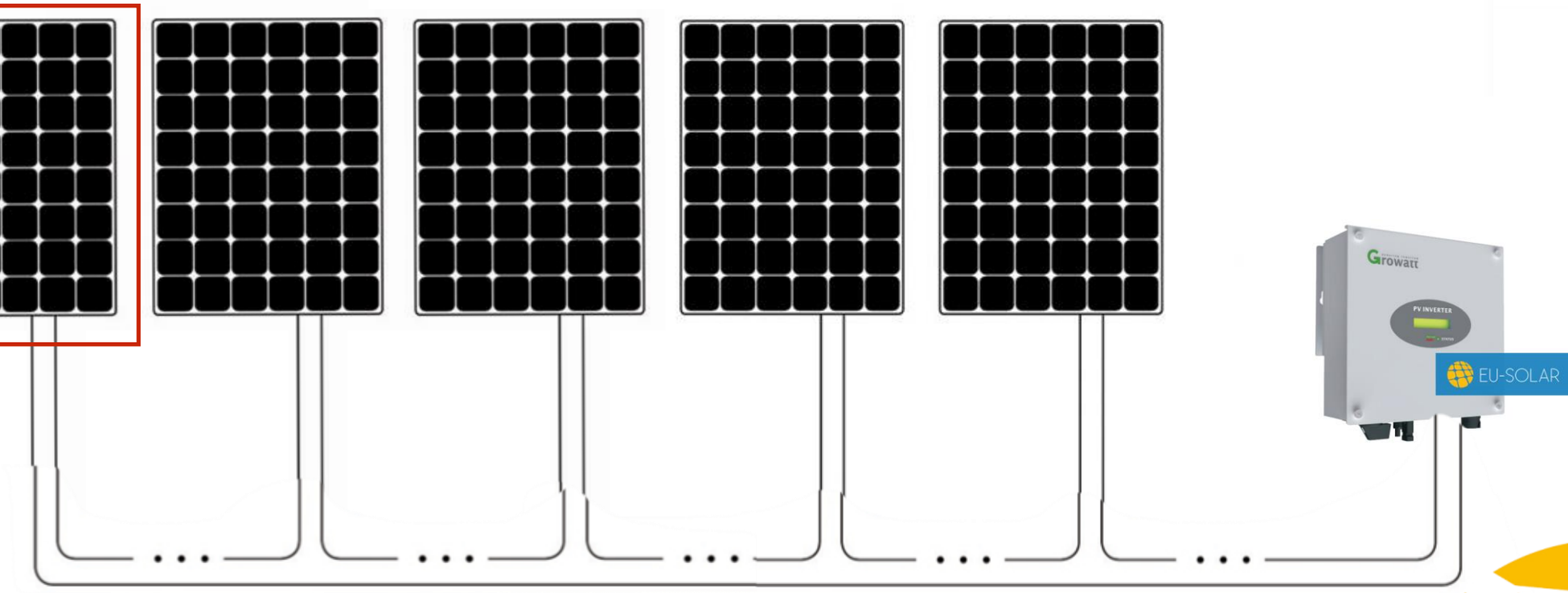
optimalizáló
4x12000.-Ft



Growatt system

+25% hozam?

1 db napelem
40000.-Ft



Napelemenkénti optimalizálás

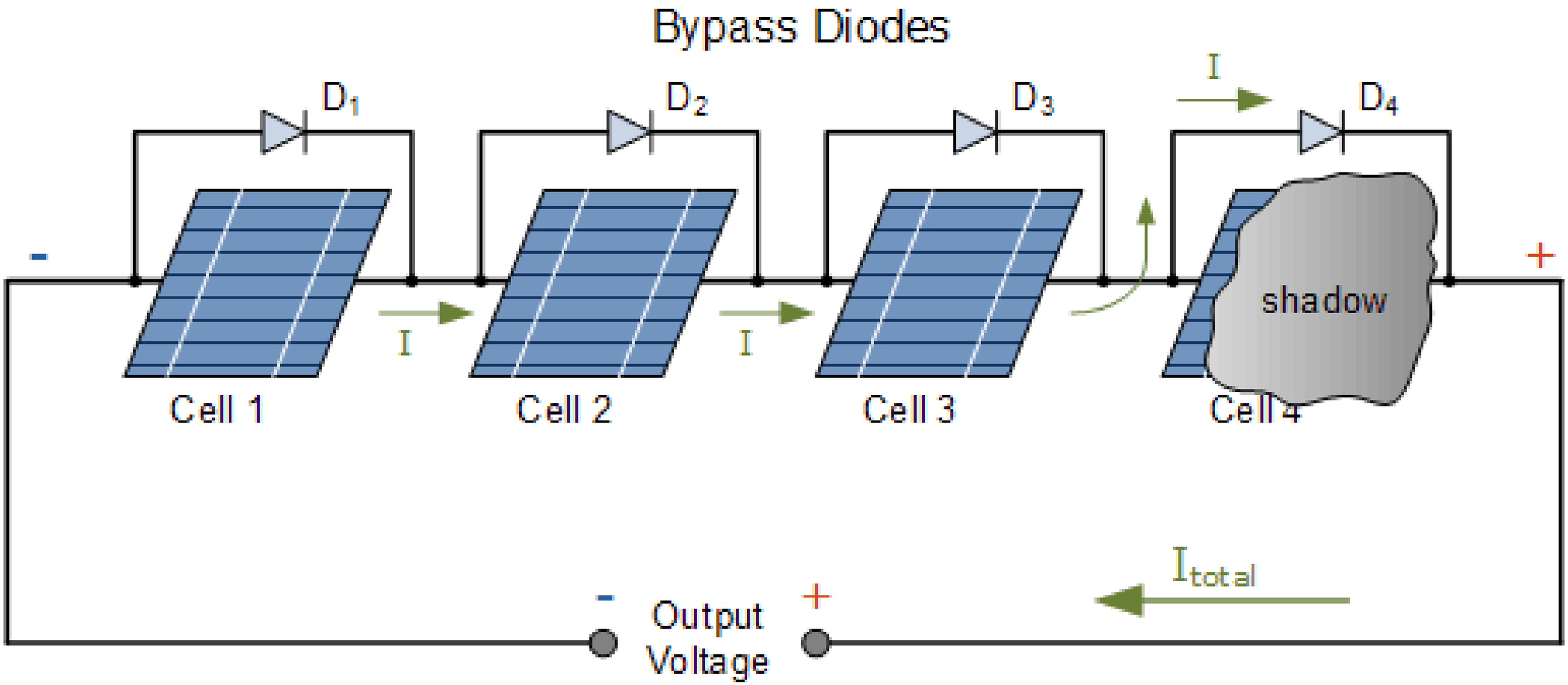
Meg kell érteni hozzá a napelemek és a bypass diódák működését

Napelem panelekbe épített Bypass dióda működése

EU-SOLAR

1. Példa
Vertikálisan telepített napelem modulok

A nap mozgása hatására az árnyék változása a modulokon


Bypass Diodes
D1
D2
D3
D4
I
I
I
I
-
+
shadow
Cell 1
Cell 2
Cell 3
Cell 4
Itotal
-
+
Output
Voltage

Optimalizáló

39 Euró / napelem

39 Ft / napelem

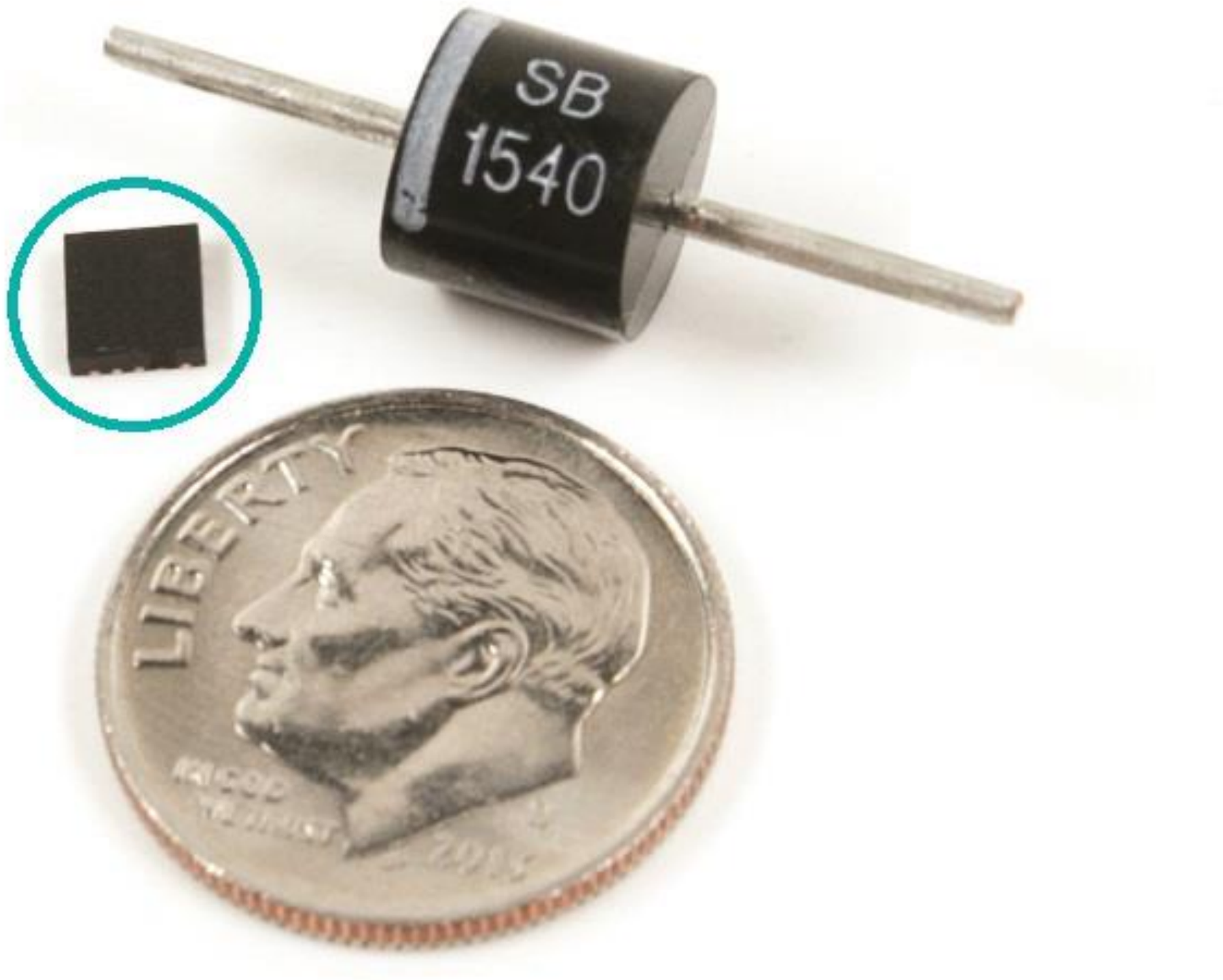
Az a terv, hogy minden elromlik!

Ki szeretne, tetőn, napelem alatt, garanciával, elektronikát cserélni?

Borítékolható a csőd!

Új megoldások az Optimalizálásban

maxim IC



Az EU-Solar trükkje

1. SZABÁLY:

NEM TELEPÍTÜNK ÁRNYÉKBA NAPELEMET!

A napelemnek napra van szüksége, hogy termeljen!

Fontosabb az inverter hatásfoka

A Growattnak bizonyítottan az egyik legmagasabb a hatásfoka a piacon!

A star is born?

Despite a few flaws, the 5000TL from China's Growatt New Energy can hold its own against many European devices

Highlights

- The Growatt 5000TL is a single-phase transformerless inverter with a DC nominal power of 4,800 W
- The device's MPP range stretches from 280 to 500 V
- Its maximum conversion efficiency is 97.7 percent, while its European efficiency is 97.1 percent and its Californian efficiency is 97.4 percent
- The inverter's PHOTON efficiency for medium irradiation is 96 percent; its PHOTON efficiency at high irradiation is 96.8 percent

Just last month, we published the results of PHOTON Laboratory's tests of a promising new inverter from Chinese manufacturer Sungrow – the SG4KTL (see PI 1/2011, p. 118). But that device is already being forced to make way for a new challenger from the East. The 5000TL, made by Shenzhen, China-based Zhejiang Growatt New Energy Co. Ltd., which was founded less than a year ago, performs well at latitudes with medium irradiation levels and even better at higher irradiation levels. But the numbers don't tell the full story – PHOTON Lab discovered a few problems during testing.

First off, after signing the usual test agreement with the manufacturer, the lab had to place significant limitations on the candidate's voltage range in order to produce usable results without running the risk of an overload. Moreover, Growatt's specifications for this single-phase inverter are somewhat confusing: the data in the accompanying manual differ from the information on the device's type plate – and both differ from the values listed on the company's website. For example, PHOTON Lab discovered inconsistencies related to the unit's weight and nominal power on both the DC and AC sides.

After contacting the company in China, the lab was told to use the figures on Growatt's website, which were the most-recently updated versions. Apparently, the datasheets included with the inverters were not properly matched with the different versions of the device available in various markets.

The manufacturer has already announced the release of a slightly revised version of the 5000TL, with new software but an identical internal structure.

Construction

The 5000TL is part of an inverter range designed by Growatt for the European market, with AC nominal powers of 1,600 to 4,600 W. All of these devices are transformerless. The test candidate's design is very clean and appears easy to manufacture, and its housing makes a good impression. However, the cover is a bit difficult to mount.

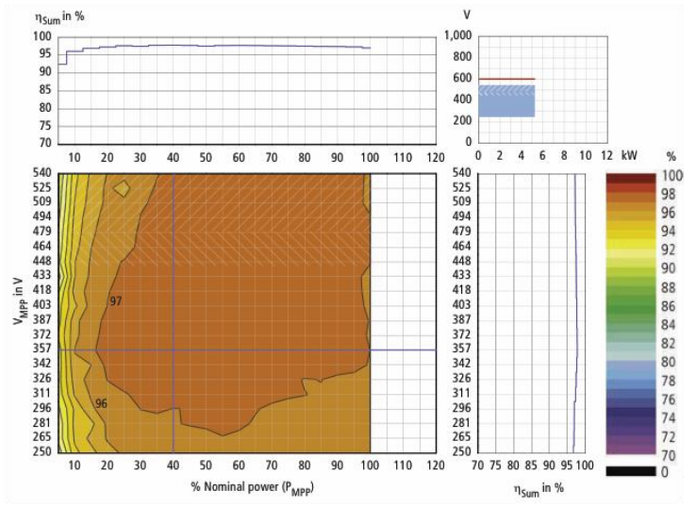
The power circuit board is located in the middle of the housing, below the control circuit board. The latter holds a small display circuit board. Three molded chokes are mounted on the cooling element to the right of the power circuit board. The power semiconductors are fitted in a discrete housing and soldered to the bottom of the circuit board, then clamped to the large cooling element, which also serves as the device's mounting platform. The 5000TL exclusively uses passive cooling; the housing consists of a cooling element and a sheet steel frame. The inverter has an IP 65 protection

▲ ▶ ▼ Clean and simple: The Growatt 5000TL's straightforward design makes it easy to manufacture. Thermographic imaging shows component temperatures reaching 125 °C on the circuit board; although this is an acceptable temperature, it

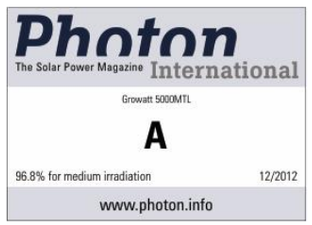
photon-pictures.com (2)

Growatt 5000MTL

▲ Growatt has considerably improved its two-tracker device, the 5000MTL, by deploying new firmware.



▲ The conversion efficiency curve, which has also improved, and the very good MPP tracking result in an overall efficiency that totals 97 percent or more over a large area of the power and voltage range.



The original test report for the Growatt 5000MTL was published in PHOTON International this summer (see PI 7/2012, p. 98). After a few initial problems due to a defect, this transformerless, single-phase device with a nominal DC capacity of 5.2 kW delivered a perfectly acceptable performance. Its PHOTON efficiency of 96.2 percent for medium irradiation translated into a »B«, and when weighted for high irradiation, its 96.8 percent was enough to earn it an »A.« However, even before the test report appeared (the test itself was carried out at the start of the year), Growatt implemented a substantial improvement. The 5000MTL has been equipped with new firmware since February 2012. According to the manufacturer, the hardware has not been modified, and PHOTON Lab was also unable to identify any changes. A device with the new operating software, S.2.1, underwent testing again (another software for the display, S.1.8, remained unchanged), and this time a double »A« emerged: 96.8 percent for medium irradiation and 97.1 percent for high irradiation.

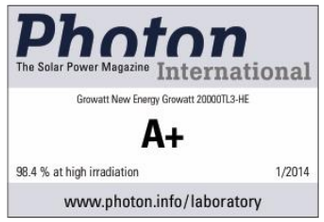
A multi-tracker device like the 5000MTL can be run in several different operating modes: with the MPP trackers under symmetric or asymmetric load, or with the trackers connected in parallel. The inverter is, however, only graded according to symmetric load. The most important factor in its improvement is that the development of the conversion efficiency is significantly more harmonious under the new firmware, and above all the interplay of the two trackers has improved. The MPPT adjustment efficiency is, apart from a few barely perceptible exceptions, consistently above 99 percent. A slight improvement can also be observed under asymmetric load. The older firmware did not give any cause for criticism when the trackers were connected in parallel.

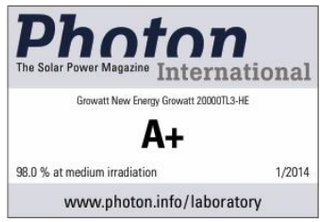
There is also one small change to the MPP voltage range specified by the manufacturer, which now spans 250 to 540 V instead of 250 to 550 V. The distance to the maximum DC voltage of 600 V is therefore still far too small, and, even with crystalline modules, only the MPP voltage range of up to around 475 V can be utilized without limitations. ● hn, js

Further information

The full test results of the Growatt 5000MTL using firmware 5.2.0 were published in the PDF version of the July issue (see PI 7/2012, p. 198).

Contacts page 201





Pushed to new heights

A 20 kW device made by Growatt, the 20000TL3-HE, is only the second inverter tested by PHOTON Lab to achieve a conversion efficiency higher than 99 percent. The device scores third place overall, even without silicon carbide transistors

Text: Heinz Neuenstein, Anne Kreutzmann

Highlights

- The 20000TL3-HE is a 20 kW transformerless inverter featuring three-phase feed-in and one MPP tracker
- The device reaches a conversion efficiency of 99.02 percent – the second-highest value ever measured by PHOTON Lab. Its PHOTON efficiency for medium irradiation totals 98.0 percent, which scores it an »A+« and third place in the PHOTON ranking
- There are still a few weaknesses when it comes to MPP tracking at low voltages and high powers. New firmware should be able to rectify this and could push the 20000TL3-HE even higher up the rankings

When combing through the PHOTON database for all inverters currently available on the market worldwide, only isolated devices can be found whose manufacturers promise a conversion efficiency of 99 percent or higher. Spanish manufacturer Jema Energy SA, for example, specifies 99 percent for its IF-225 TL plus, a 275 kW central inverter. In the category comprised of lower capacities, this issue's test candidate, the 20000TL3-HE made by Growatt, is the only device whose manufacturer promises 99 percent. This device was given to the PHOTON Laboratory in October 2013, and the obligatory test agreement was signed.

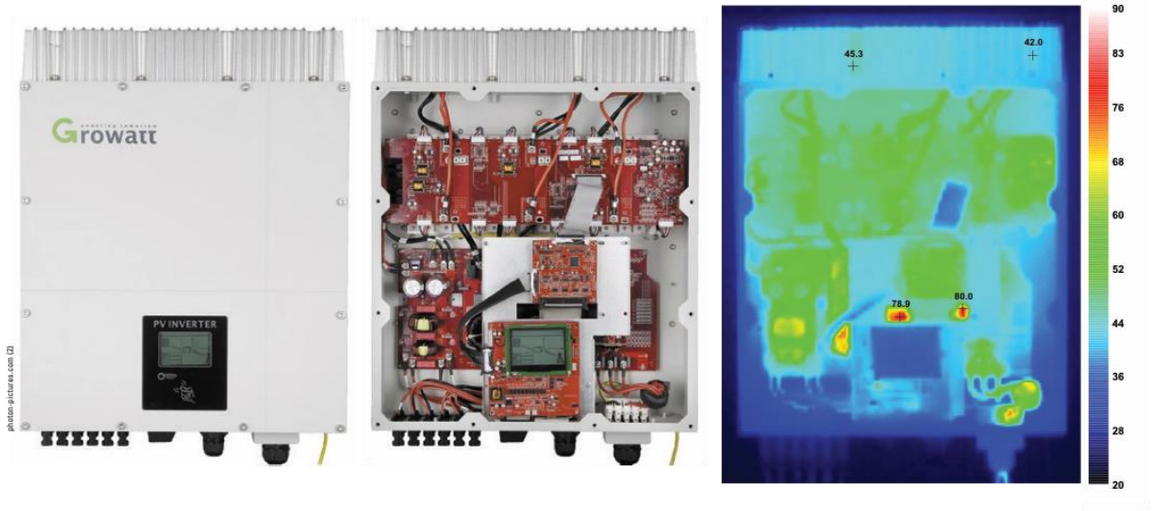
The 99-percent mark was broken for the first time a few years ago by the Sunny Tripower STP 20000TLHE-10, for which its manufacturer, SMA Solar Technology AG, specified 98.5 percent (see PI 12/2011, p. 140). However, the SMA inverter made it to 99.15 percent only after the reverse current diodes had been deactivated – when the protective diodes were operating, its efficiency was slightly below 99 percent. Furthermore, SMA used silicon carbide transistors, while Growatt manages without utilizing this silver bullet.

Of course, very good conversion efficiency is, on its own, not an adequate criterion for judging what is a very good inverter overall. Being able to break the 99-percent mark, however, shows that the manufacturer is playing in the technological major league.

Construction

The 20000TL3-HE is one of two three-phase transformerless devices in the HE family (HE stands for »High Efficiency«). Along with the inverter tested for this report, with its nominal AC capacity of 20,000 W, there is a slightly smaller 18,000 W device in the series.

The construction of the 20000TL3-HE is highly compact and production-friendly. The power element is housed on three circuit boards, two on the lower level directly on the cooling element, and one on the second level. This level is also where the control and communication circuit boards are installed, with



Nem önvallomás!

Photon Laboratórium is igazolta

Magasabb hatásfok gyorsabb megtérülés

Inverter test results

Inverter	Observed voltage range*1	Medium irradiation eta$_{Pmed}$	Grade as of 2011	Grade before 2011	Position	High irradiation eta$_{Phigh}$	Grade as of 2011	Grade before 2011	Position	PI issue
SMA's STP 20000TLHE-10*3	580 - 800 V	98,5 %	A+	–	1	98,6 %	A+	–	1	12/2011
Growatt's 20000TL3-HE revised	580 - 800 V	98,4 %	A+	–	2	98,5 %	A+	–	2	6/2014
Refusol's 020k SCI	490 - 800 V	98,2 %	A+	–	3	98,3 %	A+	–	4	7/2012
Growatt's 20000TL3-HE	580 - 800 V	98,0 %	A+	–	4	98,4 %	A+	–	3	1/2014

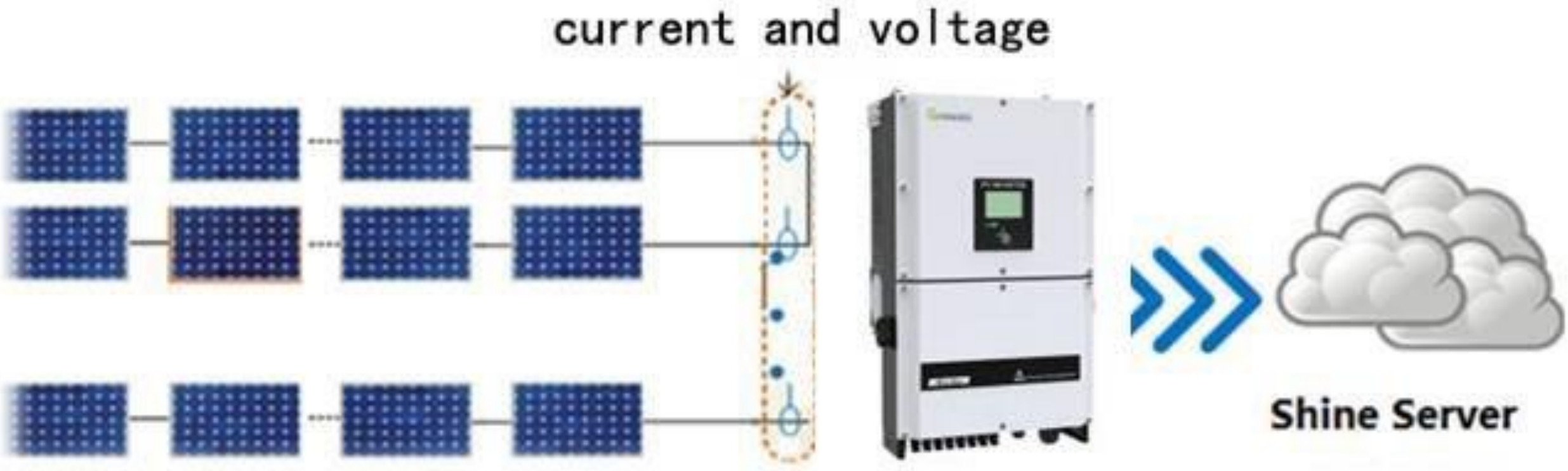
*3 kereskedelmi forgalomban nem kapható!

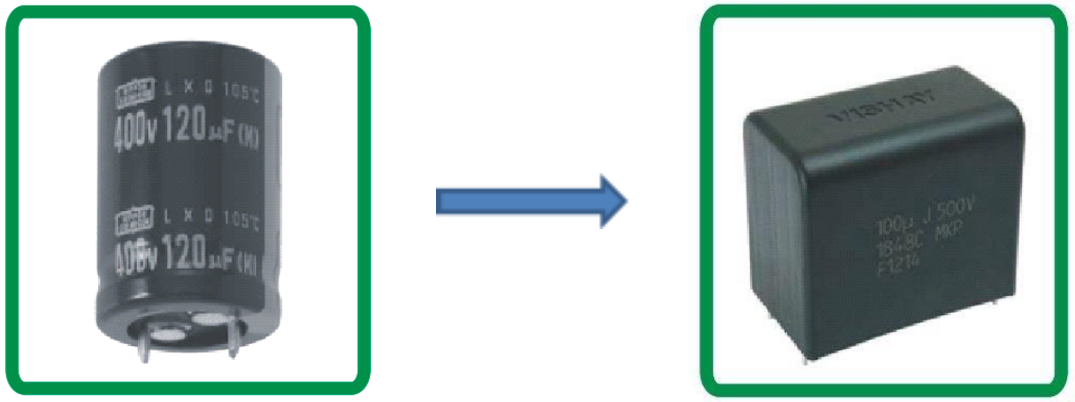
Photon
The Solar Power Magazine International
Growatt New Energy Growatt 20000TL3-HE
A+
98.0 % at medium irradiation 1/2014
www.photon.info/laboratory

Ne vegyen olyan Invertert amit a független Photon laboratórium nem tesztelt!

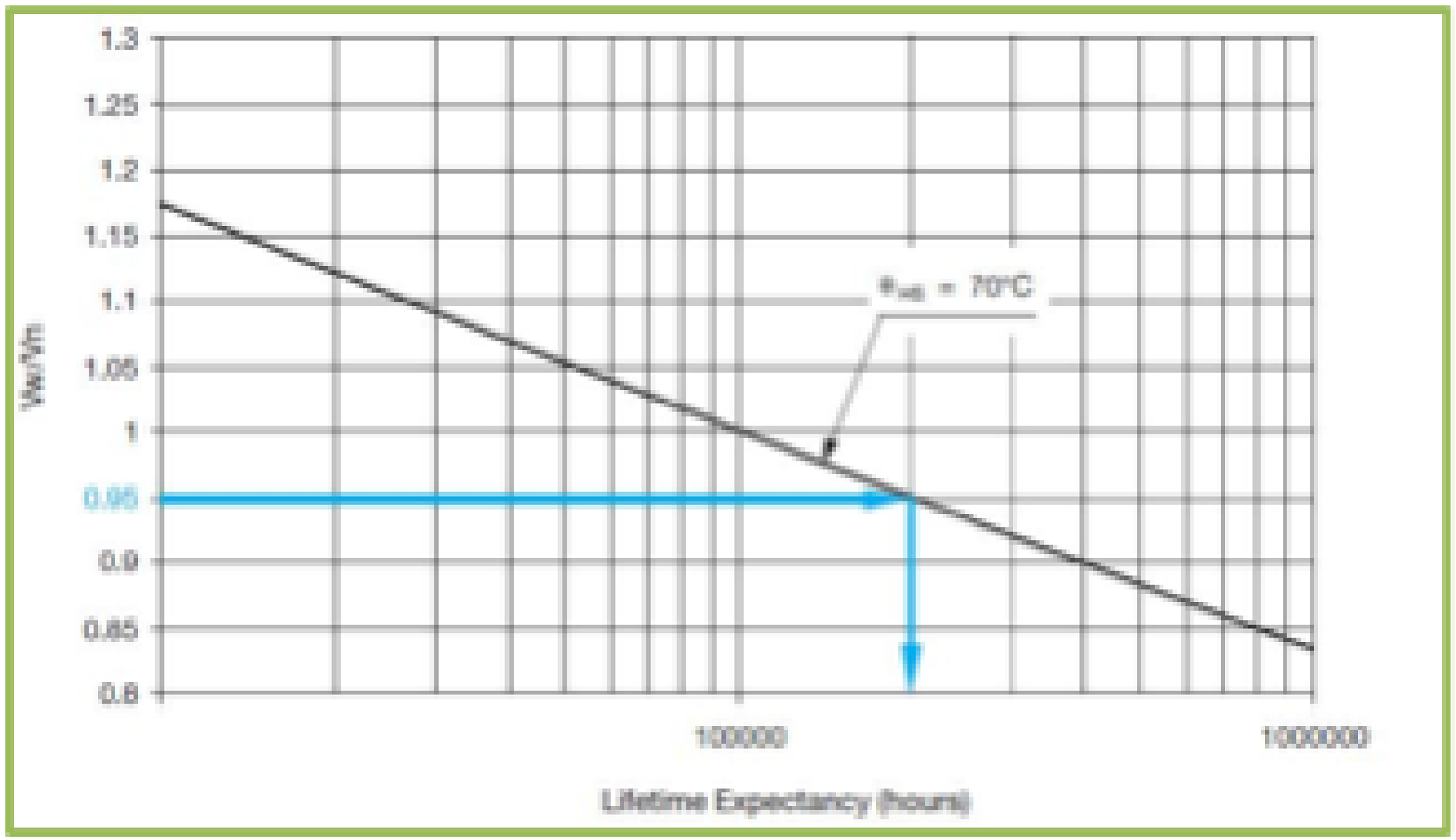
Korszerű inverter felépítése

Sztring monitoring



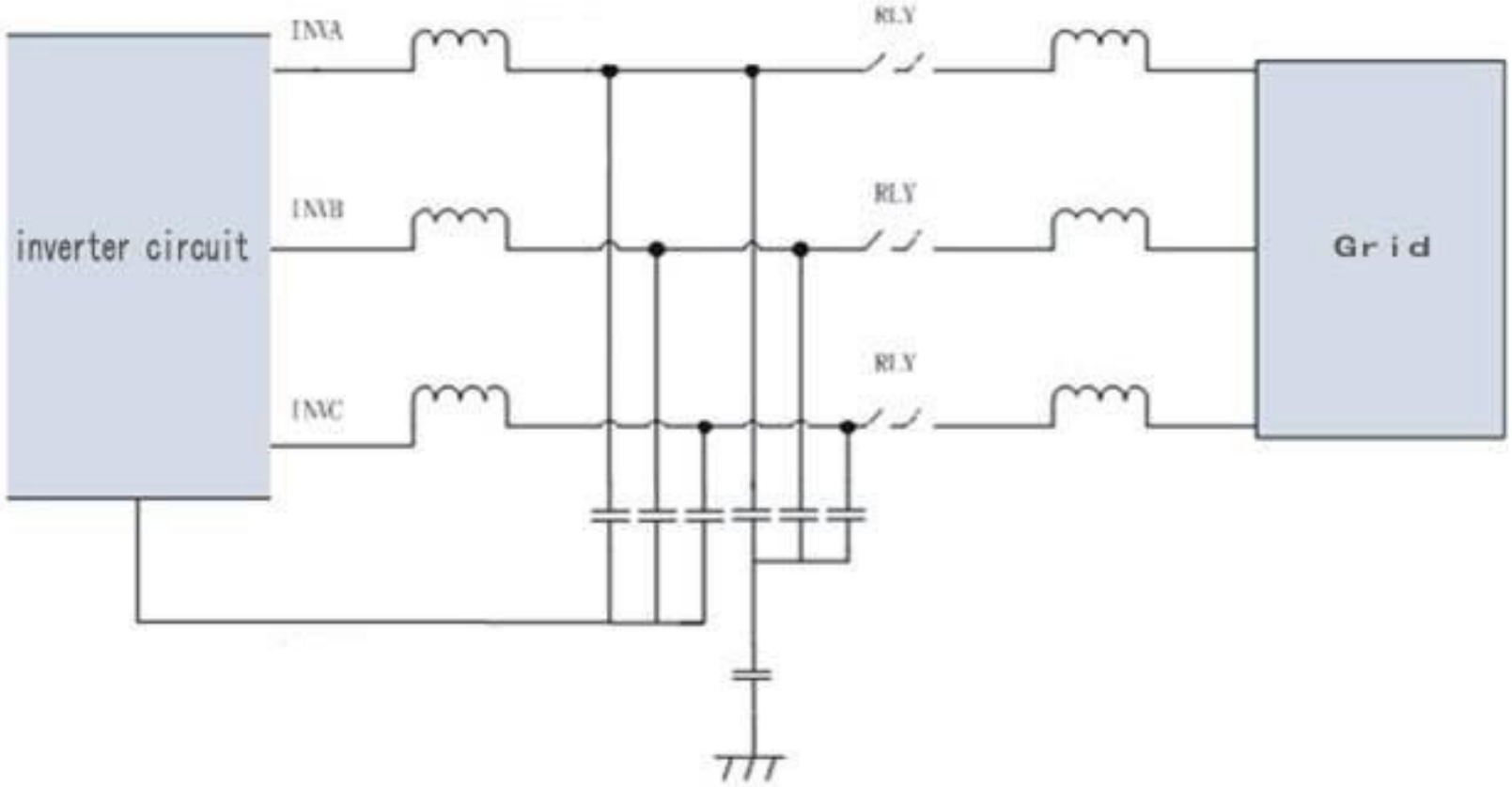


Elektrolit helyett Vékony réteg kondenzátorok



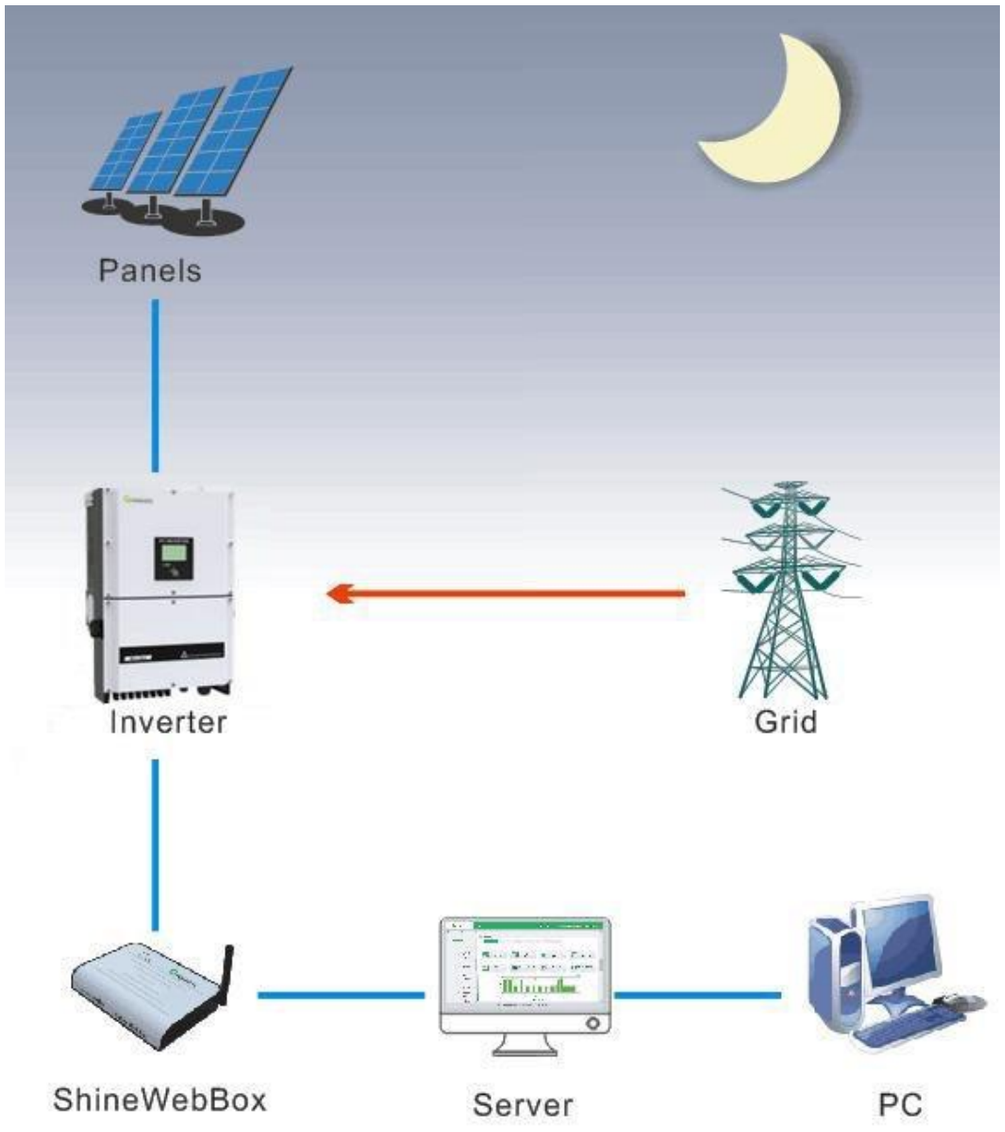
Stabil AC

LCL áramkör



Segéd feszültség

Éjszaka is üzemkész

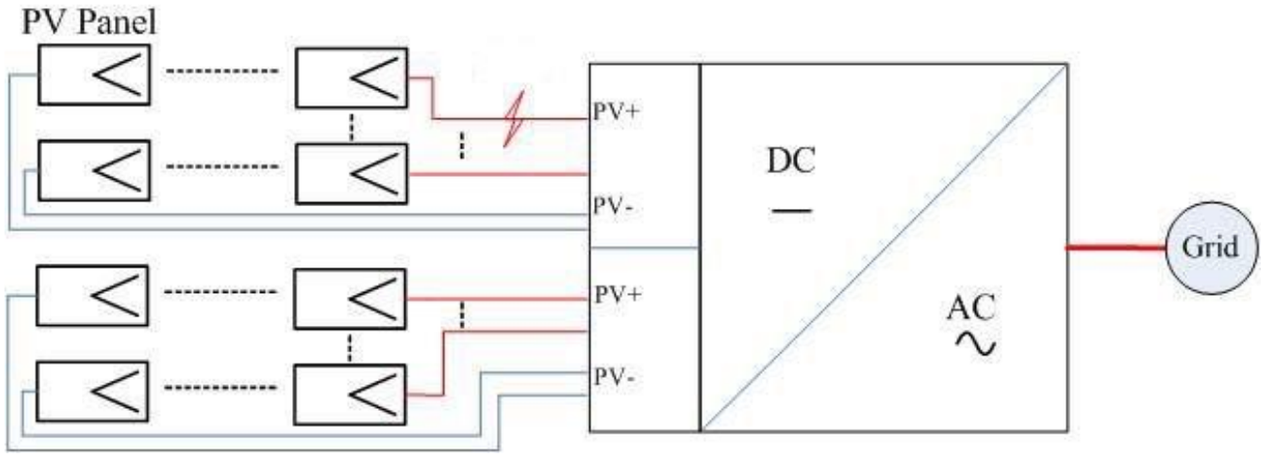


Új távlatok a távfelügyeletben:

- Szoftver update
- 24h monitoring

AFCI

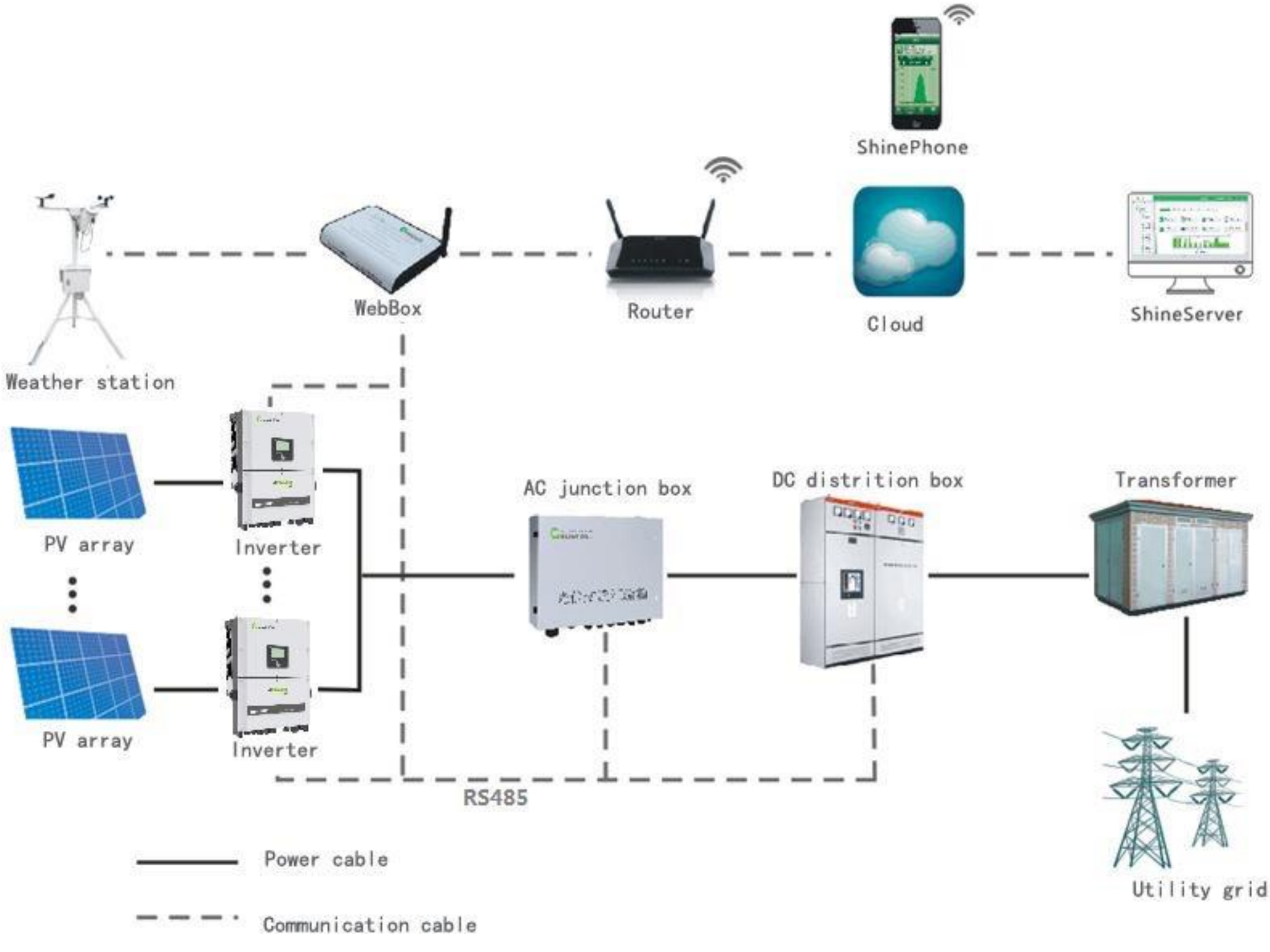
Villamos ív (tűz) elleni védelem



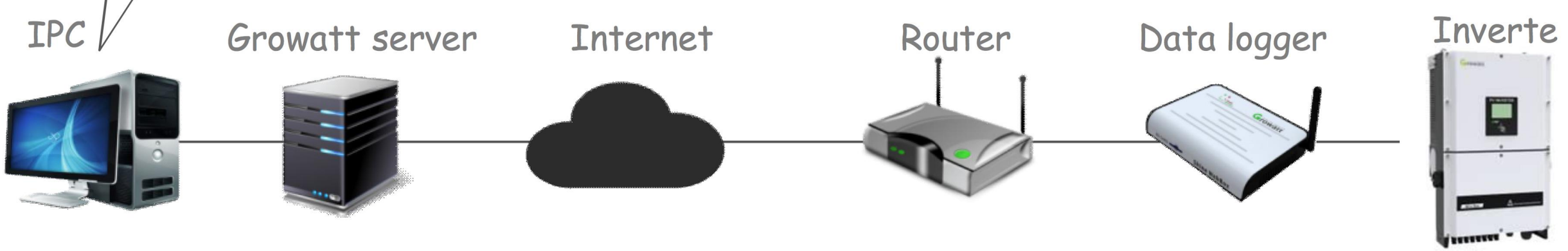
PID védelem

RCD védelem

Blokk diagramm

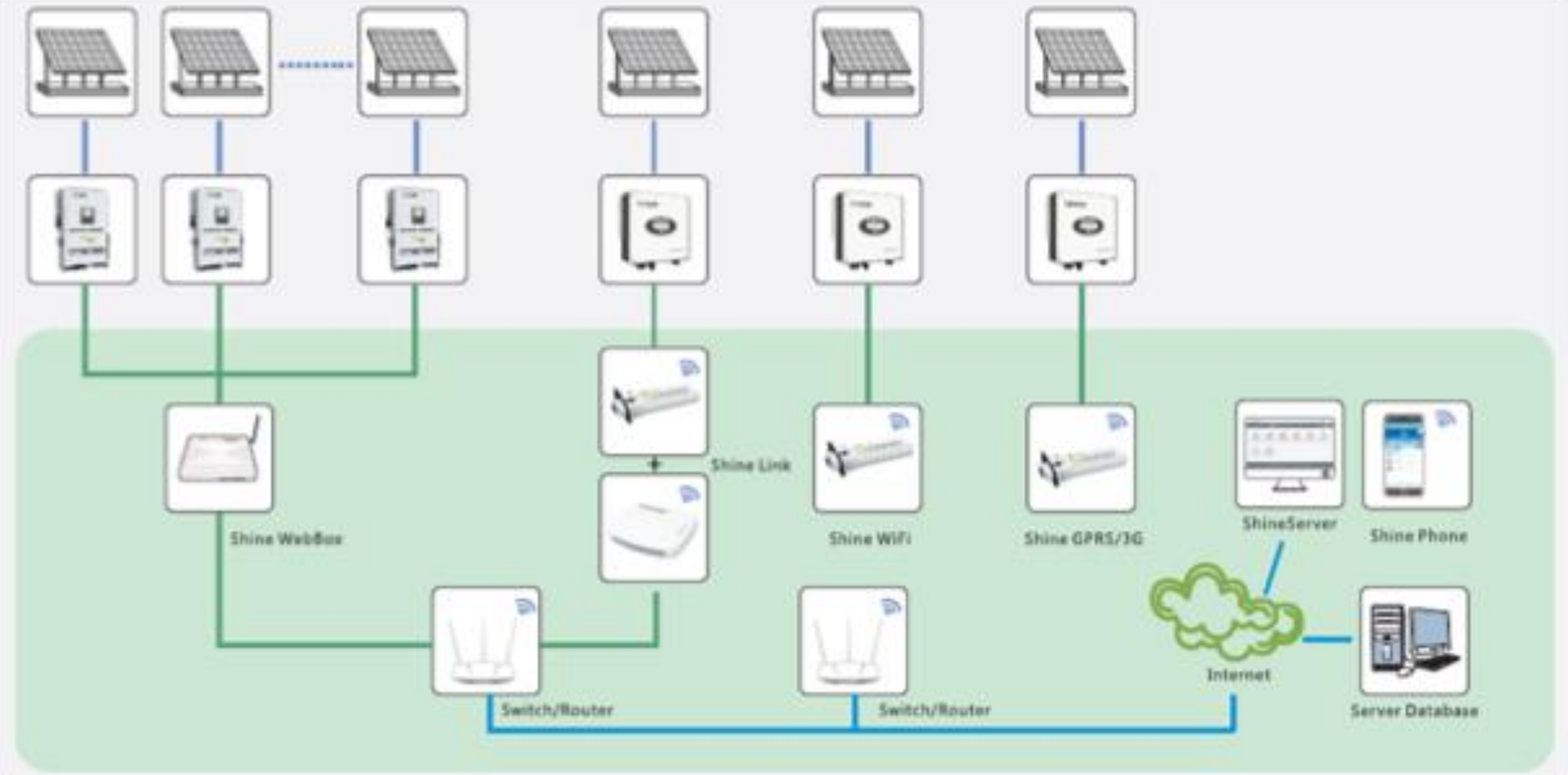


Távoli felügyelet

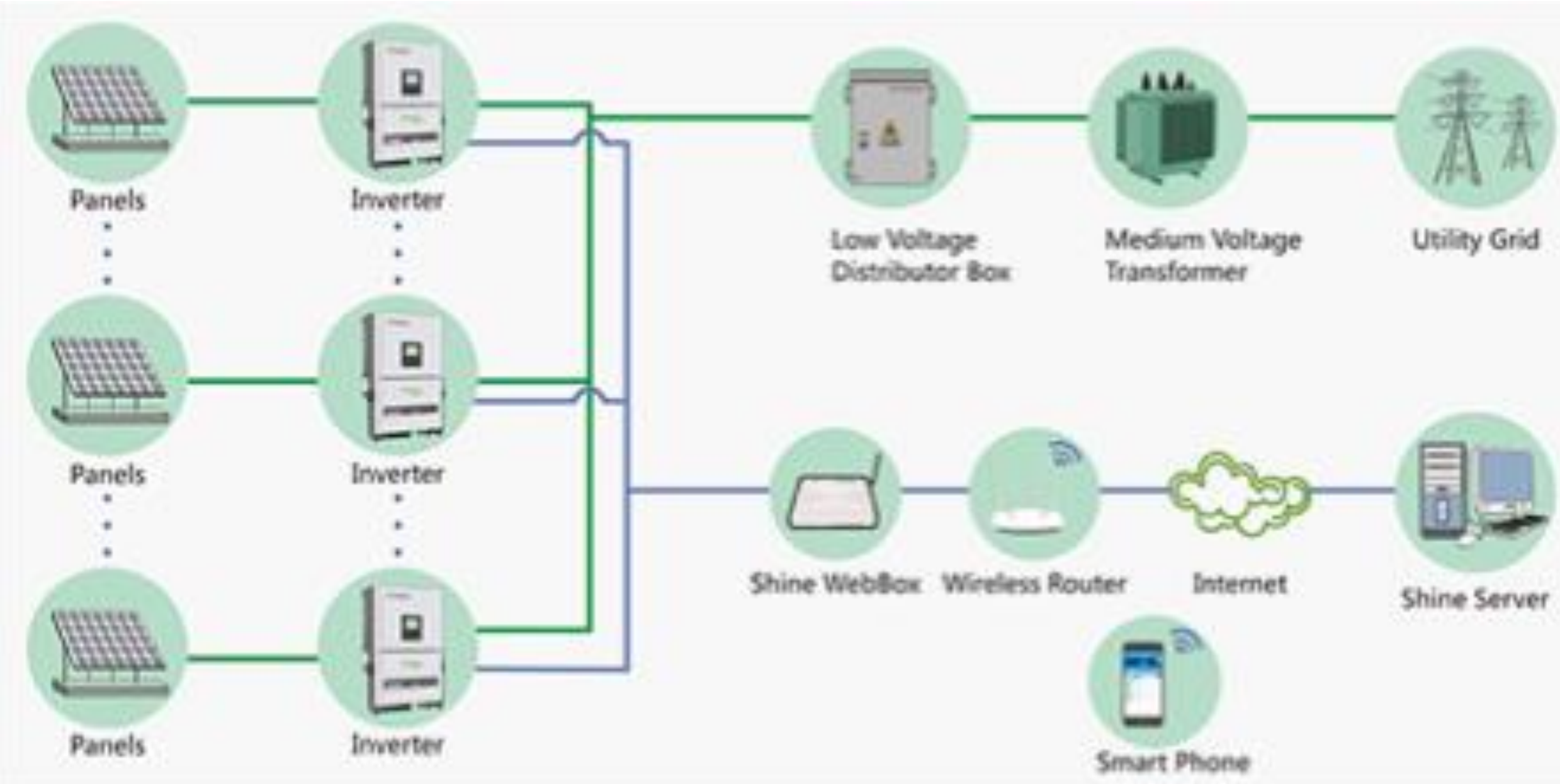


Magas IP védettség

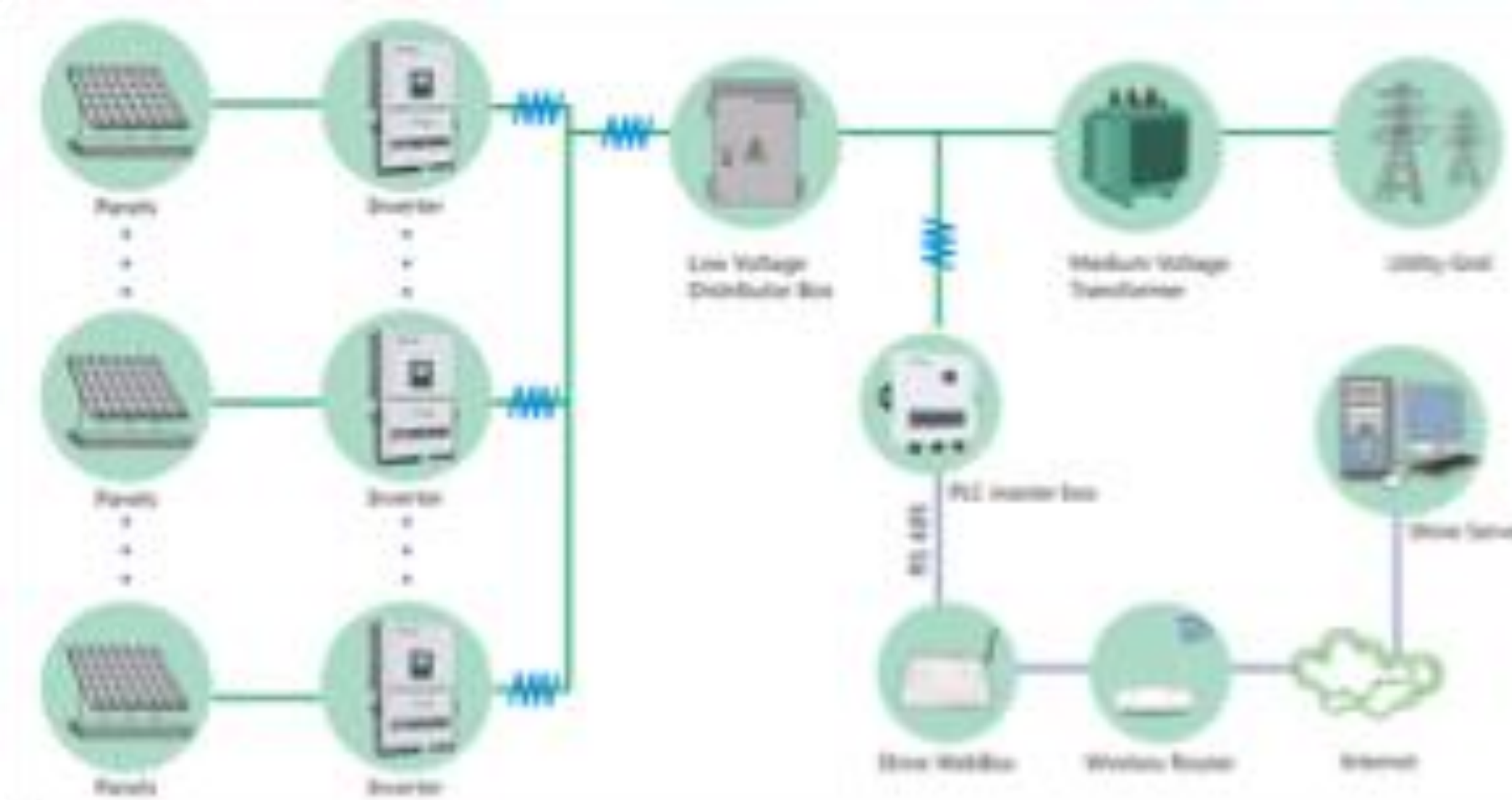
Könnyű elhelyezés


Shine Link
Shine WebBox
Shine WiFi
Shine GPRS/3G
ShineServer
Shine Phone
Internet
Server Database
Switch/Router
Switch/Router

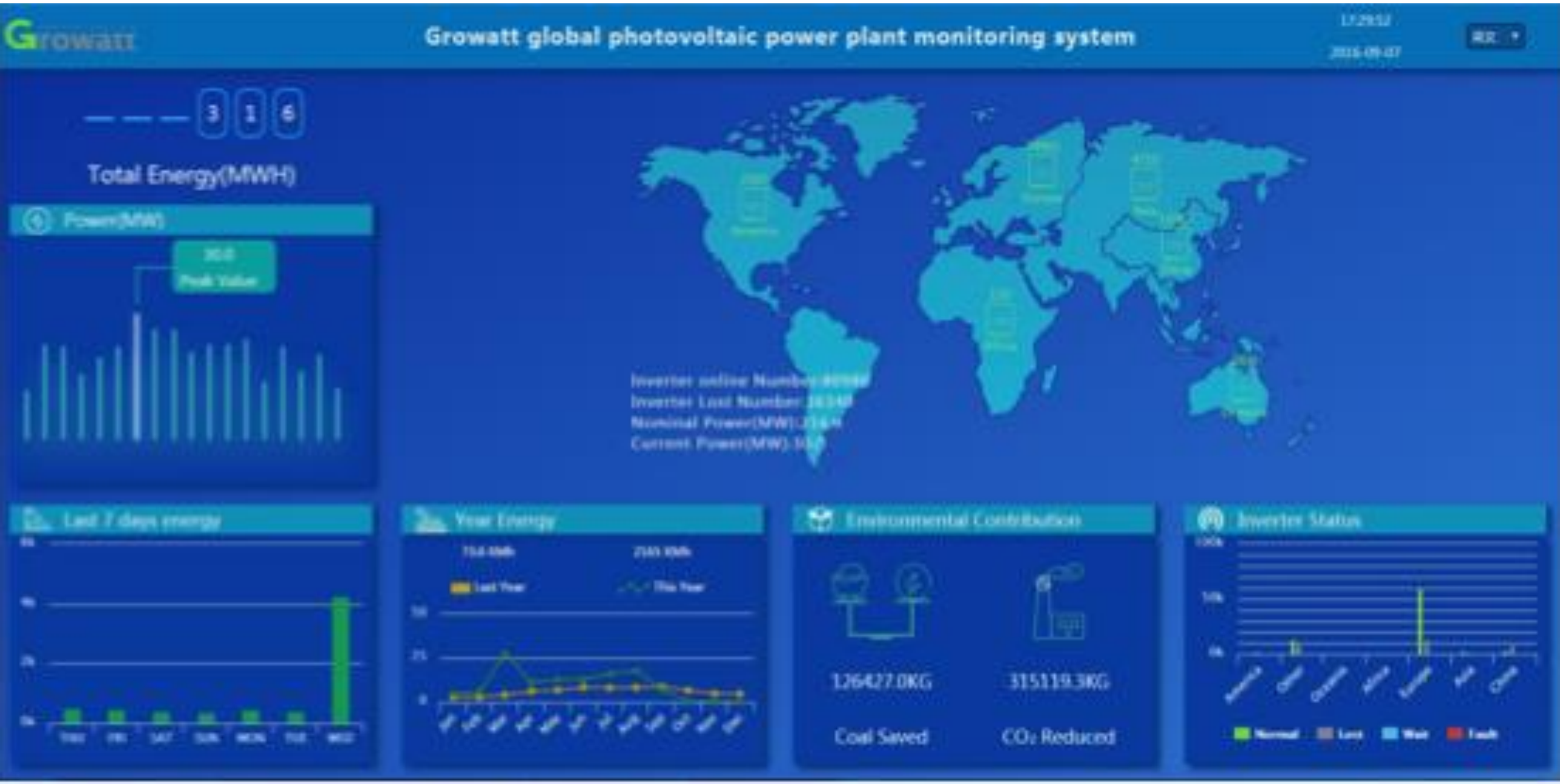
Hagyományos kiépítés



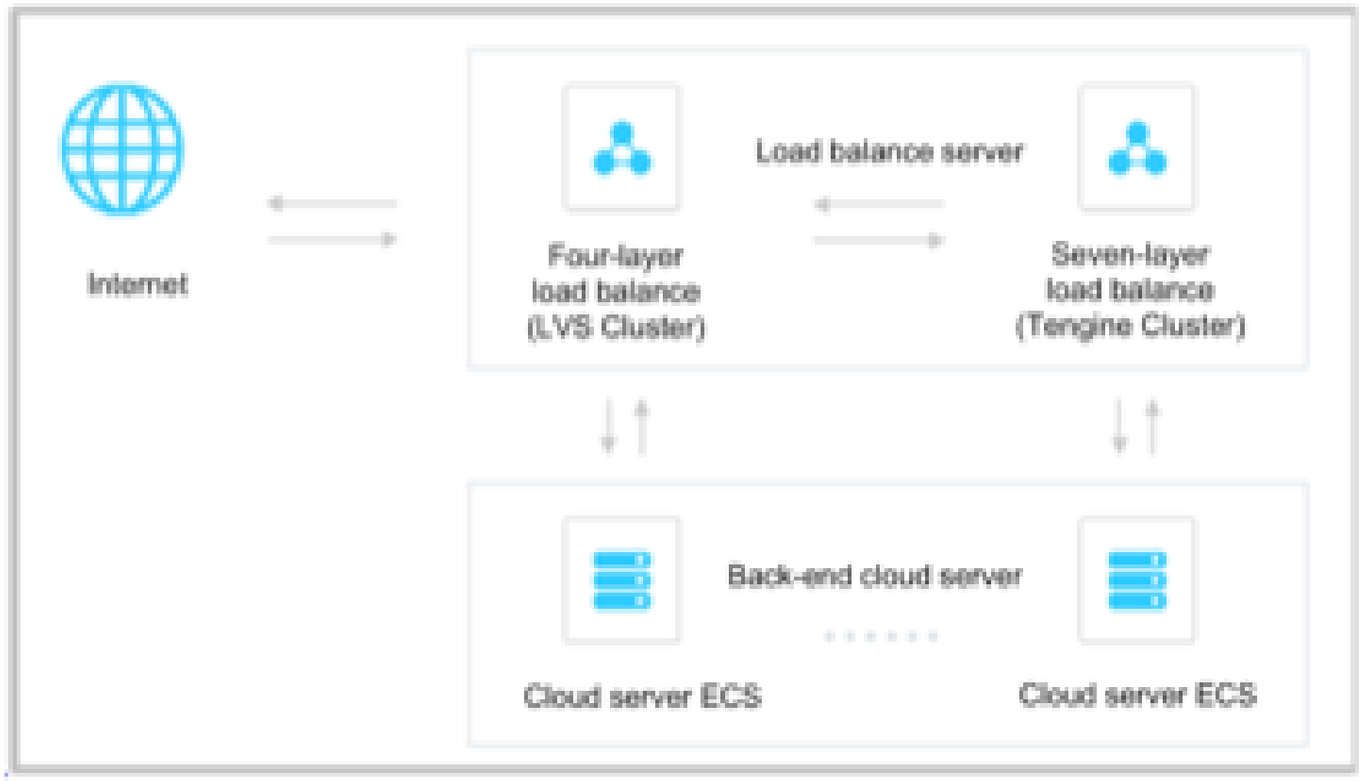
Power Line Communication PLC

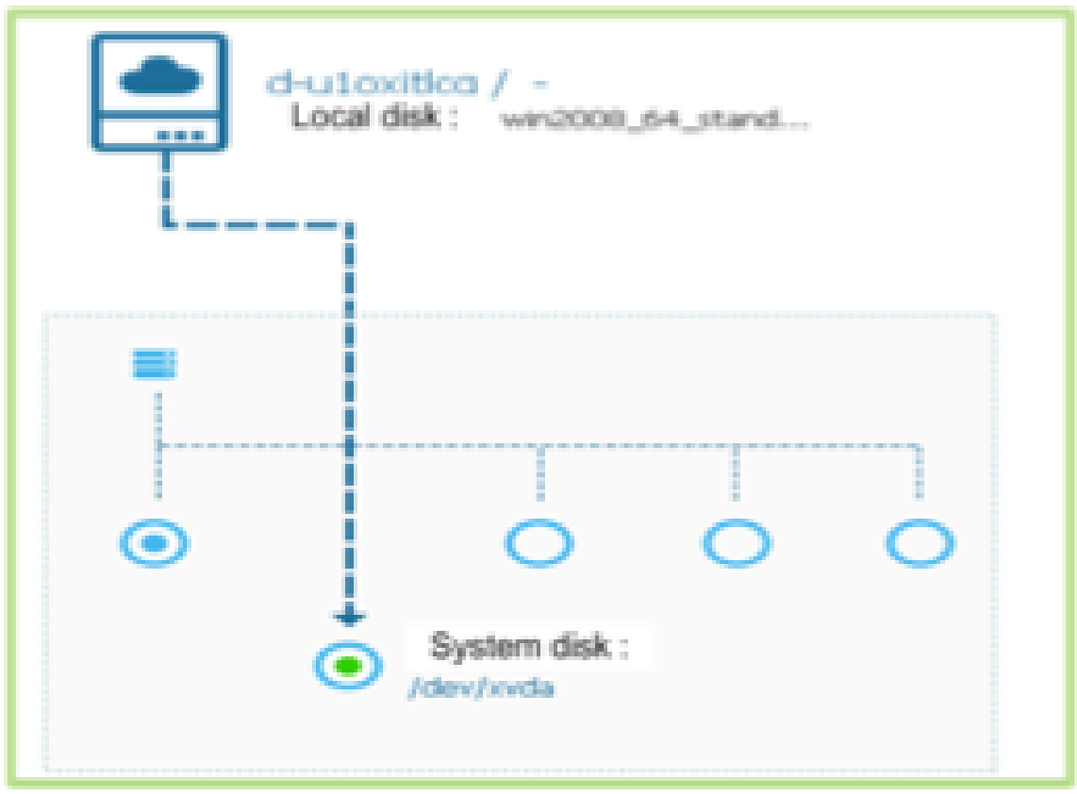


130000 rendszer online

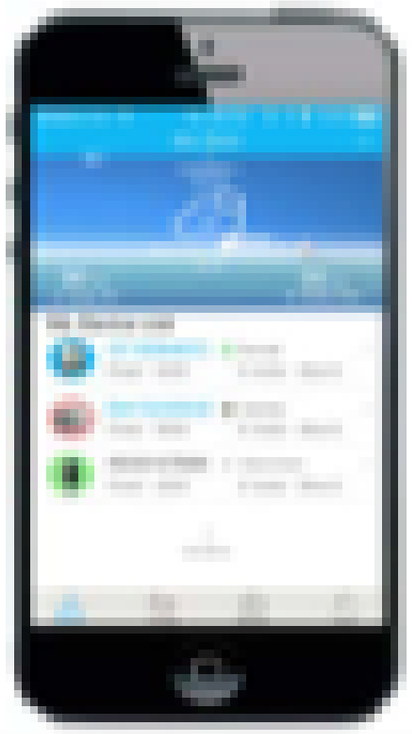


Napi adat mentés





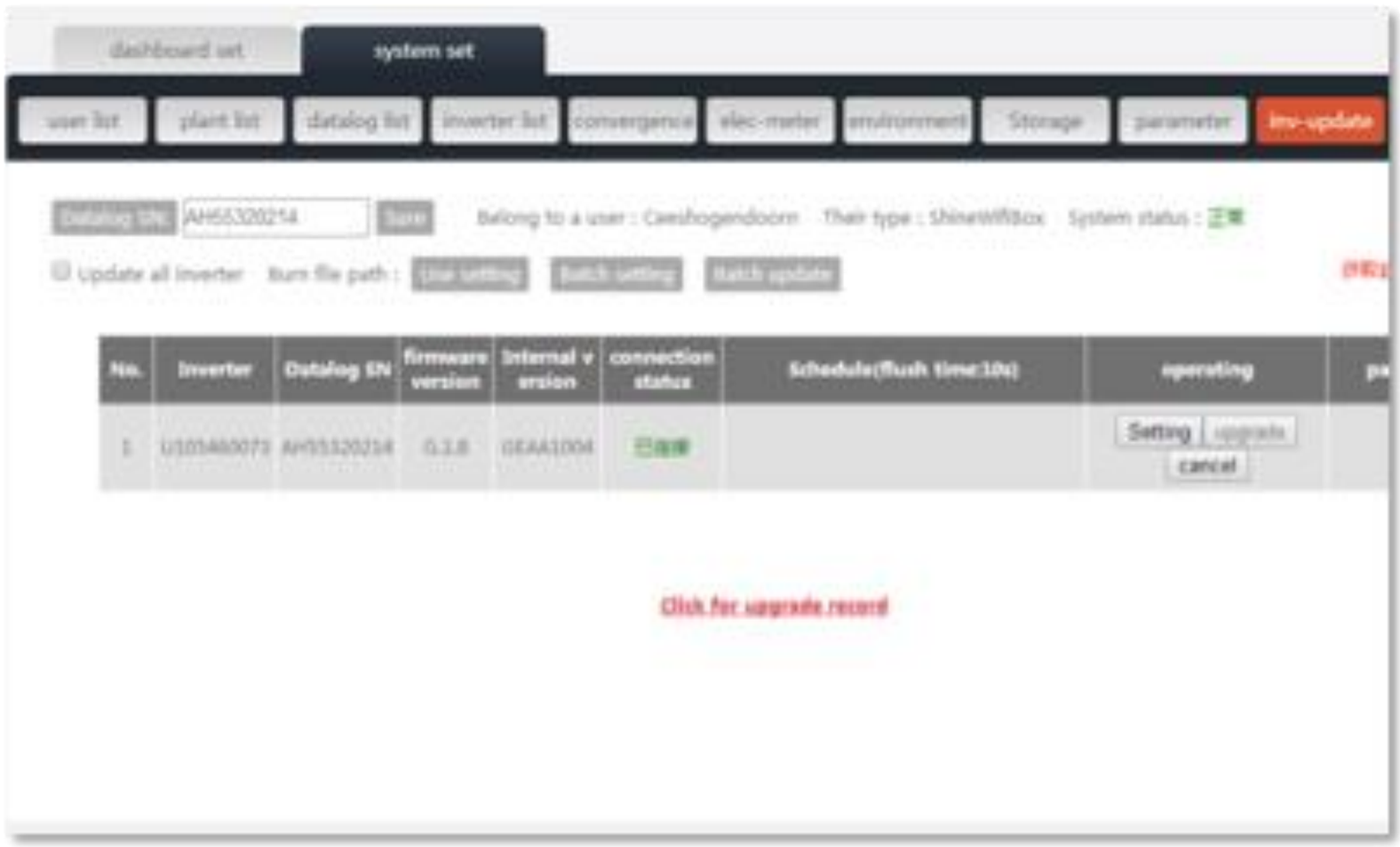
Okos alkalmazások



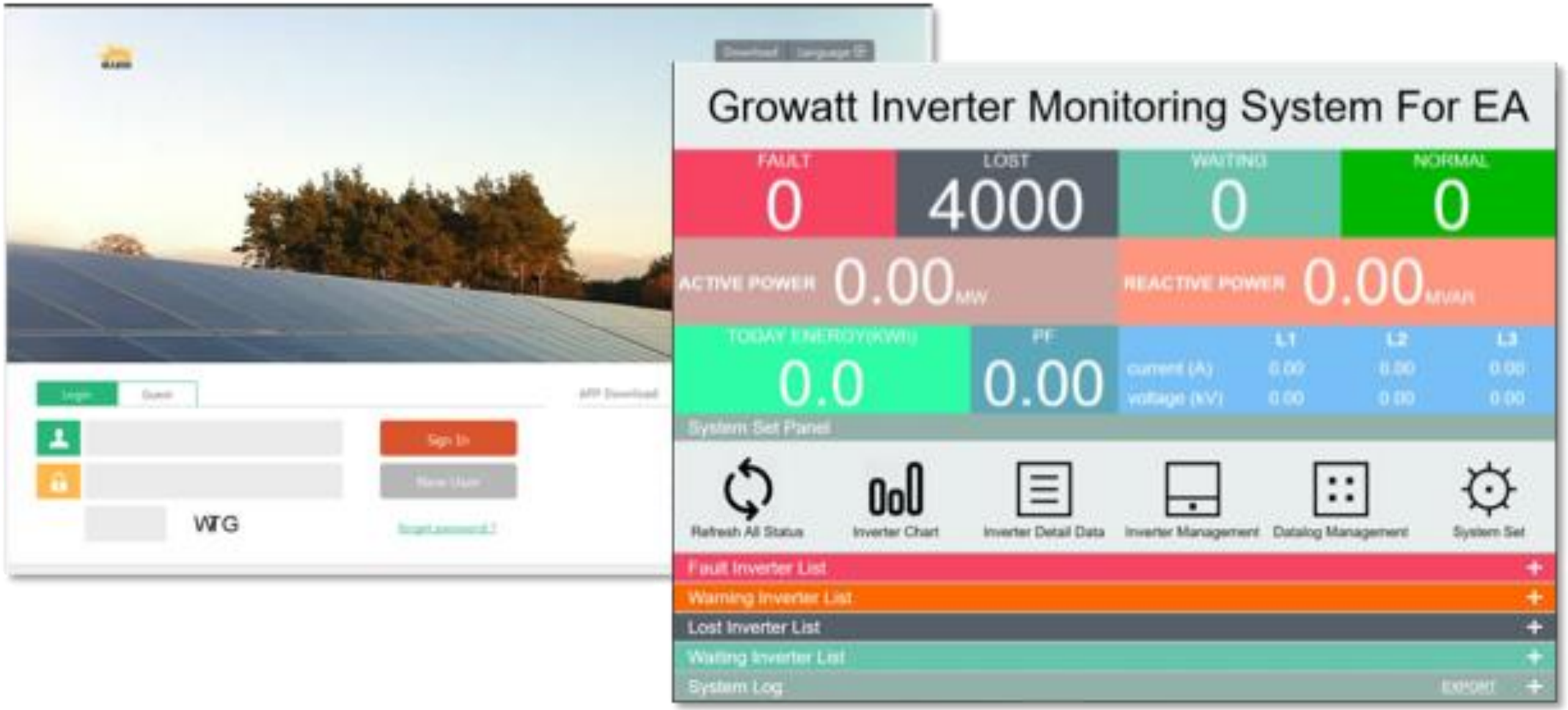
Adat elemzés PC-n

Adat elemzés mobilon

Távoli beállítás és firmware update

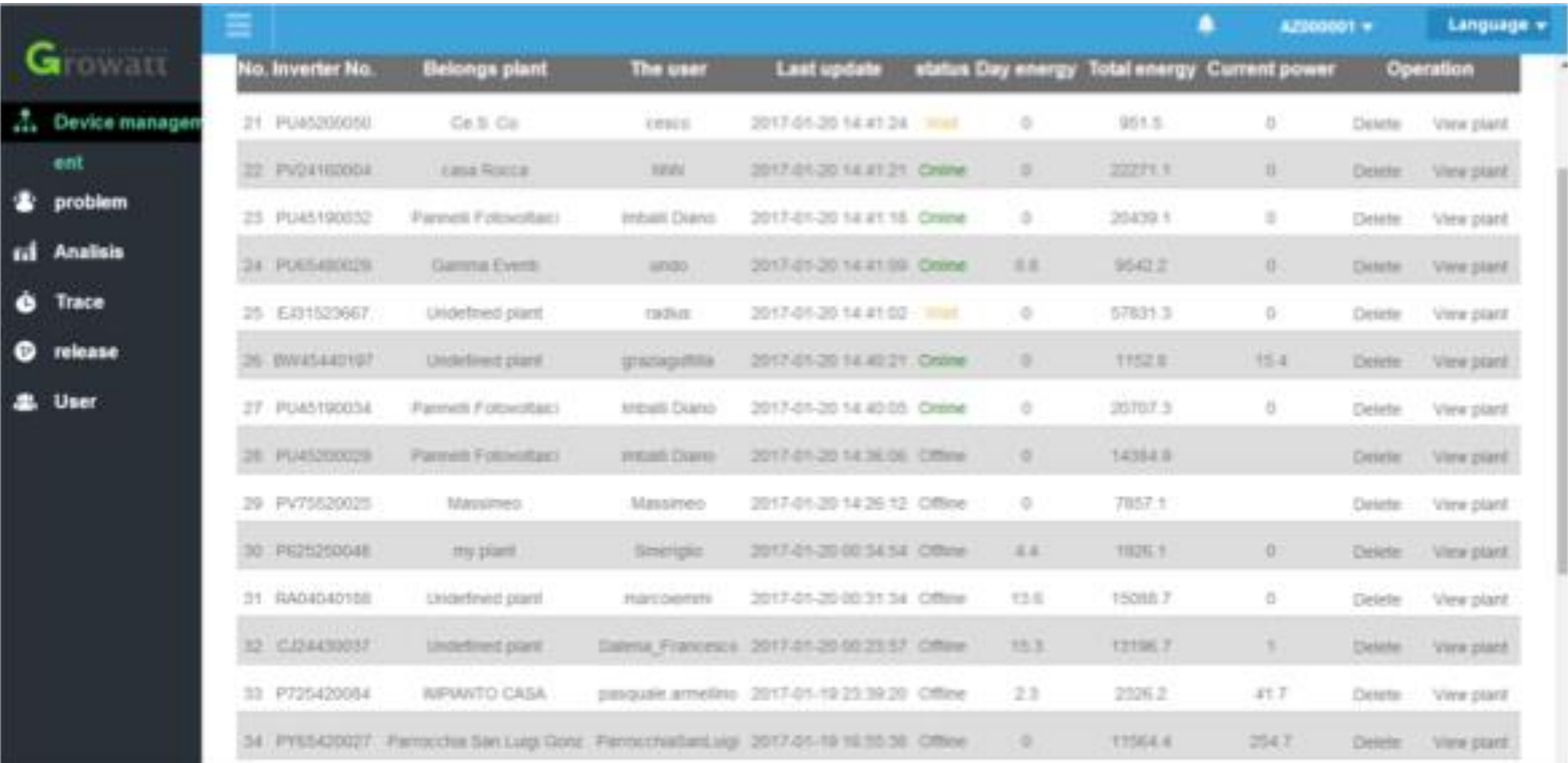


Flexibilis Server



Hiearahikus hozzáférés

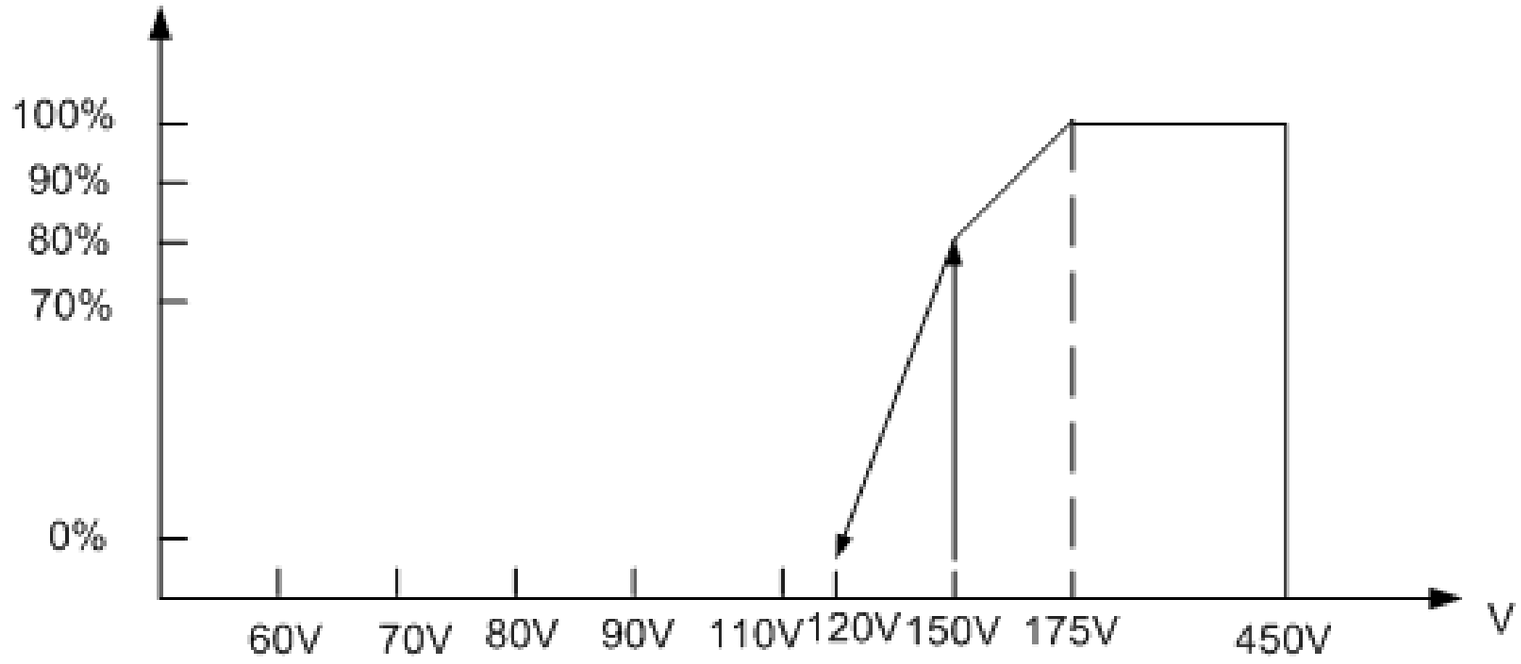
Kereskedői fiók



Alacsony induló feszültség

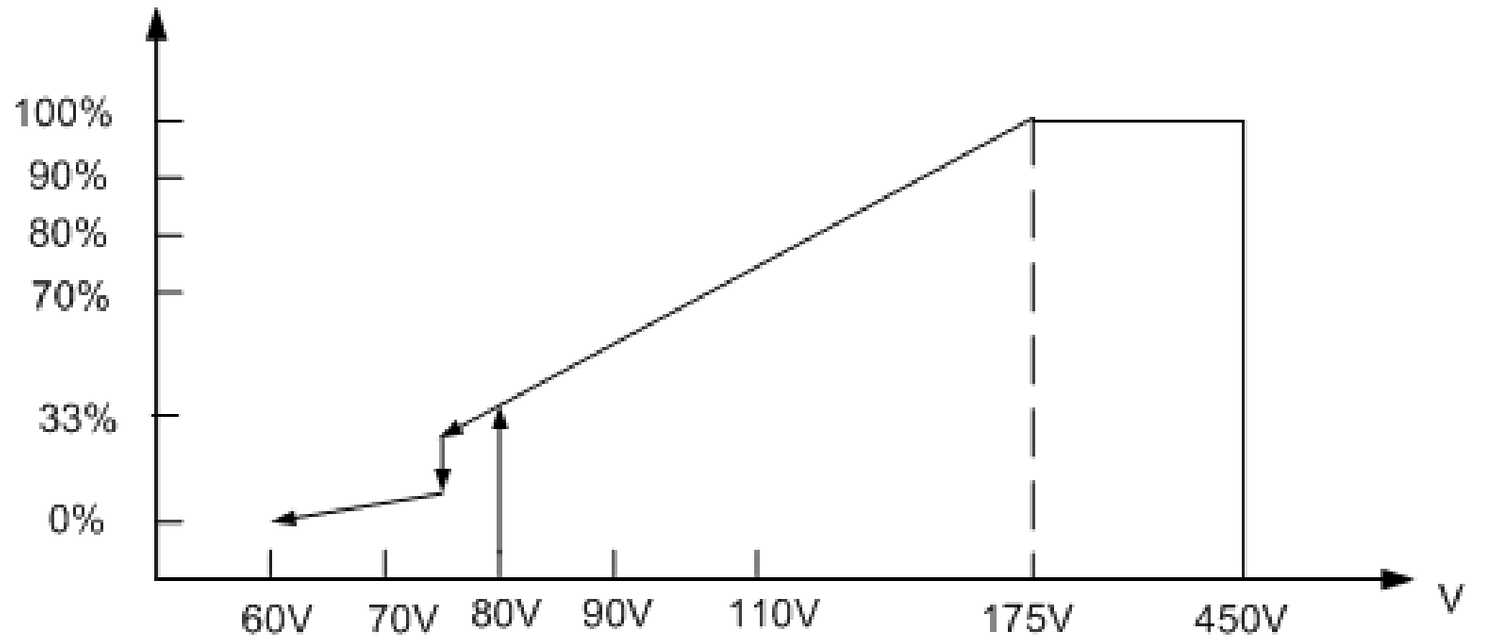
Még több termelés a reggeli és esti időszakban

Growatt 1500

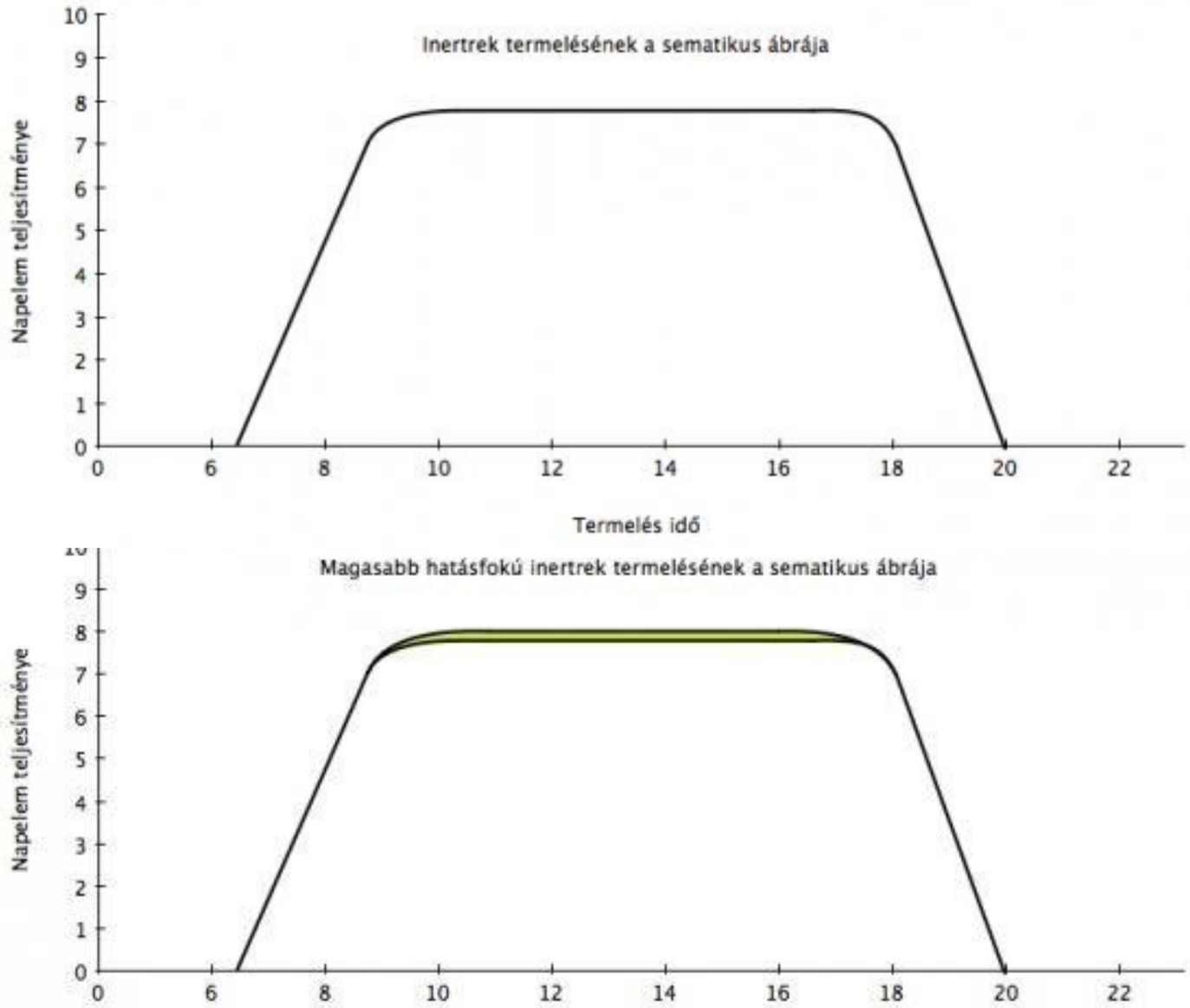


Alacsonyabb induló feszültség

Growatt 1500S

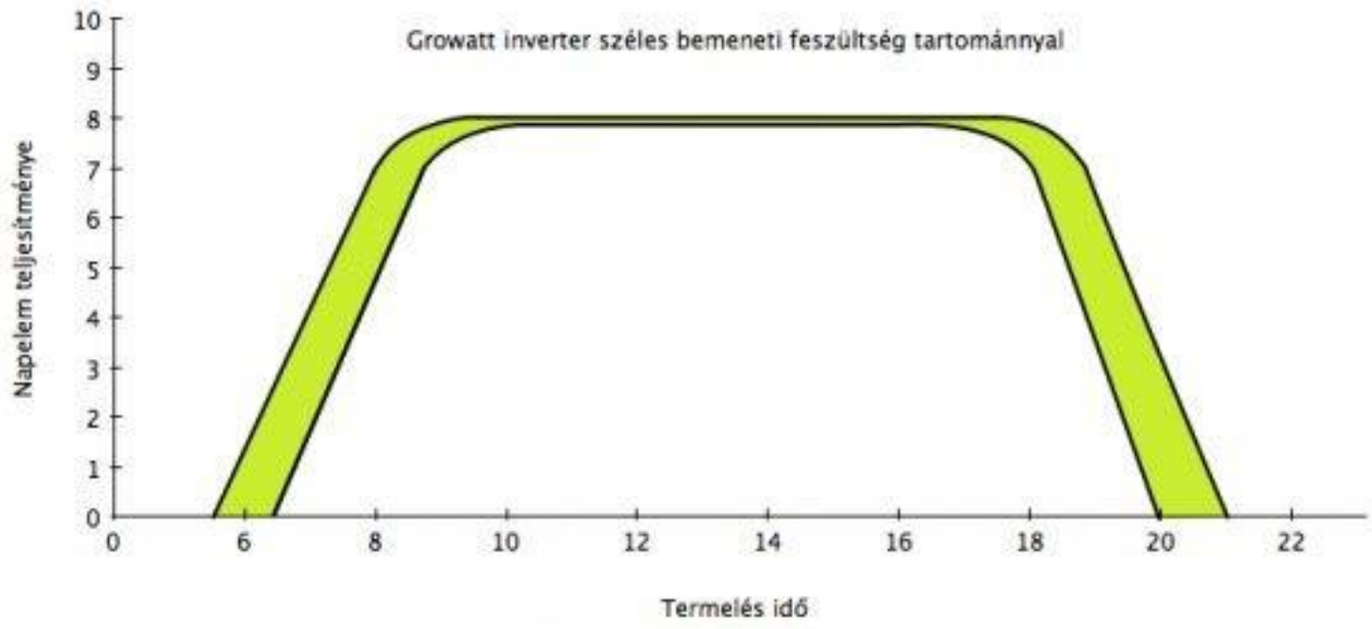


inverter termelési görbéje



Magasabb hatásfok

Alacsonyabb induló feszültség



Ki a

tulajdonosa?

A világ legsikeresebb kockázati tőkebefektetője:

SEQUOIA

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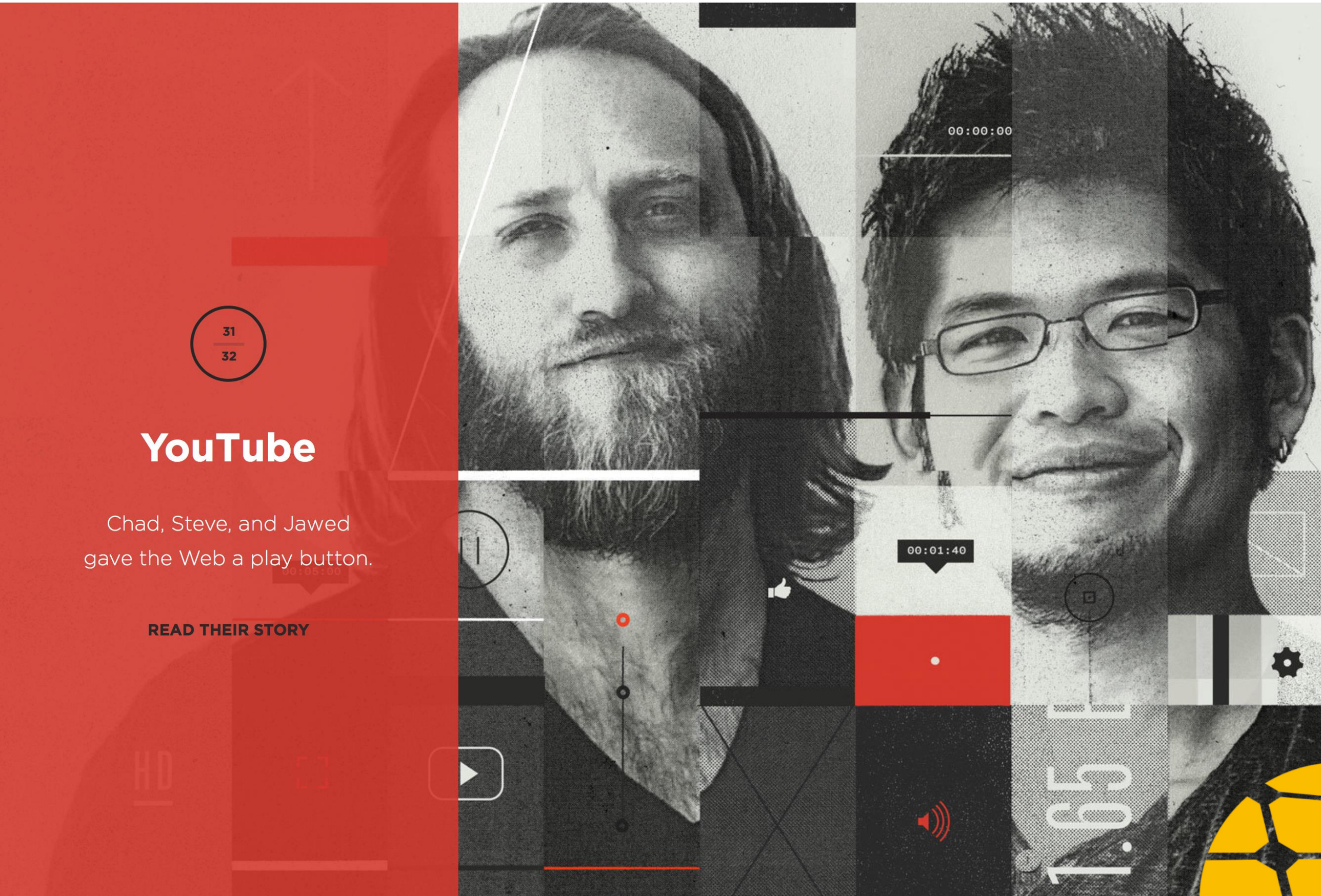
These are their stories.

22
32

Google

Larry and Sergey organized the world's information.

LEARN MORE



31
32

YouTube

Chad, Steve, and Jawed gave the Web a play button.

READ THEIR STORY

32
32

Apple

Steve and Steve made the computer personal.

READ THEIR STORY

SEQUOIA

A Sequila Capital híresen jó befektető!

A napelemes piacon a SEQUOIA

powering tomorrow Growatt -ot választotta!

2011-ben 10 000 000 USD-t fektettek a Growattba.

Growatt

Growatt, established in 2010, is focused on providing solar inverters and system solutions for the global market. Growatt recently reached over 2.5GW installation worldwide, and is becoming a world leading manufacturer of cost-effective solar inverters with high efficiency.

Egy csapatban a nagyokkal

Ezek alapján összegezhetjük:

Mára odáig jutottunk, hogy
a **“Made in China”**menő márka lett!

Magyarországi Raktárkészlet

Több mint 500 inverter raktáron.

Kiegészítőkkel együtt több mint 800 Growatt termék.

Garanciális raktárkészlet,
Csere akár 24 óra alatt.

Legújabb fejlesztésünk

EU-SOLAR

powering tomorrow

Growatt

Garancia ügyintézés indítása 15 percen belül!

Inverterek garanciális ügyintézése

Mi átvállaljuk Öntől a garanciális ügyintézés gondjait.

A Growatt által az EU-Solar Kft-nél elhelyezett garanciális raktárkészletből 48 órán belül elintézzük garanciális ügyeit. Önnek csak az a dolga, hogy kitöltse a a garancia bejelentő lapot és továbbítsa nekünk. Ha problémája van töltse ki most online, és még nyomtatnia sem kell.

Kérem, figyelmesen töltse ki a nyomtatványt!

EU-SOLAR

let the sunshine win

Elrontani sem tudjuk!

EU-SOLAR

powering tomorrow
Growatt

Teljesen automatizált garanciális rendszer!

EU-Solar Ltd.

Growatt Warranty Claim Form

Nr. of warranty ticket: TT227836

Dear Vivian,

We are issuing the error report for warranty claim below. With the data below a warranty claim was recorded for a Growatt 1000 inverter.

Type:
Growatt 1000

Serial Nr:
123123123

Display status:

Date of purchase:
2001-10-10 (yyyy-mm-dd)

Installer Company:
asdasd

Contact person:
Teszt

Contact phone:
+3630122222

Contact e-mail:
web@eu-solar.hu

Detail Address:
7624 Pécs, asd u 3

We referred our client to complete the tests, from the Growatt 's official troubleshooting instruction but the error has not been averted successfully.

Reply form for the report:

Please, click only one (colorized smart link) option, since the error will be processed accordingly.

The inverter must be replaced. I refer EU-Solar Ltd to replace the inverter.

Further questions are addressed to investigate the problem. Sending an e-mail regarding the issue.

Thank you for your instant reply, we address the issue immediately.

Besr Regards.
2017-02-09 (yyyy-mm-dd)

Andrew Petre
CEO-Co founder
EU-Solar Ltd.

powering tomorrow Growatt

Eu-Solar Zrt. 7630 Pécs Siklósi út 2. www.eu-solar.hu

Warranty Claim Form

Note: Items marked with '*' are necessary. Growatt shall have no obligation for unqualified application such as incorrect information or missing necessary information.

Product(Típus)*	Growatt 5000MTLs	Model (menüből kiírva)*	
FW version(szoftver)*		Serial Number (S/N)*	9R06150003
Company Name(cégnév)*	enHome		
Contact Person* (Kapcsolattartó)	Szakács Ádám	Contact Number* (telefonszáma)	36 (20) 339-23-41
Contact email*	weszelovszkyk1@gmail.com		
Detail Address (Cime)*	1214 Budapest, Völgy utca 95.		
End user email/phone* Felhasználó adatai	Weszelovszky Károly	Date of Purchase	2017-02-17

Issue & Fault Description: **(Hiba részletes pontos leírása)**

Display reads*(kijelző)	Error: 118

Detailed Description: (hiba pontos leírása)
Az inverter 118-as hibakódot ír!
Kérem azonnal vegyék fel a kapcsolatot az ügyféllel!!!

EU-SOLAR let the sunshine win

EU-Solar Zrt. tölti ki

Replacement Unit (Wholesaler) Authorised Person:
Date:
Replacement Unit (Power Parameters):

Model No:	S/No:	Date:
Faulty Unit Returned:	Credit Details:	
Date:	Invoice No:	

Service Engineer: **Date:**

Köszönjök a megtisztelő figyelmüket!

EU-SOLAR

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+36 20 800 4000