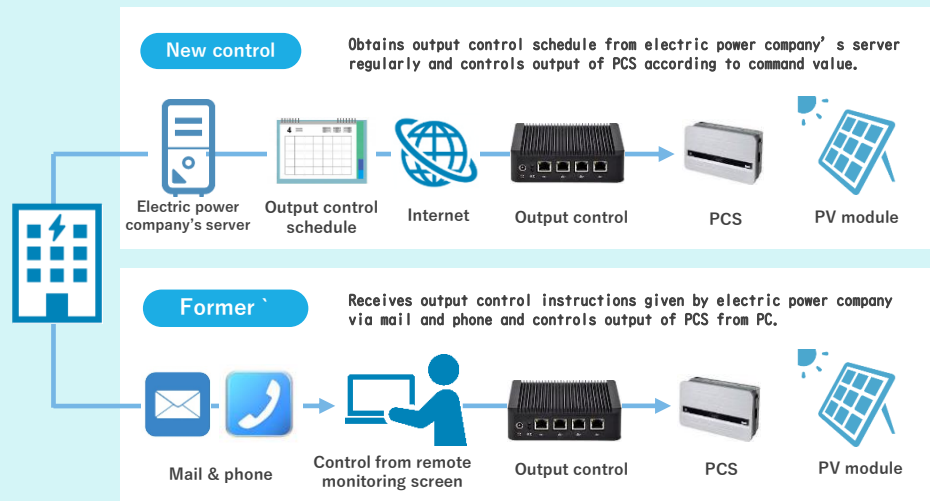## Output Control

For output control of PV power generation, application conditions vary between electric power companies while interface methods differ between manufacturers of PCS.
CSD will consult with customers to offer an optimal choice.

Example of output control configuration

New control — Obtains output control schedule from electric power company's server regularly and controls output of PCS according to command value.

Electric power company's server → Output control schedule → Internet → Output control → PCS → PV module

Former` — Receives output control instructions given by electric power company via mail and phone and controls output of PCS from PC.

Mail & phone → Control from remote monitoring screen → Output control → PCS → PV module

＊ Megane ＝ glasses

CSD
Customer Solutions Development

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Photovoltaic remote monitoring system
(Cloud Service)
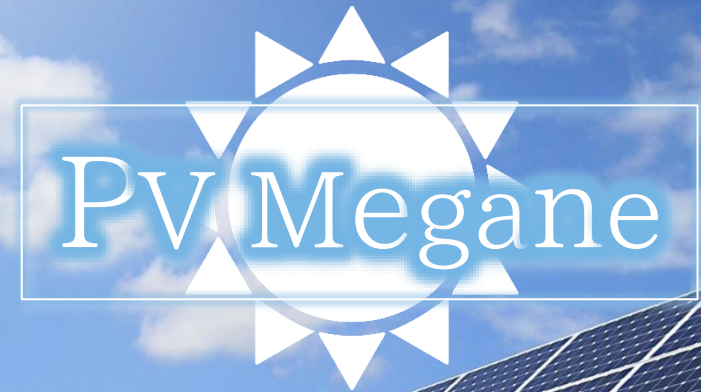
Pv Megane

Long term & reliable service.

CSD
Customer Solutions Development

Detect abnormalities in Pv power generation system early!

Contributes to maintaining long-term feasibility and safe operation of PV power generation.

PV-Megane Features

✓ **Cloud computing service**
Collects, accumulates and manages data in the cloud, eliminating the need for servers and hardware, and reducing initial cost.

✓ **Achieves low cost by packaging devices and software necessary for monitoring of solar power plant**
CSD's experience in building microgrid EMS results in a slim configuration in which communication control devices, I/O devices, and software are packaged. It can be applied as a component of microgrid.

✓ **Possible to configure the system with different measurement scales**
It is possible to configure the system in accordance with various levels of measurement scales from central inverter, string inverter, power collection box to string unit.

✓ **Supports various types of system configuration**
Flexibly supports upgrading of existing on-premise system to cloud-based system and building of a new cloud system.
(*System configuration for on-premise system is possible.)

✓ **Carries out various performance diagnoses of facilities**
Through real time monitoring of solar power plant and equipment performance diagnosis of power generation performance and conversion efficiency of PCS, it contributes to maintaining long-term feasibility of operation.

✓ **Output control assistance**
Obtains output control schedule from the electric power company's server periodically and controls output of PCS. CSD's expertise in building microgrid EMS and VPP ensures minimization of power generation loss.

✓ **Sends notification mail when detecting abnormalities**
When detecting abnormalities, it sends an alert notification mail to minimize power generation loss.

PV-Megane System Structure
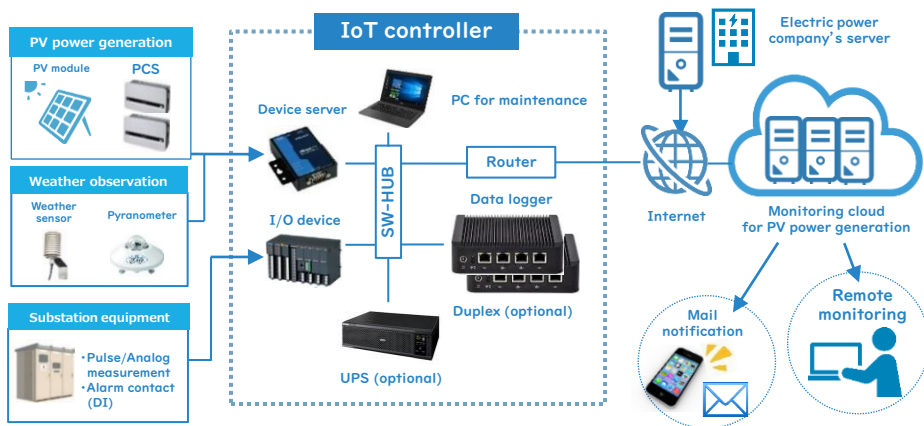
Functions

Functions	Description
Monitoring of power generation and operation status	Displays the current status of power generation, including generated power and its amount, solar radiation intensity, temperature, etc.
Operation status of PCS	Displays detailed operation status of each PCS with graphs.
Trend chart display	Graph displays performance data of any power plant.
Power generation report	Creates daily, monthly, and annual reports, which include the amount of power generation, solar radiation, and outside temperature with graphs.
Alarm history	Abnormalities detected in power plant and alarms are chronologically displayed. Detection follows the setting of alarm filter.
Mail notification when detecting abnormalities	When abnormalities are detected, alert notifications are sent via mail. Notification recipients and alerts level can be configured.
String monitoring	Regularly collects and saves the data of each string. The data include voltage, current, and electric power.
List of alarm and event	Refined search by keywords related to any event and alarm.
Form output	Daily, monthly, and annual reports as well as the list of event and alarm are displayed in printing screen.
Export of measured data	Exports measured data to CSV file. Data include daily, monthly, and annual reports and trend.
Performance diagnosis of power generation	Conversion efficiency of PCS, power generation efficiency, power generation performance monitoring, capacity utilization rate, etc.
Power generation diagnosis (optional)	Comparison diagnosis between expected and actual amount of power generation per PCS or string.
Power generation amount forecast (optional)	Forecasts the amount of power generation for a few days based on weather forecasting model and power plant's facility specifications.
Output control of PV power (optional)	Regularly obtains output control schedule from electric power company's server and controls output of PCS.

Sample Screen

❶ **dashboard** — Current operation status and operation of control output

❷ **operation status of PCS** — Displays operation status of each PCS

❸ **Trend chart** — Graph displays performance data of any power plant

❹ **Power generation report** — Daily, monthly, and annual reports are displayed in graph format

❺ **planning and control** — Displays abnormalities and alarms chronologically

❻ **output control** — Confirmation of output control schedule and results