

# Nipron Wave

## Vol.67

### Highlights

- 1 Examples of power storage system installations -Vol.2-**  
Introducing examples of power storage system installations, such as an obligation to reduce the GHG, countermeasures against blackouts and surplus power storage.
- 2 GP products**  
Introducing EV Solar Carport, PV Maximizer and PV Guardmyan.

## Examples of power storage system installations

Sumitomo Metal Mining Co., Ltd.



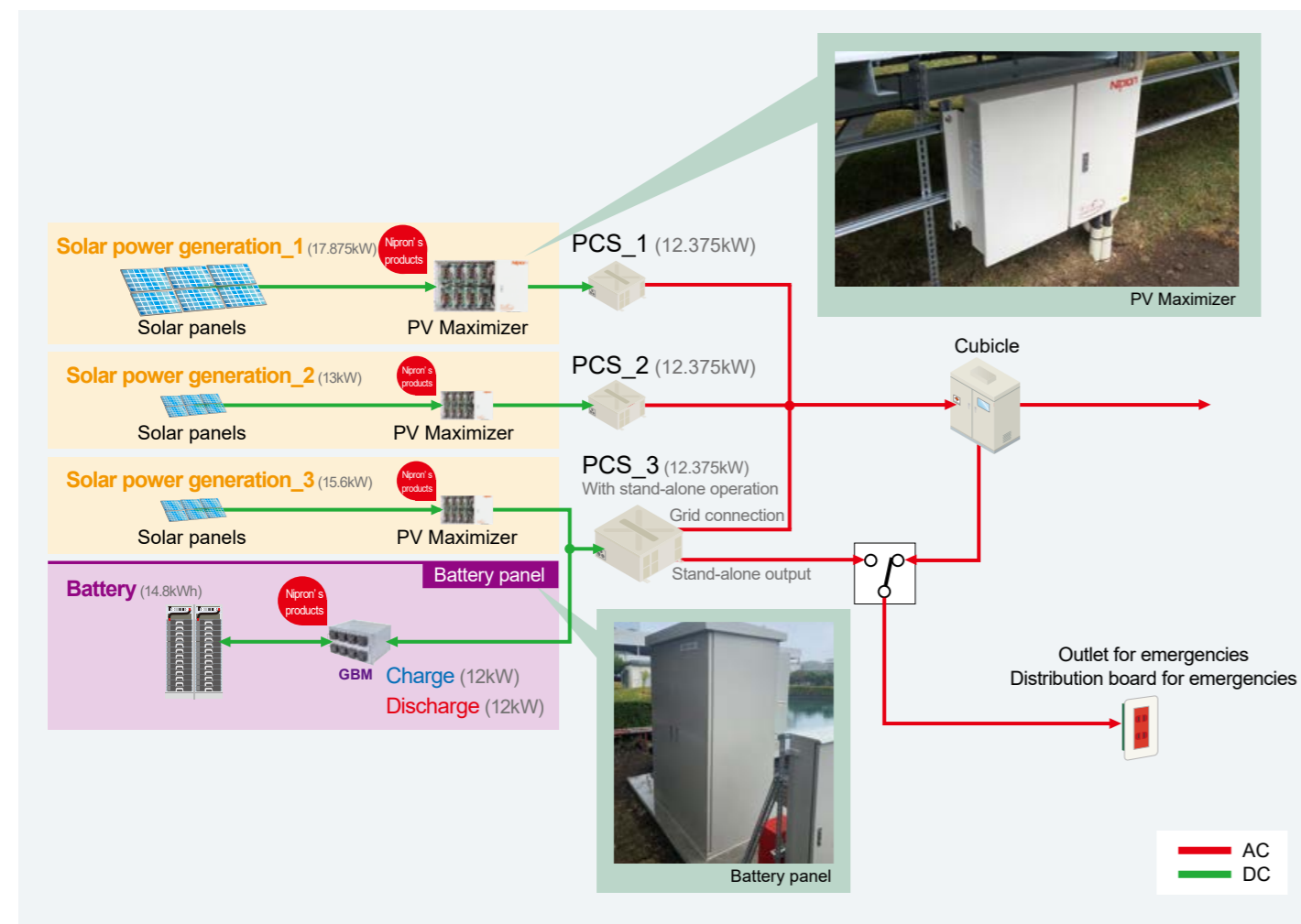
Solar cell

Solar cell

### Nipron GP products have been adopted in response to the Tokyo Metropolitan Government's call to reduce GHG emissions.

The Ome District Div. of Sumitomo Metal Mining Co., Ltd. is designated as a "Designated Business against Global Warming" of Tokyo Metropolitan Government (TMG) and has an obligation to reduce the GHG (greenhouse gas). If they fail to comply, they will be forced to purchase emissions allowances, resulting in a significant cost increase. In order to fulfil this obligation, they took advantage of TMG's "Local Production for Local Consumption Renewable Energy Expansion Project" to introduce this system and have achieved the obligatory reduction of 25%. This is a system incorporating photovoltaic power generation and batteries and, in an event of a blackout, it is possible to backup particular loads by supplying power from a stand-alone PCS (power conditioner).

#### System configuration



### Ome District Div., Sumitomo Metal Mining Co., Ltd.

The Sumitomo Metal Mining Group undertakes sustainability projects aiming at coexistence with global environment and the society. The Ome District Div. of Sumitomo Metal Mining Co., Ltd. was created in 1967 as the Ome Plant of Electronic Metal Division and has become a major production facility of functional materials used in PCs and smartphones.

We serve corporations to realize the carbon-free management

<http://www.nipron.com>

## Examples of power storage system installations

Ohkuchi Electronics Co., Ltd.



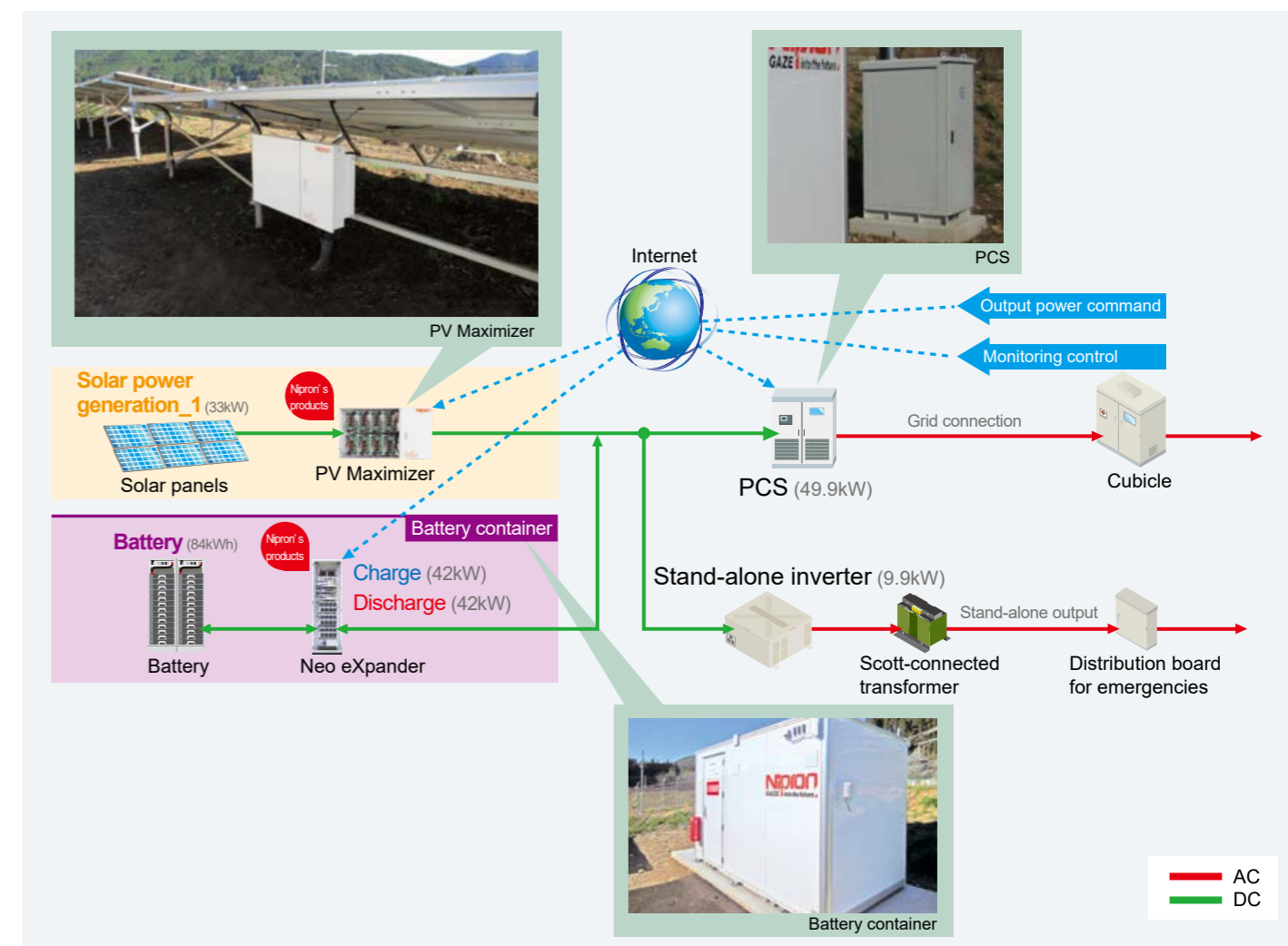
Back: Battery container

Solar cell

### Nipron's VPP-compatible power storage systems were adopted as BCP measure using renewable energy

This is a system incorporating photovoltaic power generation and batteries and it supplies power to the power grid during the normal operation and stores surplus electricity in batteries. In an event of a blackout, the power is fed to a stand-alone inverter that backs up particular loads. It is also compatible with VPP, being capable of controlling batteries and PCS appropriately to control the output power following external output power commands.

#### System configuration



### 大口電子株式会社

### Ohkuchi Electronics Co., Ltd.

Ohkuchi Electronics Co., Ltd. offers quality environment-friendly products based on their expertise in engineering developed over the years. The company specializes in recovery and recycling of valuable metals from waste circuit boards and production of crystalline materials for communication devices, such as smartphones, functional shielding inks used in window films of automobiles and structures, etc.



Nipron's power storage system is available for VPP

<http://www.nipron.com>

# Examples of power storage system installations

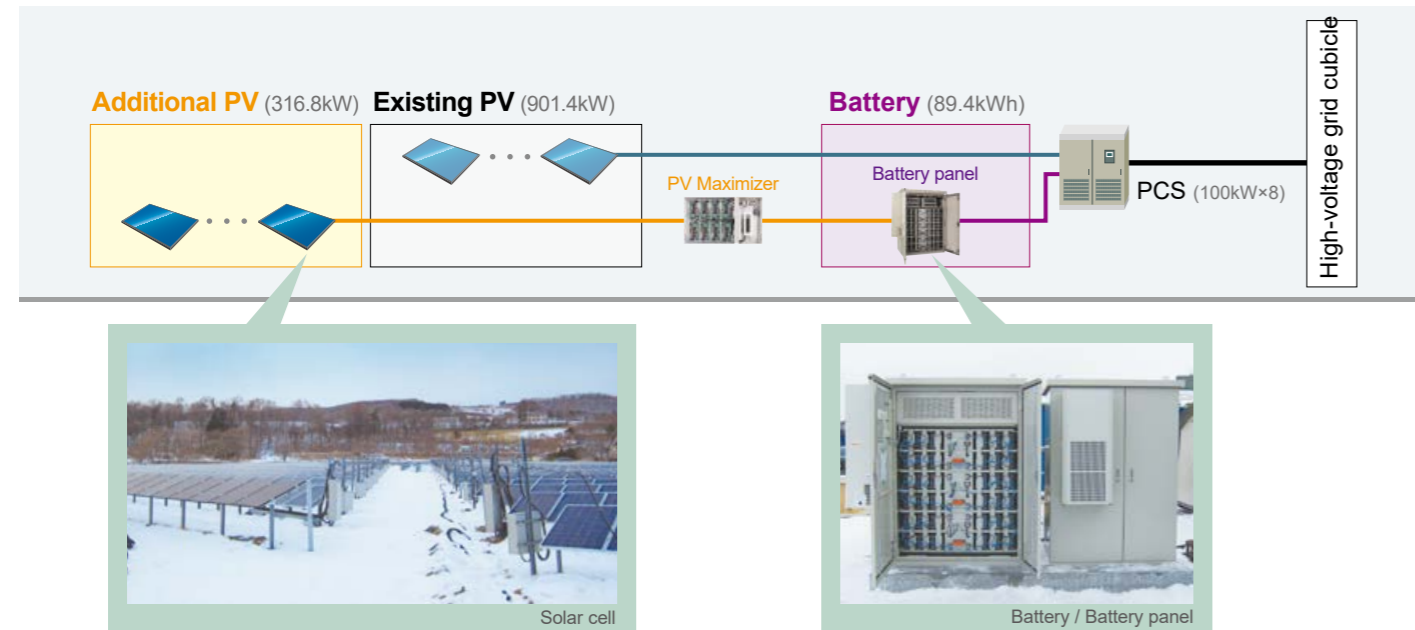
PV eXpander (Surplus electricity storage system)



## Real Estate Management Center Co., Ltd.

The PV eXpander (surplus power storage system) was selected since it can carry much higher loads than existing PCS. Storing surplus power in this way enables the sale of electricity for extended periods.

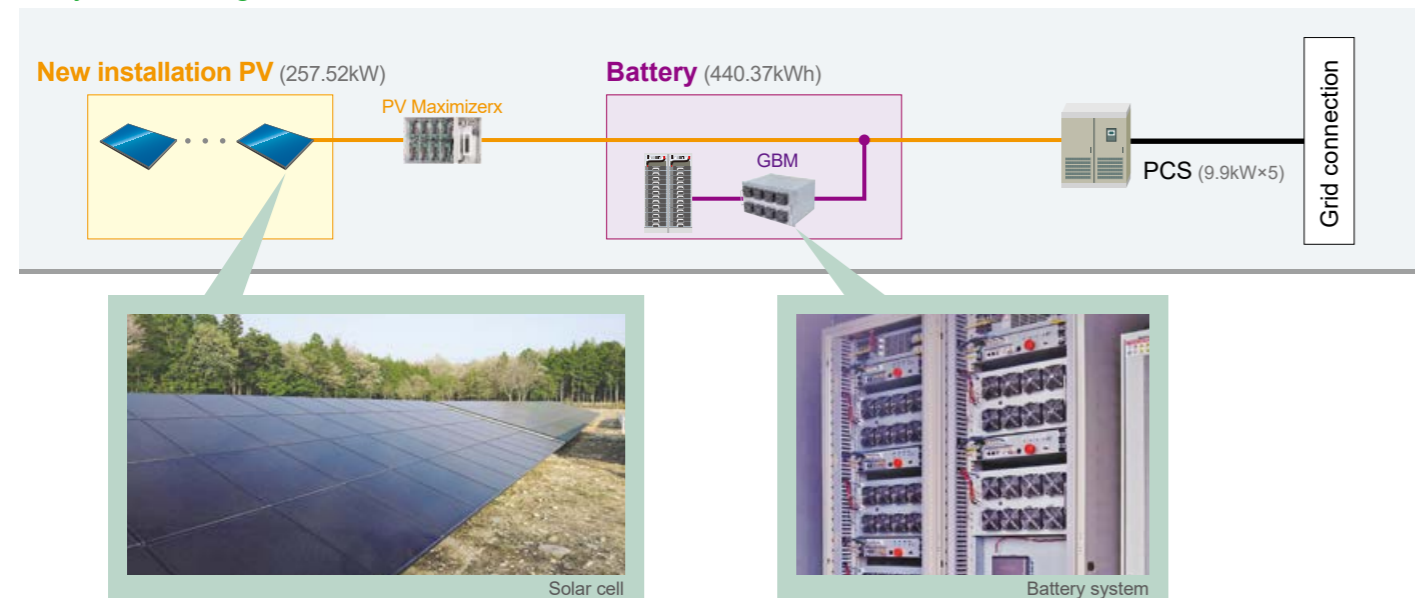
### System configuration



## Tochigi Prefecture "D" Company

The PV eXpander (surplus power storage system) was selected since it can carry much higher loads than existing PCS. Storing surplus power in this way enables the sale of electricity for extended periods.

### System configuration



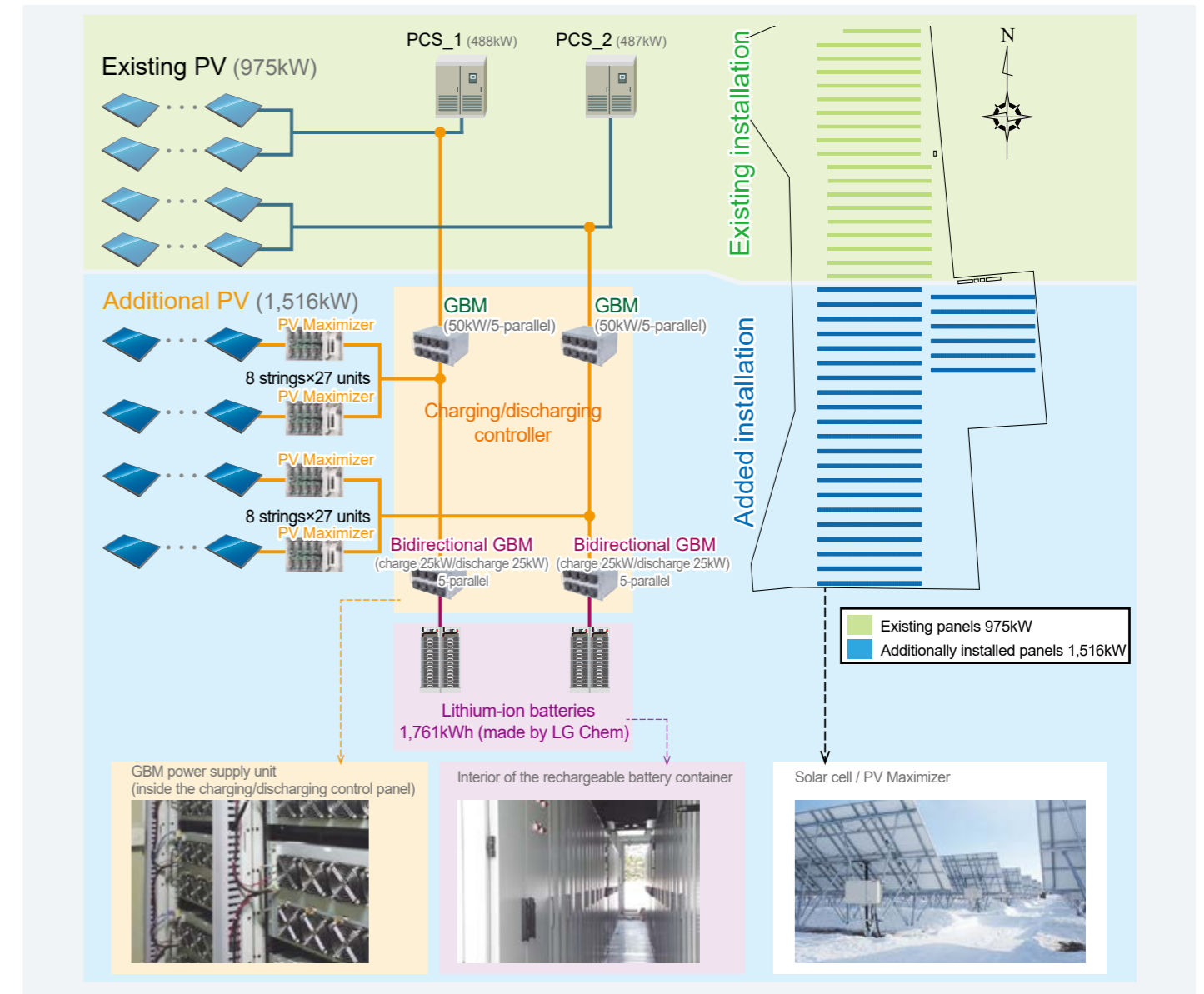
Rely on Nipron for power storage systems

<http://www.nipron.com>

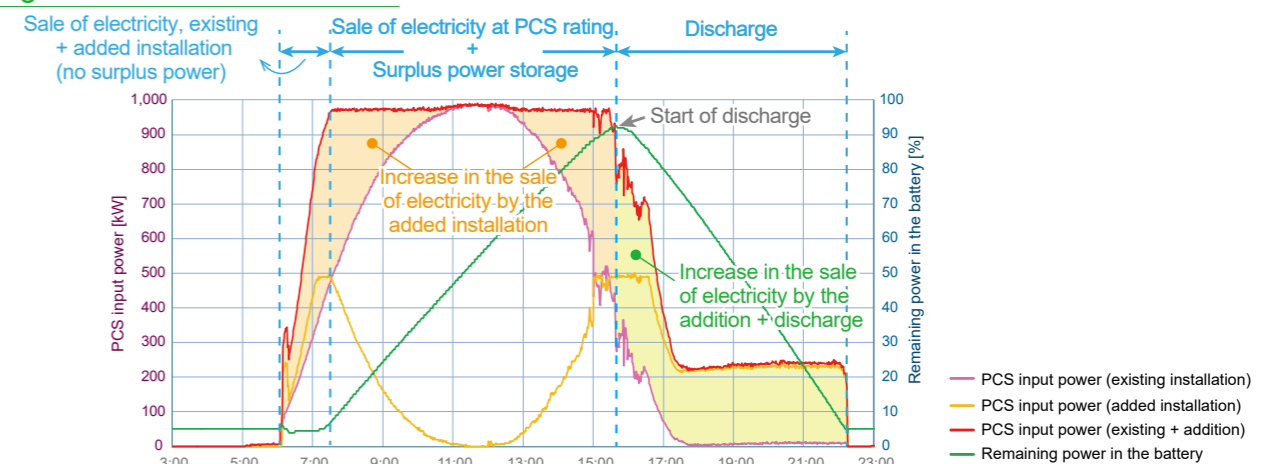
## Kita Koudensha Corporation

The PV eXpander (surplus power storage system) has been adopted for the Mega Energy Storage system, which combines a 2.5 MW mega photovoltaic power plant and a 1.8 MWh battery.

### System configuration

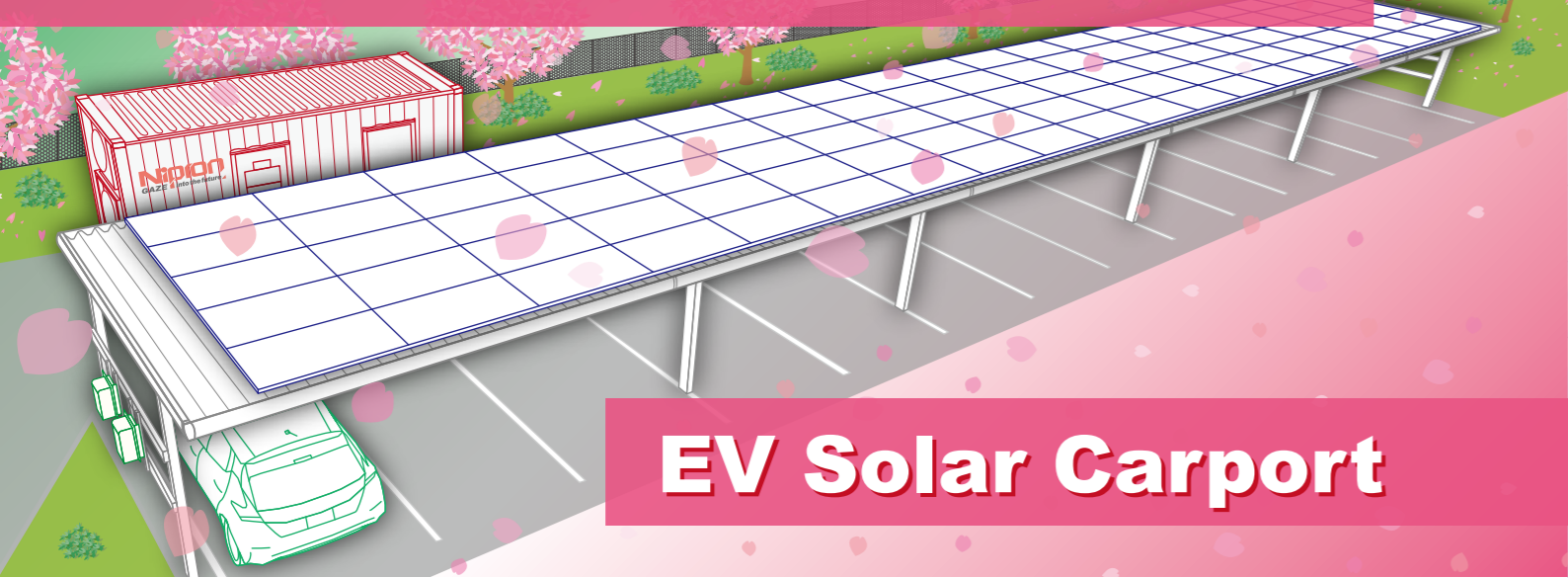


### Power generation data (March 21, 2018)



Please consider Nipron GP products with an extensive track record of installations <http://www.nipron.com>

# EV charging using 100% renewable energy

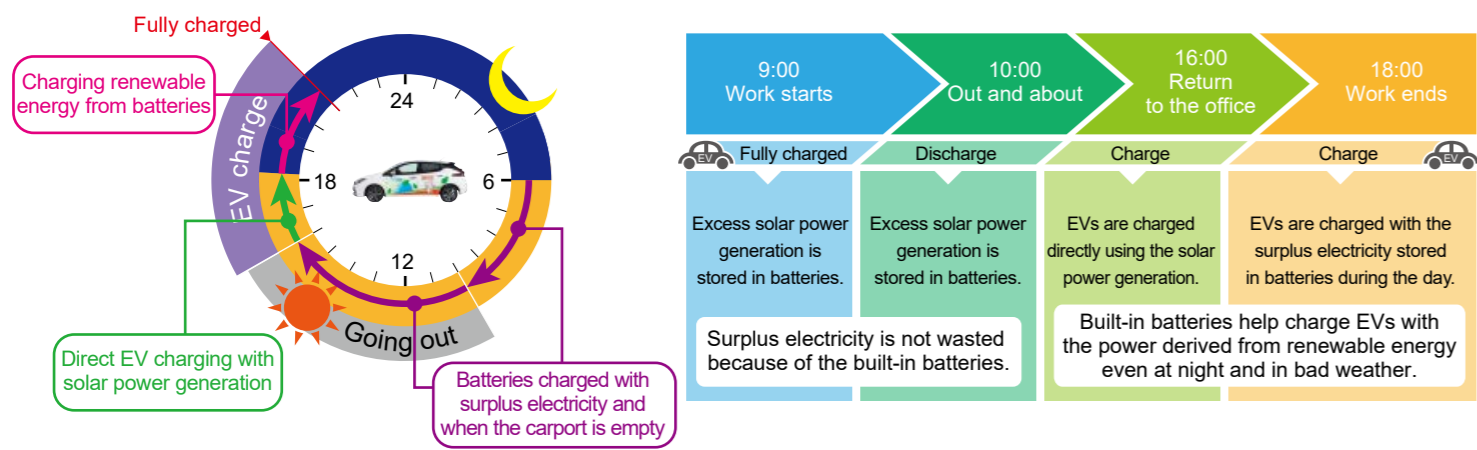


## EV Solar Carport

### EV charging with 100% renewable energy at any time of the day or night

Solar Carport is ideal for business and government vehicles that are often used during the daytime, because batteries are provided along with solar panels, enabling EVs to be charged with 100% renewable energy anytime without the influences of weather and time. If an extended period of bad weather makes it difficult to run the system with 100% renewable energy, the system also allows to charge EVs and batteries using commercial AC power.

#### Weekday flow of the company EV (example)

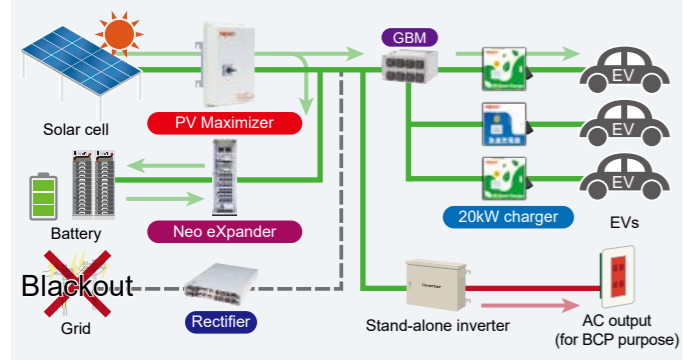


### Solar-generated electricity provided in emergencies

The Solar Carport serves as a shelter, providing electricity from Photovoltaic power generation and rechargeable batteries in a wide-area power failure (blackout) caused by a natural disaster. It serves as a renewable energy power plant and EV charging station in ordinary times and as a shelter during a disaster if required by the national or local government.

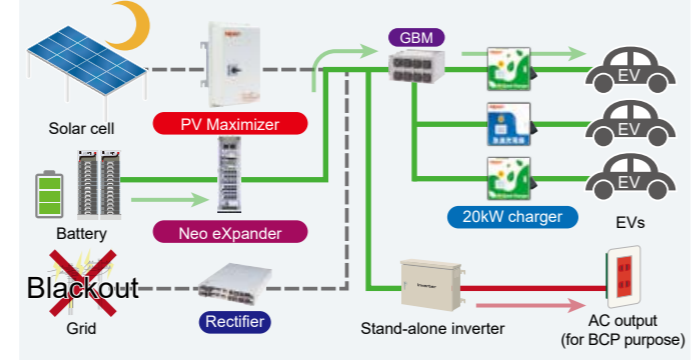
#### Blackout + Sunny weather

Power generated from the solar cells or from batteries can be supplied to EV charge and particular loads even if there is a blackout.



#### Blackout + At night

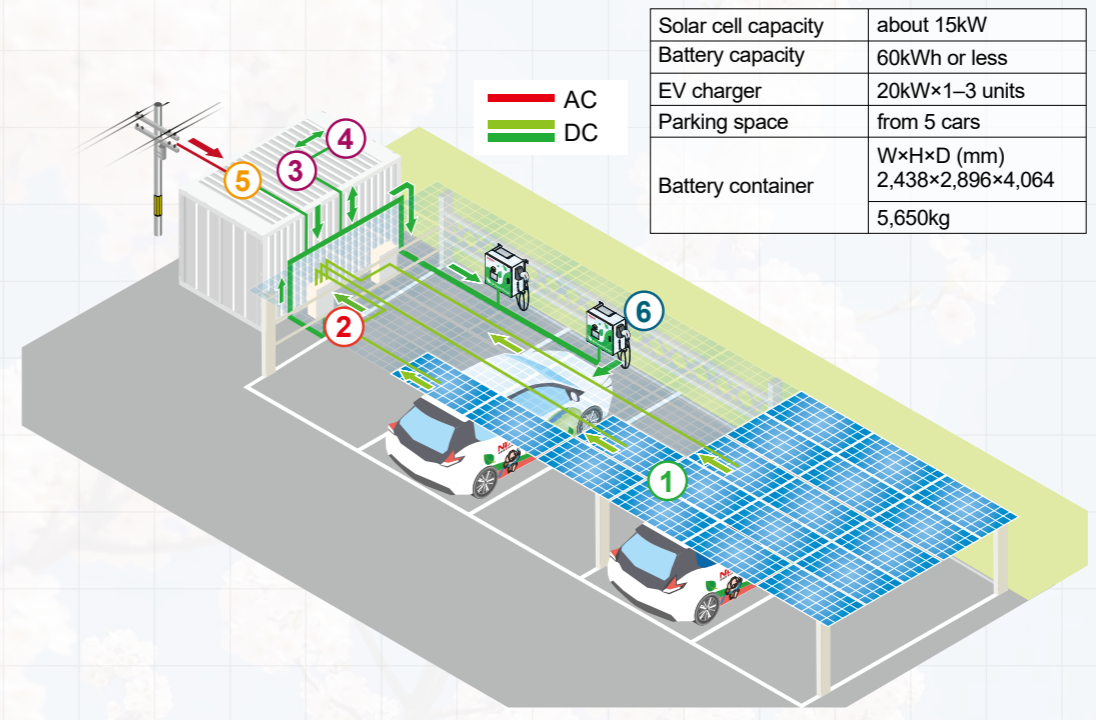
Even if there is a blackout at night, electricity can be supplied to EVs and emergency equipment from storage batteries.



Nipron EV Solar Carport which can be used as a disaster resilience base <http://www.nipron.com>

# Small & medium packages

### Configuration example of small packages



1 Solar cell

2 Step-up DC-DC

Newly upgraded PV Maximizer

3 Charge/discharge converter

Neo eXpander

4 Battery

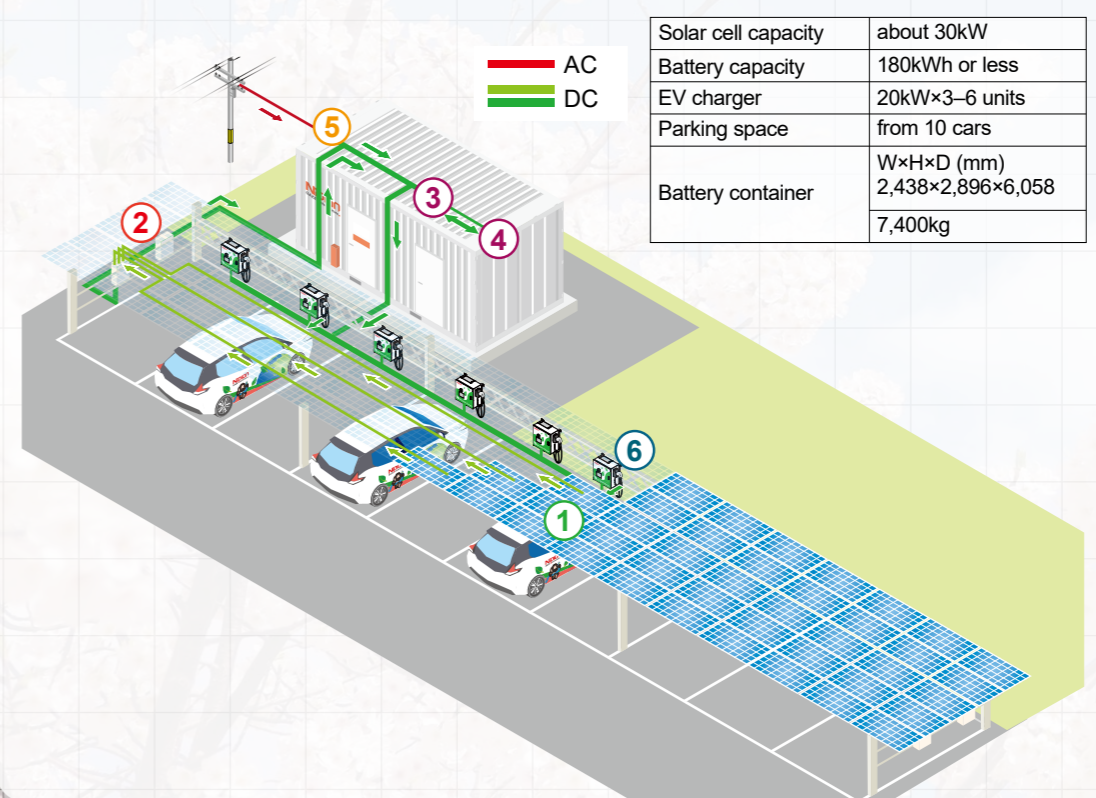
5 Rectifier

GP1UT

6 EV charger

Quick EV charger with DC input  
Size 600×600×303.5 (W×H×D mm, except for fixing metal fittings)  
Weight about 65kg  
Max. output 20kW

### Configuration example of medium packages



\* Since the product is under development, the specifications and appearance shown here may change without notice.

Flexible proposals can be made to fit the parking space <http://www.nipron.com>

# Accommodating the growing needs of data centers while contributing to carbon neutrality

# DC-powered Renewable Energy Edge Data Center

Excellent compatibility with Solar Carports

The speed of increase in digital data in the areas of transportation infrastructure, medicine, finance, etc. is remarkable and, like the rapid expansion of IT traffic, power consumption is also expected to increase dramatically. On the other hand, the Japanese government has set the target of realizing carbon-neutral society in 2050. Concerning these propositions of actions to attain carbon-neutrality and development of data centers, Nipron offers solutions from a composite perspective.

## Features of DC-powered Renewable Energy Edge Data Center proposed by Nipron

### Introduction of renewable energy

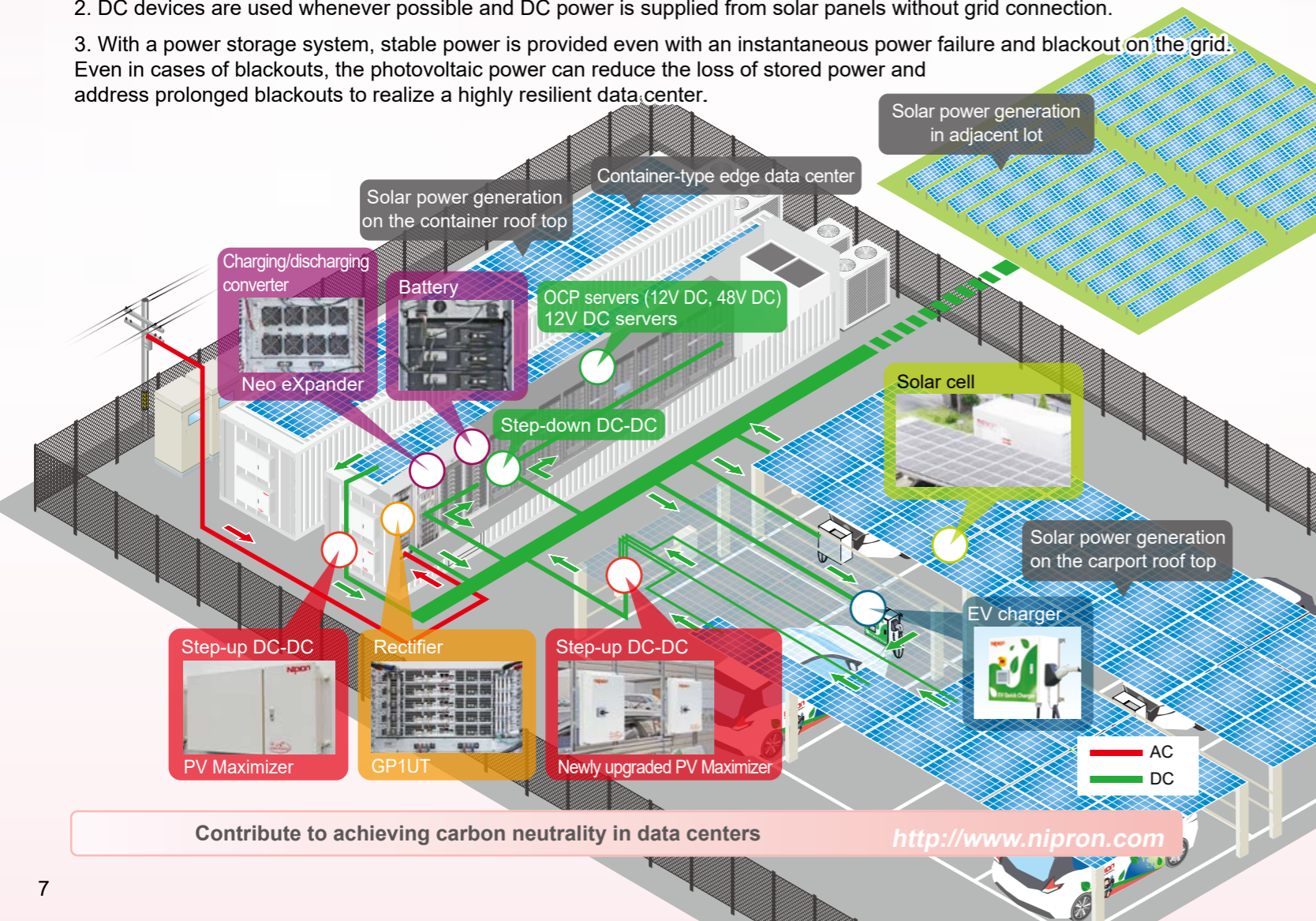
- Reduction of CO<sub>2</sub> emissions
- Local production for local consumption of energy

### Introduction of DC power supply

- Reduction of power conversion loss
- Improvement of reliability

## Configuration example of DC-powered renewable energy edge data center

1. Photovoltaic power provided for container-type edge data center and carports
2. DC devices are used whenever possible and DC power is supplied from solar panels without grid connection.
3. With a power storage system, stable power is provided even with an instantaneous power failure and blackout on the grid. Even in cases of blackouts, the photovoltaic power can reduce the loss of stored power and address prolonged blackouts to realize a highly resilient data center.



Contribute to achieving carbon neutrality in data centers

<http://www.nipron.com>

Renewable energy

DC power supply

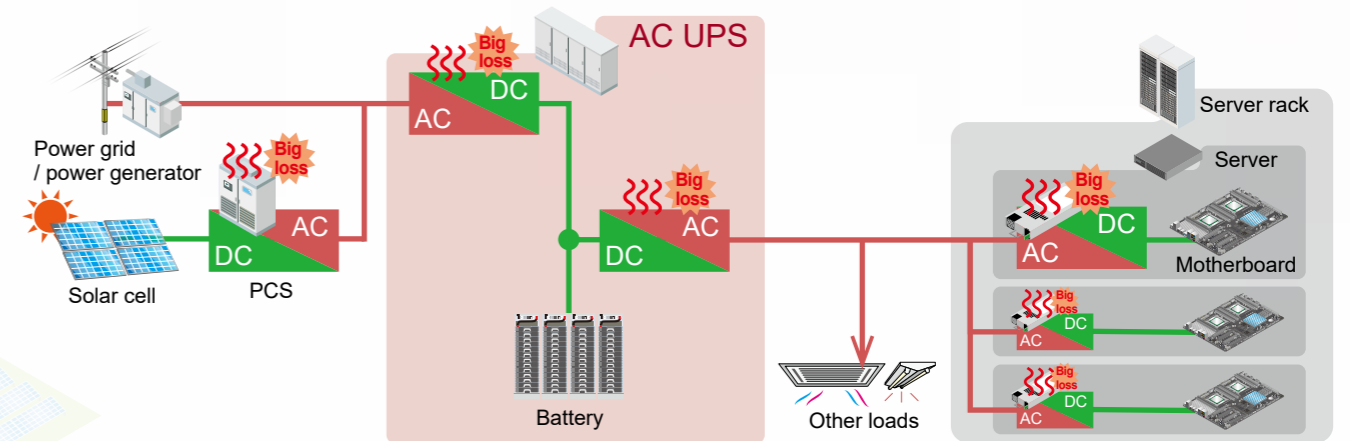
= CO<sub>2</sub> emissions

High efficiency

Enhanced resilience

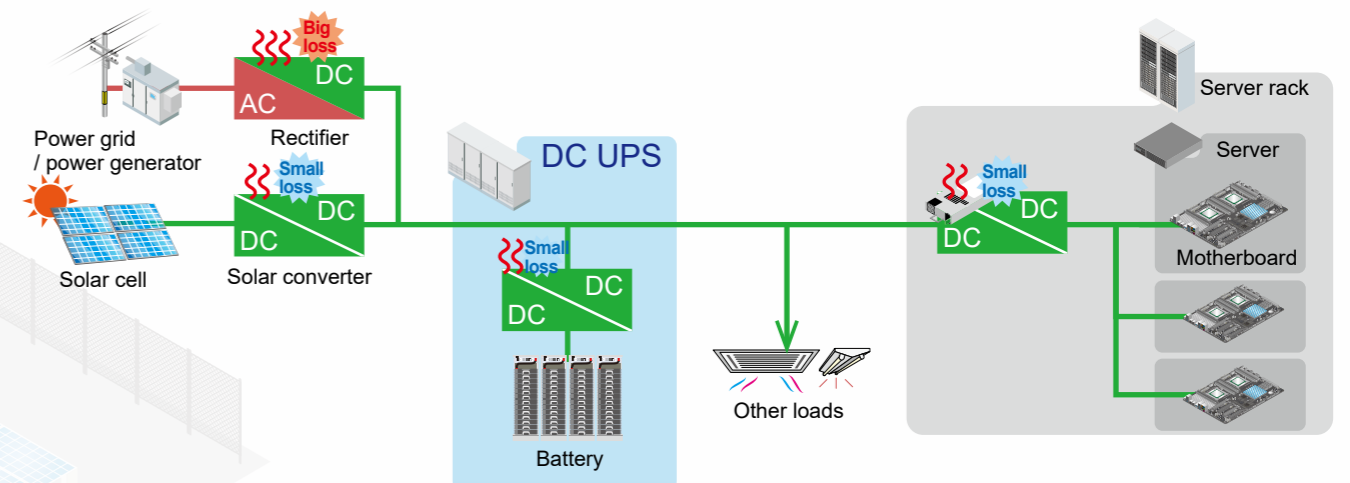
## Benefits of DC power supply

### AC power supply



There are many losses and the system tends to be complicated...

### DC power supply without grid connection DC-powered Renewable Energy Edge Data Center



DC power supply is highly efficient and reliable for renewable energy utilization.

Nipron proposes a new way to utilize renewable energy!

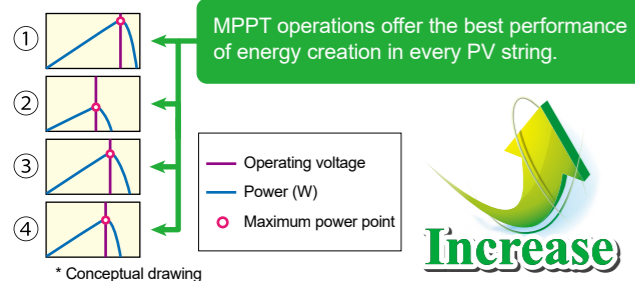
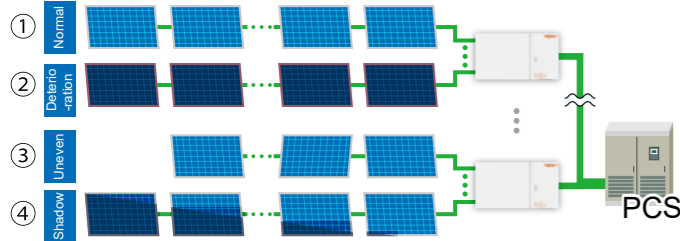
<http://www.nipron.com>

# Step-up DC-DC converter PV Maximizer

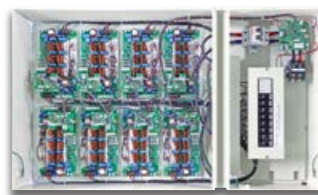


## Maximize the power generation of solar cells in all installation conditions

Solar panels are susceptible to various factors like shadows of utility poles and trees, irregular orientation of arrays, irregular number of panels in series connection, mixture of different panel types, etc. resulting in a drop in the string voltage. The PV Maximizer can cancel the voltage gap between strings by raising the string voltage that has dropped while maintaining the maximum power point, maximizing the power from the panels available for the power production.



## Designed with high reliability and long service life



High reliability and long life attained because of the elimination of limited life components like electrolytic capacitors and fans.

## System lineup with three different voltages

Systems supporting the maximum input voltages of 400, 750 and 1,000 V are available and, thus, small power stations of dozens of kW to the MW class mega-Photovoltaic power stations can be supported.

- 8STB-750V**: 8 strings, Max. input voltage: 750V
- 1STS-1000V**: 1 string, Max. input voltage: 1,000V
- 4STQ-400V**: 4 strings, Max. input voltage: 400V
- 1STS-750V**: 1 string, Max. input voltage: 750V

## Excellent sales track record

**More than 7 years!**  
**More than 1,500 cabinets!**

The PV Maximizer has a sales track record of more than 1,500 cabinets since 2014, serving power stations throughout Japan.

## Minimize losses due to aging of panels

Ten years have passed since the Feed-in Tariff (FIT) for renewable energies was introduced in July 2012. Taking this opportunity, Nipron proposes repowering\*1 of systems utilizing the PV Maximizer. Since the service life of a power conditioner is commonly said to be 10 to 15 years and, therefore, it is time to consider overhauling or replacing power conditioners that have been operated since the early days of FIT introduction.

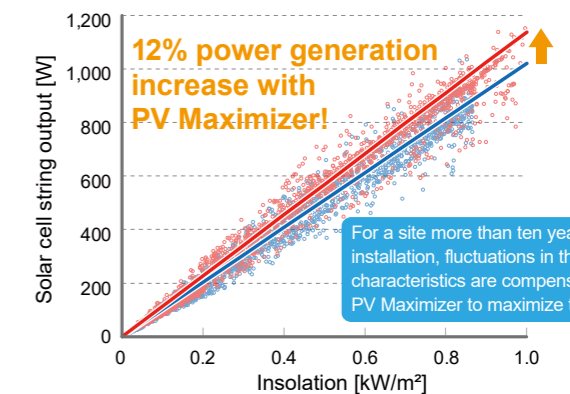
On the rooftop of Nipron's Hanshin Dream Factory, plots of PV string output and actual measurements of insolation were taken by switching ON and OFF the PV Maximizer control every 24 hours. Approximate lines were drawn for actual measurements obtained in both periods in which the control was ON and OFF to compare the power generation amount under the same insolation conditions.\*2

Panel installation: 2008  
Test period: April 1 to 30, 2019



## A case example of improved power generation with PV Maximizer

[with PVM] ○ Measurements — Approximate lines  
[without PVM] ○ Measurements — Approximate lines



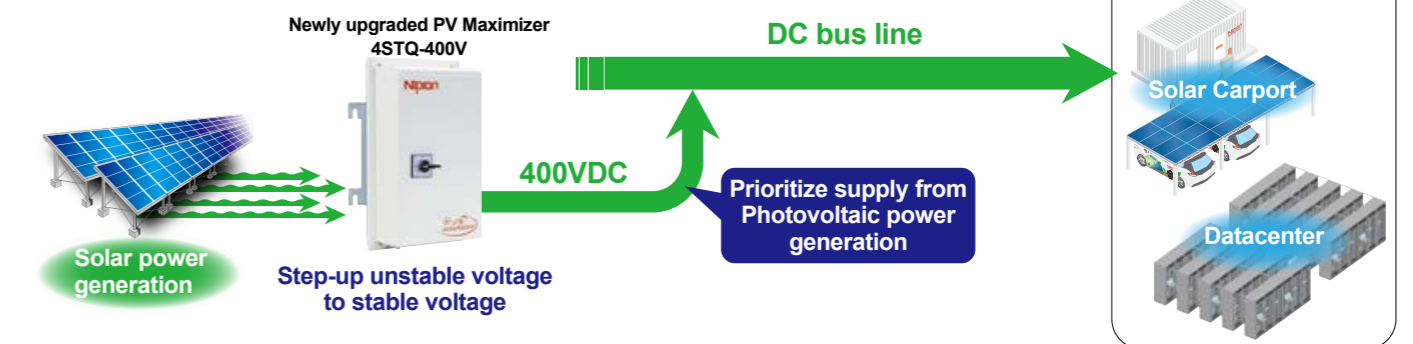
\*1 Increasing the output power of aged PV power stations by replacing major components or adding new devices.  
\*2 Please see Nipron Wave 56 for more details on the test results.

## Newly upgraded PV Maximizer 4STQ-400V

- Input voltage range: 160–400V DC
- Solar cell input circuit: 4 circuits
- Input current: 10A/Circuit Max.: 40A
- Input power: 3.2kW/Circuit Max.: 12.8kW
- Output voltage configurable range: 200–400V DC

## PV Maximizer is optimal for DC power supply

The PV Maximizer is also adopted in the supply of DC power. Because the generated power can be supplied in DC without converting it to AC, it is a product suitable for DC devices (data centers, batteries, etc.).



## Example of installation in a solar carport



## Features

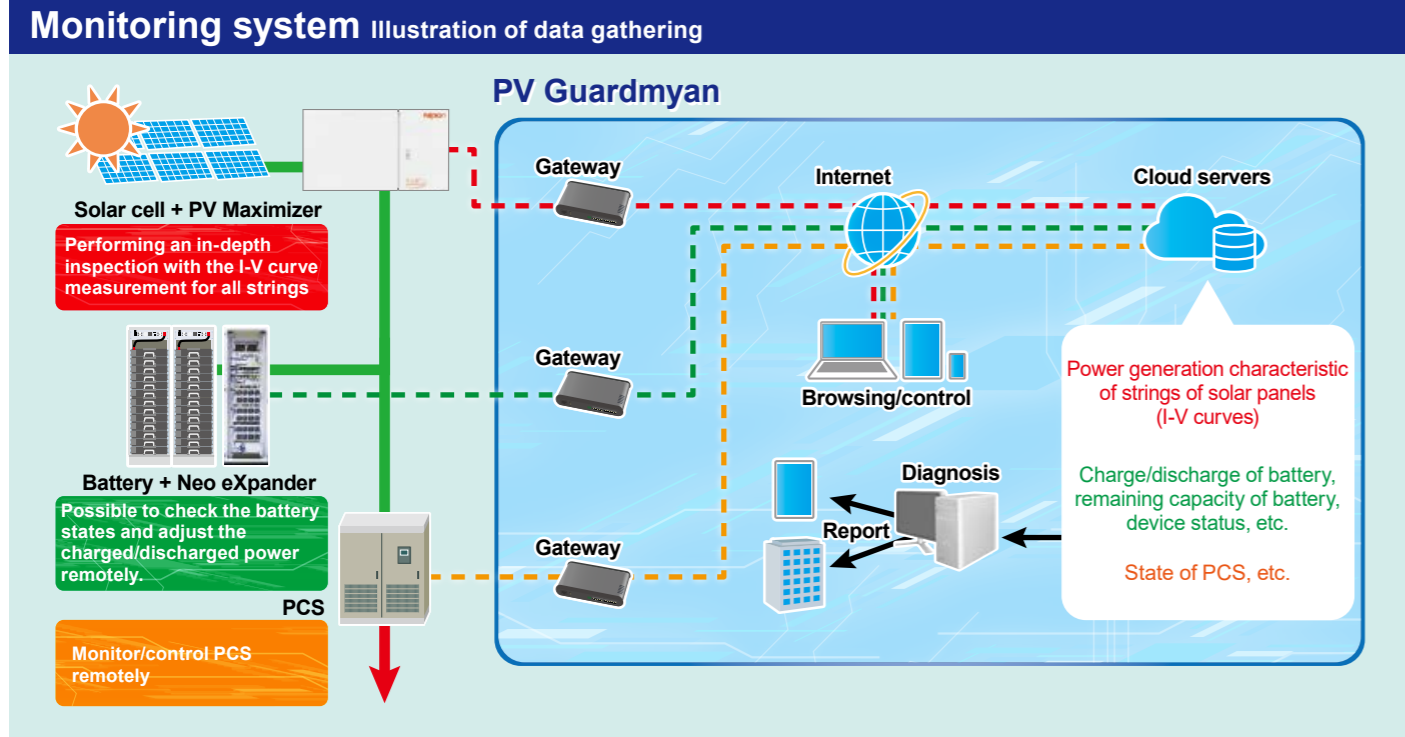
- 1 unit supports 4 strings of open-circuit voltage 400V
- Maximizing the power generated by the MPPT control for each string
- Supports remote monitoring function (PV Guardmyan)
- Various settings such as output voltage are available from the cloud
- Sealed construction for the waterproof & dustproof performance of IP44 or higher
- The power density is more than 200% higher than that of Nipron's past/current models.

PV Maximizer can be used for power stations of various scales

<http://www.nipron.com>

PV Maximizer can maximize power generation and DC power supply

<http://www.nipron.com>



## 1. High-performance remote monitoring of photovoltaic power generation

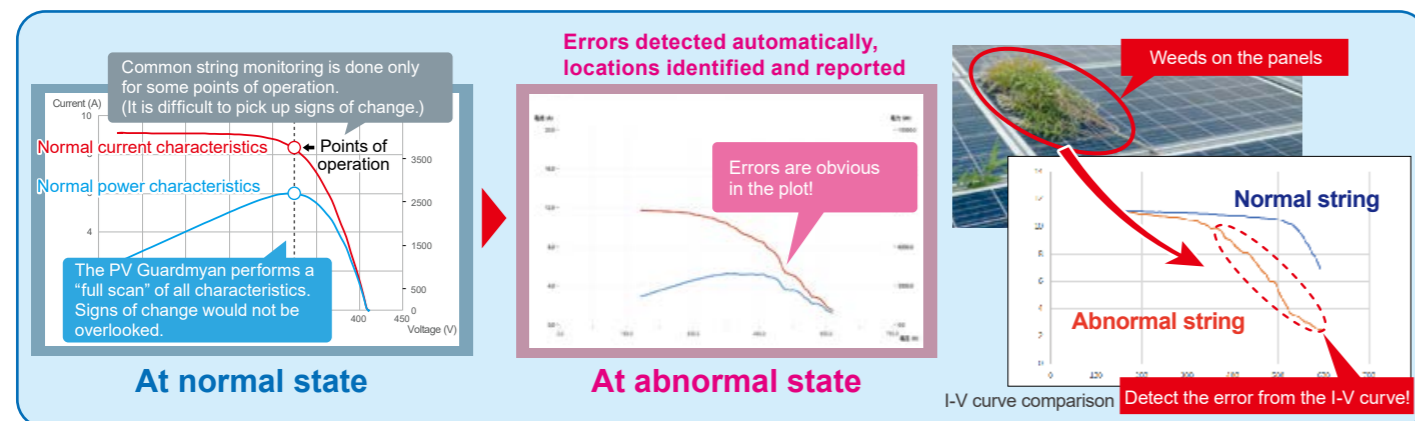
Irregular signs can be surely identified by measuring I-V curves simultaneously for 365 days a year.

PV Guardmyan reports irregular conditions by managing and analyzing big data (power generation strings) stored on a cloud server and I-V curves show the strings' conditions.

### Diagnostic feature for early detection of problems

A variety of problems in power generation are detected.

Characteristic curves from proper operation and erroneous operations are compared and analyzed to identify problematic strings and notify the user.



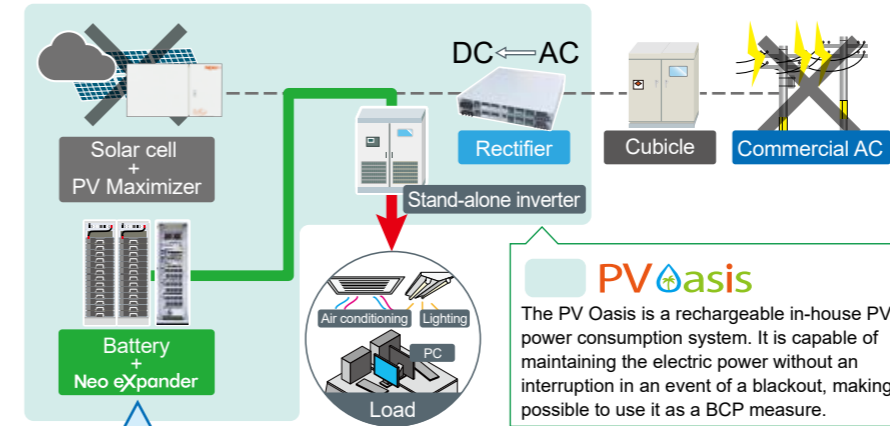
Our high-performance remote monitoring system misses no problem in power generation

<http://www.nipron.com>

## 2. Remote monitoring and remote control of batteries

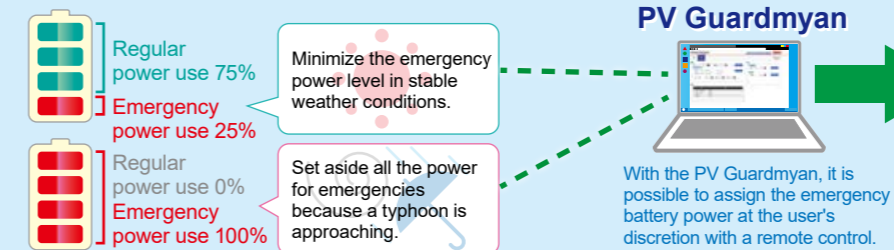
### Remote switching of operation mode to address blackouts

The PV Guardmyan supports the monitoring and cloud diagnosis of power storage systems and remote control of their charging and discharging operations. This makes it possible to use the system as a BCP measure, in addition to the reduction of maintenance cost.



### Emergency battery assignments can be controlled remotely.

In situations where natural hazards are expected, the system can be operated as a BCP measure by reserving a part of batteries for emergencies.



#### System monitoring screen (GBM PSU)



Displays the operational status of the charging/discharging power supply (GBM).

#### System monitoring screen (battery)



Displays the operational status of the battery.

#### Assignment setting screen (GBM PSU)

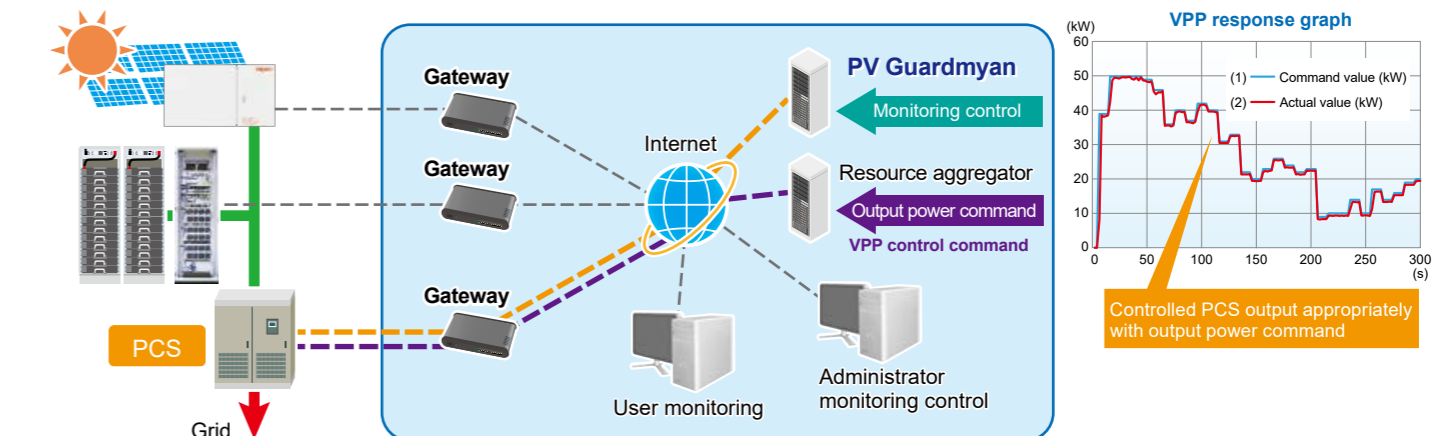


It is possible to assign the emergency battery power at the user's discretion.

## 3. Output power control with VPP support

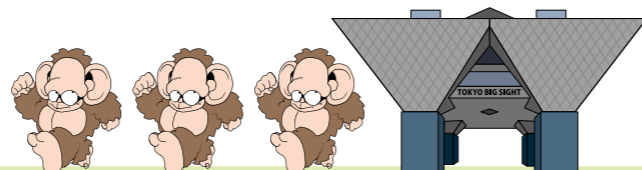
### PCSs can also be monitored and controlled.

By utilizing the PV Guardmyan, a VPP supported power storage system can be constructed. The PV Guardmyan receives output power commands from the aggregator and controls the PCS to supply the power as commanded.



PV Guardmyan — enabling remote monitoring / control of both PCS and battery <http://www.nipron.com>

# Exhibition report



## Participated in the INT'L SMART GRID EXPO

Nipron participated in the INT'L SMART GRID EXPO Spring held for three days from March 16 to 18 at the Tokyo Big Sight. This exhibition was a comprehensive power system exhibition with the presentations of technologies enabling VPP and facilities like energy management systems and batteries.

At the Nipron booth, various products and solutions suitable for the realization of carbon-neutral society were presented. In the demonstration of "EV Solar Carport System (photovoltaic power generation, power storage & EV chargers in a parking lot)," for which inquiries are received from many corporations and local governments, special ideas were used to make the system understood visually by displaying the status of power generation and remaining power in the batteries on a large screen and representing the flow of electric current with an LED tape. Actual EV charger was also presented to offer an opportunity for many visitors to see it. Other presentations included the PV Maximizer, which enables repowering of power stations by limiting the influences of deteriorated panels and shadows, and track records of power storage systems. During the exhibition, we invited lecturers from a variety of industries to deliver lectures on "carbon-neutral society," "DC power supply," "renewable energies," etc. The exhibition was a huge success with many visitors.



# New employees



## 33 new employees joined Nipron this year.

This year, Nipron welcomed a total of 33 newcomers including five humanities major and four science major university graduates and 24 high-school graduates. In the initiation ceremony, each newcomer made a fresh start as a member of community by stating his/her pledge after instructive speeches of President Sakai and officers. University graduates will be assigned to jobs in different departments after a training lasting for three to four months.



The initiation ceremony



The initiation ceremony



New employee training



A wide range of power supply units is available. Call us to find out more

<http://www.nipron.com>

# Customer Interview: Reason to have adopted a Nipron power supply



## Interview

**We have expectations and sense of security that Nipron is reliable in terms of product quality, reliability and customer support.**

MIS Corporation, an industrial equipment manufacturer whose products have been the choice of customers in many industries, including plant, medicine, semi-conductor, etc., uses a variety of Nipron products.

**MIS Corporation**



### Please share with us the background for selecting our power supply units.

The main reason is that Nipron is a manufacturer producing power supply units in Japan. We have experienced troubles in using imported power supply units sometime ago. The manufacturer's analyses of problems were minimal and that left us in a difficult situation. In that sense, we have expectations and a sense of security that Nipron's attitude towards its product quality and reliability, as well as customer support, is reliable. That is why we selected Nipron's power supply units.

### What do you think is important in selecting PC power supply units?

Although there are many factors influencing the selection of PC power supply units, the operating temperature range of PSU is particularly important. Because we develop industrial products requiring stable operation under a high temperature, the operating temperature range 0 to 60°C of Nipron PSUs is ideal for system applications. Also, as we often propose systems incorporating batteries to our customers, the features like the UPS function and communication interfaces, such as RS232C and USB, are also important in selecting the PSU.

### Please tell us the advantages (problems solved and merits) in selecting our PSUs you have experienced.

Because we seldom have problems with PSUs, we have never experienced serious problems with PSUs. Also, if a PSU did fail, we can rely on Nipron to analyze the problem thoroughly and prepare an analysis report. It is a big help that Nipron offers an excellent customer support after the sale and in cases of product failures.

### What are the user responses and satisfaction rate of your PCs with our PSUs?

We seldom have PSU troubles with systems incorporating Nipron PSUs. Because we receive almost no report on PSU troubles, we assume that our customers do have a sense of security and stability on the PSU.

### Please tell us the characteristics and strengths of your PC business.

Our strength is that we can customize the PC system flexibly in accordance with the customer's request. Depending on the customers' devices, we often receive in-depth requests concerning features and specifications and we customize our systems by satisfying the requirements as much as we can.

### Please tell us the outlook of your PC business and your plan in expanding your business.

Like we have been working on to date, we will continue to undertake the business focusing on the controllers for industrial equipment. It is expected that the PC systems will undergo a trend of miniaturization in the future throughout the industry. We are, therefore, planning to expand our product lineup to satisfy customers' needs, including high-performance miniature PCs that are space-saving, fanless box type PCs, AI systems, etc., in addition to the scalable PC systems offered in the past.



**iMX8700**  
Powered by 8th Generation Intel® Core™ i7 Processor  
Highly reliable industrial computer



**HPCSA-570P-X2S**  
Continuous 400W Peak 570W output  
80PLUS BRONZE certified, high-efficiency ATX power supply

If you are having trouble with your power supply, please contact Nipron

<http://www.nipron.com>



# The Nipron Story, by Our President

## Are we facing the most serious crisis of the postwar era?

The cherry blossoms are now in full bloom. On April 1, 2022, a grand welcoming ceremony was held for 33 new employees (9 university and graduate school graduates and 24 high school graduates).



For those wondering why we need to recruit such a large number of new employees, let me explain the reason.

Along with manufacturing focused on 100% domestic production, Nipron aims to achieve 100% in-house production. For more than a decade, we have been filling the shortage of manufacturing personnel with Chinese trainees. However, the recent COVID-19 pandemic has made it difficult to hire them, and related labor costs have been rising, tending to be even higher than those for Japanese.

Additionally, considering disadvantages of not being able to increase the effectiveness of training because of the apprenticeship program within a three-year time period, I was beginning to feel a limit in our efforts to improve quality and productivity. The recent years' environmental change in the increase of high school graduate applicants was an opportunity for us to switch from hiring Chinese trainees to hiring 100% Japanese permanent employees, and taking this advantage, we decided to exploit our distinctive characteristics.

With this change in policy, to get a step ahead of trends, we are also planning to carry out workstyle reform, which is a turning point of the times. We manufacturers operating in the "real" industry need people but at the same time have already started efforts in promoting automation, labor saving, and robotization as much as possible, as well as in taking approach to DX, which we will further accelerate in the future. To this end, we need to have more sophisticated and professional manufacturing personnel.

Starting with the hiring of many new high school graduates as I mentioned earlier, we have decided to strengthen our manufacturing capabilities by providing advanced education and training for them to acquire knowledge and techniques required for manufacturing, that is what we have not been able to do until now. We will systematically provide such training throughout the year and develop our employees as highly skilled manufacturing personnel, thereby cultivating multi-skilled workers to further improve quality and productivity. Furthermore, to motivate them, we will reward them according to their achievements, and further enhance the merit system, which allows salary increase as their abilities improve.

I have decided to make another big change.

Upon turning 78 years old this past February, I decided to step down as President, a position I had held for 53 years, and assume the position of Chairman and CEO (Chief Executive Officer). Tatsuya Futami, outside director, will be informally appointed as new president at the Board of Directors meeting in March, and officially appointed at the extraordinary shareholders' meeting and Board of Directors meeting to be held in June. As President and COO (Chief Operating Officer) from July, the beginning of the 42nd term, he will continue to pursue further evolution while continuing on our present course.

About two years ago, I developed Parkinson's syndrome and have difficulty in walking. I have made up my mind this time because I have not been able to visit our customers, sometimes causing delays in business and giving inconveniences to the customers.

Going forward, as Chairman and CEO, I will mainly take charge of making important decisions, formulating strategic policies, and contributing to "Nipron with enduring vitality" in consultation with the new president.

I look forward to your continued guidance and support in the future.

*Setsuo Sakai*  
*April 2022*

 **Nipron Co., Ltd.** <http://www.nipron.com>

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