

# Gateway Server User Manual

---

2024/09/30 V3.3.8 ©3EGREEN

©3egreen



## Contents

Chapter 1 Gateway Server User Manual .....	2
1.1 Server Settings .....	2
1.2 Basic Settings.....	2
1.3 Ensure that the Gateway and Hook are Connected.....	3
1.4 Setting up single-phase and three-phase devices .....	4
1.5 Setting the Alert Function - 1 - Basic Settings.....	7
1.6 Setting the Alert Function - 2 - Detailed Settings .....	9
1.7 Setting Groups (linked demand detection and multi-layer plant power usage pages) .....	10
1.8 Electricity Price Setting (linked with demand detection and multi-layer plant area electricity usage page) .....	12
1.9 Modbus Device Configuration.....	13
1.10 Final Inspection System Settings .....	14
Chapter 2. Device List Settings .....	15
2.1 Setting Device List.....	15
Chapter 3. Modbus Point List .....	17
3.1 Modbus Point List Settings .....	17
Chapter 4. Cloud Dashboard.....	17
4.1 Cloud Dashboard Homepage .....	17
4.2 CSV File Export.....	19
4.3 Current Trend Inquiry .....	21
4.4 Demand Electricity Detection.....	23
4.5 Multi-layer Field Electricity .....	25
4.6 Electricity Bill Calculation .....	27
4.7 Device Alert History .....	29
4.8 API Service .....	30

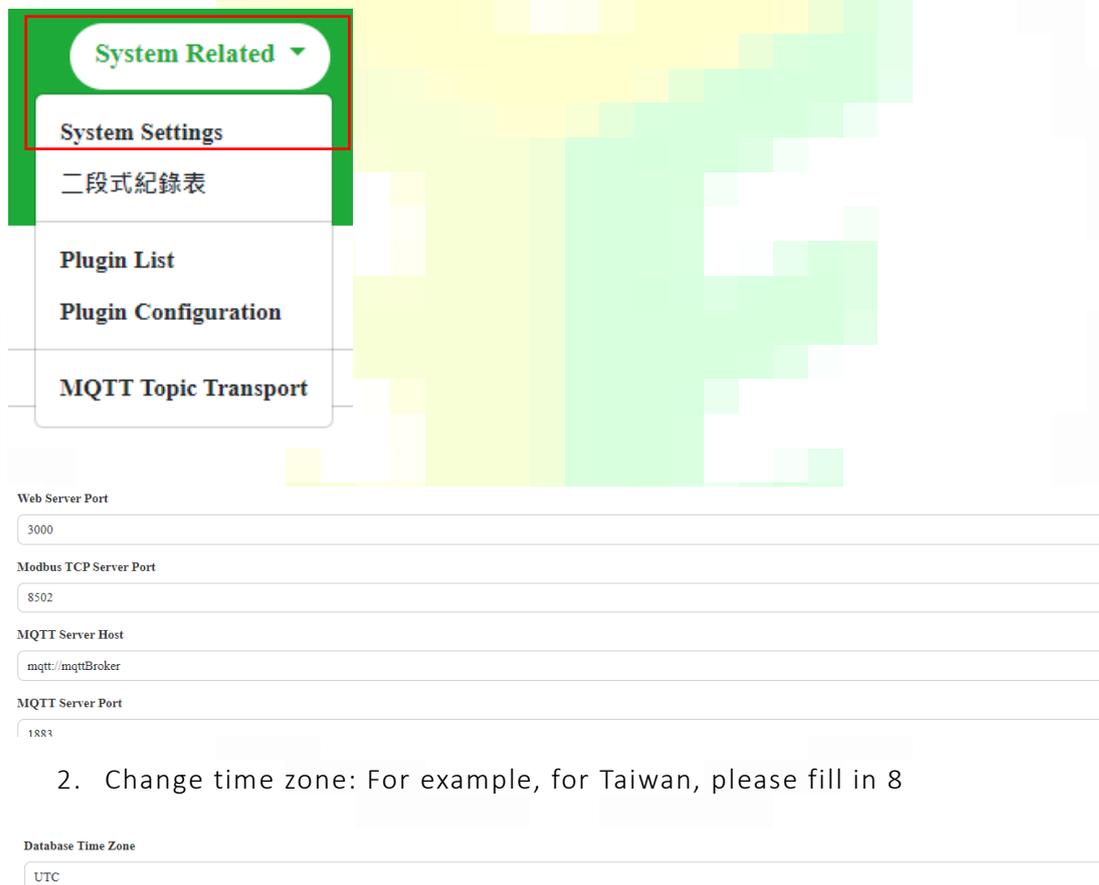
# Chapter 1 Gateway Server User Manual

## 1.1 Server Settings

You may use [domainName]) or (URL localhost:3000) IP:3000

## 1.2 Basic Settings

1. To set Time zone "Click "System Settings"



**System Related** ▾

- System Settings**
- 二段式紀錄表
- Plugin List
- Plugin Configuration
- MQTT Topic Transport

Web Server Port  
3000

Modbus TCP Server Port  
8502

MQTT Server Host  
mqtt://mqttBroker

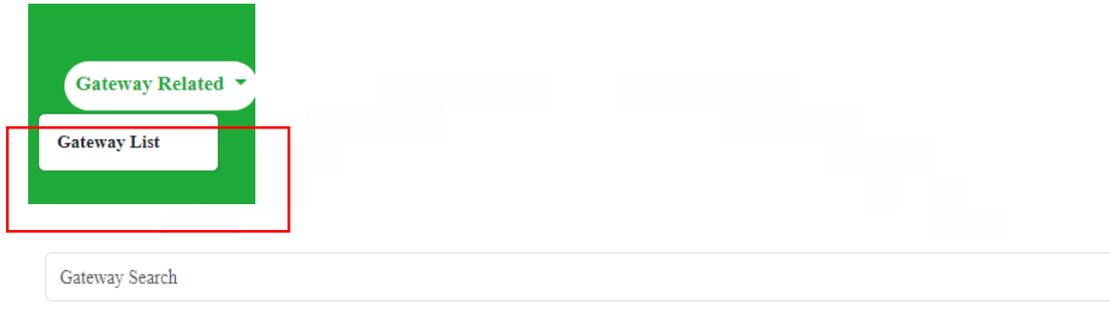
MQTT Server Port  
1883

Database Time Zone  
UTC

2. Change time zone: For example, for Taiwan, please fill in 8

## 1.3 Ensure that the Gateway and Hook are Connected

1. On Gateway Related Click "Gateway List": See example below.



2. Confirm the gateway connection status (for gateway connection settings, please refer to the gateway connection settings document):

Click the "..." icon on the right side of the table to modify the gateway alias (e.g. Pillar A Gateway).

*2.1 The gateway status is divided into "connected" and "disconnected". If it is not connected, no data will be uploaded for more than 10 minutes.*



3. Click "Clamp Meter List" (this page has been hidden, if you need to use it, please enter the URL directly, xxx.3egreen.cloud/#/dashboard/clamp-meter-list):

Gateway Location	Gateway MAC	Last Update Time	Gateway Status	Operation
N/A	28EC9A7E3AF0	2024-09-27 14:33:32	Disconnected	...

4. Confirm the connection status of the connected hook : Next on the operation click the three dots. See example below.

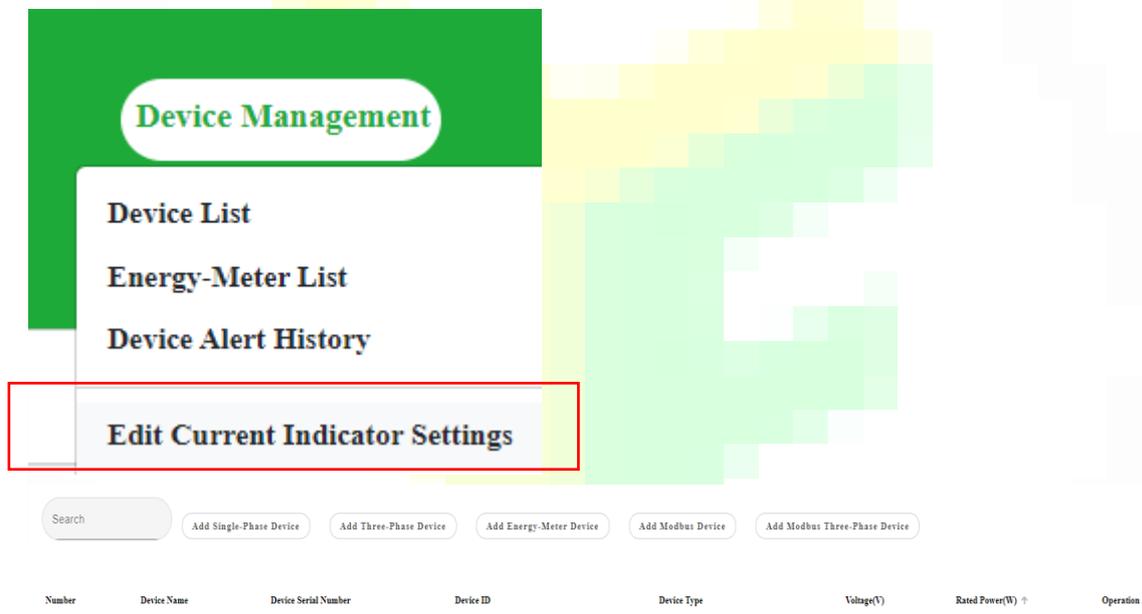
Clamp Meter Alias	Clamp Meter MAC	Voltage	Current	Rssi	Battery Level	Temperature	Last Update Time
N/A	AC:4D:16:F1:8A:91	110	12.6	-82	95	32767	2024-09-13 17:57:57
N/A	CC:03:7B:87:9D:AF	110	0	-80	97	32767	2024-09-27 11:51:32

## 1.4 Setting up single-phase and three-phase devices

Special note: Please set the single-phase first, then the three phase! Once the three phase is successfully bound to the single-phase device, the single-phase device will change from a "single phase smart current indicator" to a "phase sub-device" !

The power calculations displayed in the system are based on the device (s) configured on this page.

1. Click "Edit Current Indicator Settings":



The screenshot displays the 'Device Management' section of a web application. A green header contains the title 'Device Management'. Below it, a white sidebar lists 'Device List', 'Energy-Meter List', and 'Device Alert History'. The 'Edit Current Indicator Settings' button is highlighted with a red rectangular box. Below the sidebar, there is a search bar and several buttons: 'Add Single-Phase Device', 'Add Three-Phase Device', 'Add Energy-Meter Device', 'Add Modbus Device', and 'Add Modbus Three-Phase Device'. At the bottom, a table header is visible with columns: 'Number', 'Device Name', 'Device Serial Number', 'Device ID', 'Device Type', 'Voltage(V)', 'Rated Power(W) ↑', and 'Operation'.

## 2. Click "Add Single-Phase Device":

Enter the device name (customized: e.g. machine\_1, can only contain \_ and -, required), device serial number (custom: e.g. eqp\_1, can only contain \_ and -, required), device identification code (MAC Address, required), voltage acquisition method (Modbus device acquisition requires filling in the slicer ID, register address, and setting the corresponding Modbus device, please see the next section for details), voltage value (custom, required), rated power (average reasonable power, required), power factor (involves power calculation, required), current multiplier (default value), disconnection reminder notification (default value).

The screenshot shows a dashboard with a 'Device Management' tab. A table lists existing devices with columns for Number, Device Name, Device Serial Number, and Device ID. To the right, the 'Single-Phase Basic Setting' form is open, showing the following fields and values:

- Device Name\*: (empty)
- Device Serial Number\*: ATT-123456
- Device ID\*: 00:AA:BB:CC:DD:EE
- Voltage Acquisition Method:  Set Manually,  Modbus Device Selection
- Voltage(V)\*: 220
- Rated Power(W)\*: 0.3
- Power Factor\*: 1
- Current Multiplier\*: 0.1

Buttons for 'Exit' and 'Add Data' are visible at the bottom of the form.

## 3. Send

You will see the set device. Click the edit and delete icons to perform related operations:

Number	Device Name	Device Serial Number	Device ID	Device Type	Voltage(V)	Rated Power(W)	Operation
1	E3M30	e4801c17ab	e4801c17ab	Modbus Three-Phase Smart Current Indicator Management	N/A	0	

## 4. Click "Add three-phase device":

Enter the device name (e.g., chiller, required), device serial number (customized: eg eqp1, can only contain \_ and -, required), device identification code (customized, required), voltage setting value (required), rated power (reasonable power, required), voltage value (customized, required), power factor

(required), R phase (MAC Address, will automatically bring in the set single-phase device, it is recommended to use the selection method, required), S phase (MAC Address, input method is the same as R phase, required), T phase (MAC Address, input method is the same as R phase, required), connection method (delta or y, as default), disconnection reminder notification (as default).

REMARKS: The device type of the device corresponding to the R, S, and T phases will be converted to a "phase sub-device" to serve as the basis for calculating the power of the three-phase device.

The screenshot shows the 3Egreen technology Inc. dashboard. The main content is a table of devices with the following data:

Number ↑	Device Name	Device Serial Number	Device ID
1	EM330	e45f01c17fab	e45f01c17fab
2	冰水主機1	modbusEqp1	modbusEqp1
3	Total	AA:BB:CC:09:13	AA:BB:CC:09:13
30	CM02-21-0001	CM02-21-0001	AC:4D:16:F1:89:D3
31	CM03-21-0001	CM03-21-0001	74:46:B3:21:57:41
32	CM04-21-0001	CM04-21-0001	74:46:B3:21:55:B1
33	FM00-01-004S	FM00-01-004S	AC:4D:16:F1:8A:A6
34	FM05-01-0001	FM05-01-0001	AC:4D:16:F1:65:45
35	CM03-05-004C	CM03-05-004C	0C:61:CF:CE:59:E9
36	CM04-05-001J	CM04-05-001J	0C:61:CF:CE:50:58

Overlaid on the right is the 'Three-Phase Basic Setting' form with the following fields:

- Device Name\* (empty)
- Can only include \_- for (empty)
- Device Serial Number\* (ATT-123456)
- Can only include \_- (empty)
- Device ID\* (00:AA:BB:CC:DD:EE)
- Can only include: (empty)
- Voltage(V)\* (220)
- Please Enter Numbers (empty)
- Rated Power(W)\* (0.3)
- Please Enter Numbers (empty)
- Power Factor\* (1)
- Please Enter Numbers (empty)
- R Phase (empty)
- Please Select a Configured (empty)
- S Phase (empty)
- Please Select a Configured (empty)
- T Phase (empty)
- Please Select a Configured (empty)
- 連接方式\* (delta)
- Exit Add Data

## 1.5 Setting the Alert Function - 1 - Basic Settings

1. Click "System Related", and then click "System Settings" in the drop-down box.

System Critical Settings (Do Not Modify)

Web Server Port  
3000

Modbus TCP Server Port  
8502

MQTT Server Host  
mqtt://mqttBroker

MQTT Server Port  
1883

2. Fill in "Email Account" (Sender Email, required), "Email Password" (Gmail, etc. will need it, optional), "Email SMTP Host" (e.g.: smtp.gmail.com, required), "Email SMTP Port" (e.g.: 587, required), Email Notification List (required, if there are multiple emails, remember to press Enter to enter), click Save Settings to send and save.

Database Time Zone  
UTC

MQTT Storage Handler Time Zone Deviation (The program is based on UTC+0, how many hours are deviated from this base)  
8

Carbon Emission Coefficient  
0.495

The latest power decimal places  
3

Monthly accumulated degrees decimal places  
3

Monthly accumulated carbon emissions decimal places  
3

Dashboard login required  
false

MQTT transportation  
true

# Alert Related Settings

## Email Account

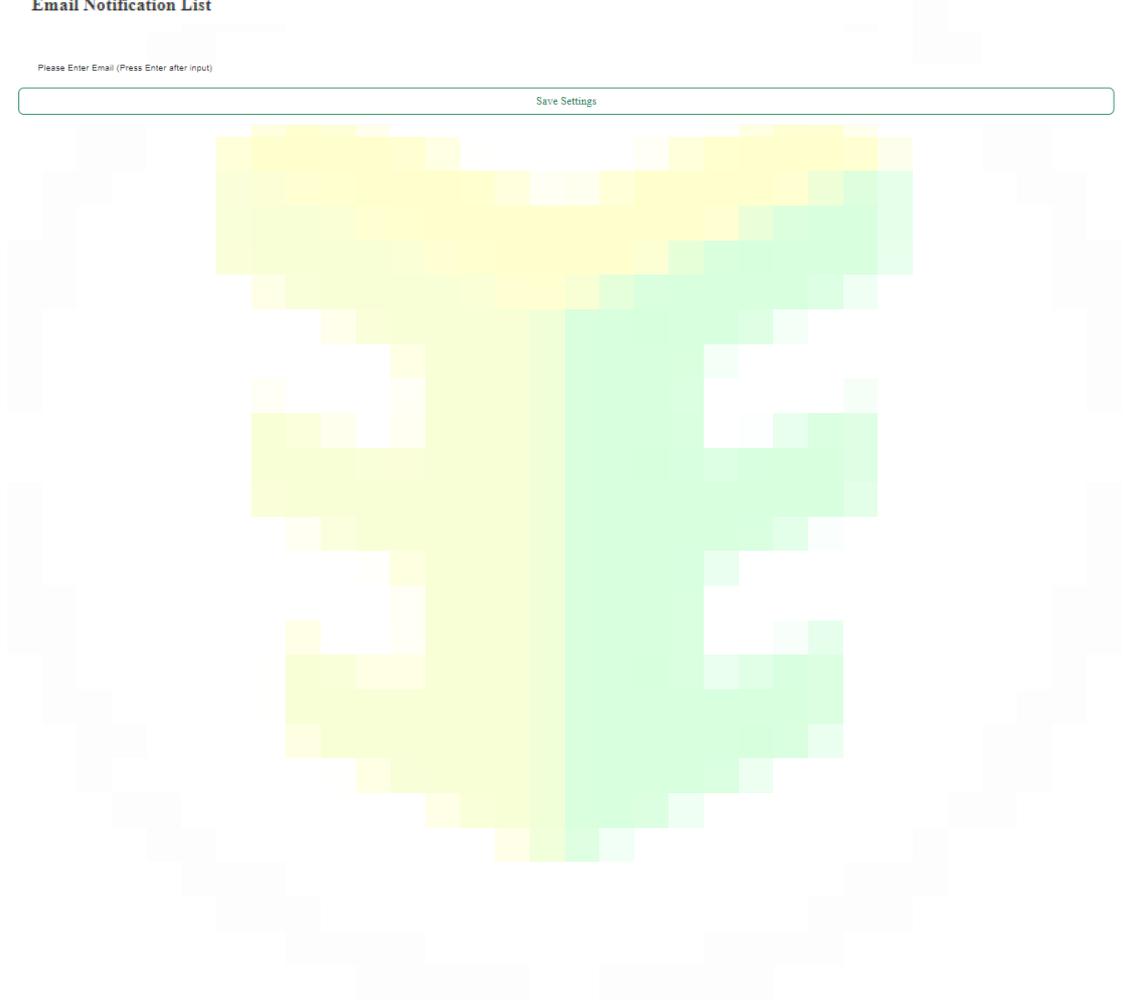
## Email Password

## Email SMTP Host

## Email SMTP Port

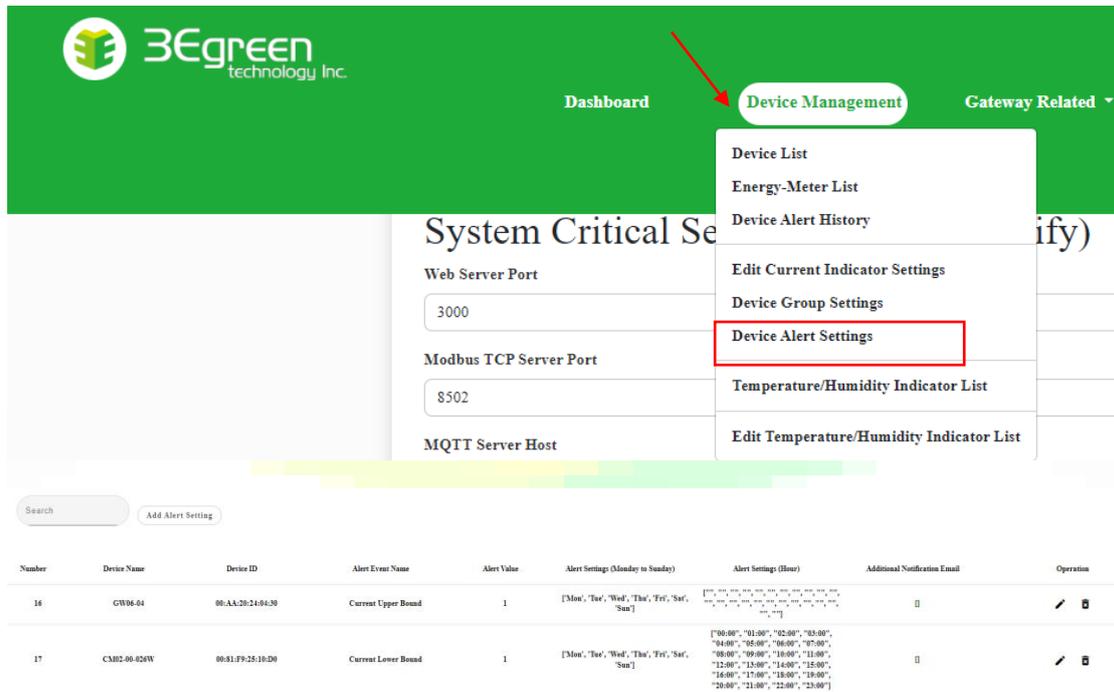
## Email Notification List

Please Enter Email (Press Enter after input)



## 1.6 Setting the Alert Function - 2 - Detailed Settings

1. Click "Device Management" and select "Device Alert Settings" from the drop-down box.



The screenshot shows the 3Egreen technology Inc. web interface. The top navigation bar is green and contains 'Dashboard', 'Device Management', and 'Gateway Related'. A red arrow points to the 'Device Management' menu, which is open and shows a list of options: 'Device List', 'Energy-Meter List', 'Device Alert History', 'Edit Current Indicator Settings', 'Device Group Settings', 'Device Alert Settings' (highlighted with a red box), 'Temperature/Humidity Indicator List', and 'Edit Temperature/Humidity Indicator List'. Below the navigation bar, there is a 'System Critical Settings' section with input fields for 'Web Server Port' (3000), 'Modbus TCP Server Port' (8502), and 'MQTT Server Host'. At the bottom, there is a table with columns: Number, Device Name, Device ID, Alert Event Name, Alert Value, Alert Settings (Monday to Sunday), Alert Settings (Hour), Additional Notification Email, and Operation. The table contains two rows of data.

Number	Device Name	Device ID	Alert Event Name	Alert Value	Alert Settings (Monday to Sunday)	Alert Settings (Hour)	Additional Notification Email	Operation
16	GW06-04	00:AA:20:24:04:30	Current Upper Bound	1	[Mon', 'Tue', 'Wed', 'Thu', 'Fri', 'Sat', 'Sun']	[00:00", "01:00", "02:00", "03:00", "04:00", "05:00", "06:00", "07:00", "08:00", "09:00", "10:00", "11:00", "12:00", "13:00", "14:00", "15:00", "16:00", "17:00", "18:00", "19:00", "20:00", "21:00", "22:00", "23:00"]		 
17	CM02-00-025W	00:81:F9:25:10:D0	Current Lower Bound	1	[Mon', 'Tue', 'Wed', 'Thu', 'Fri', 'Sat', 'Sun']	[00:00", "01:00", "02:00", "03:00", "04:00", "05:00", "06:00", "07:00", "08:00", "09:00", "10:00", "11:00", "12:00", "13:00", "14:00", "15:00", "16:00", "17:00", "18:00", "19:00", "20:00", "21:00", "22:00", "23:00"]		 

2. Click the "Add Alert Settings" button in the upper left corner.
3. In the pop-up window, select "Device Name" (the single-phase and three-phase devices set in the system will be automatically brought out, and the phase sub-device will be eliminated, which is required), select "Alarm Event Name" (the current system only supports the upper limit of current value, the lower limit of current value, and three-phase imbalance, which are required), fill in the "Alarm Value" (the default setting for three-phase imbalance is 20%, which is required), check "Alarm Date" (Monday to Sunday can be checked, and the alarm will be issued only when the corresponding time is met after selecting, which is not required), check "Alarm Hours" (00:00-23:00 can be checked, and the alarm will be issued only when the corresponding time is met after checking, which is not required), Email (Press Enter after entering the email, this field is for additional notification of personnel for this device, which is not required), Remarks (not required), click "Add Data" below the alarm settings to save.

The screenshot shows the 3Egreen technology Inc. dashboard. The top navigation bar includes 'Dashboard' and 'Device Management'. The main content area features a table of alert settings and a modal window for adding a new alert setting.

Number	Device Name	Device ID	Alert Event Name
16	GW06-04	00:AA:20:24:04:30	Current Upper Bound
17	CM02-00-026W	00:81:F9:25:10:D0	Current Lower Bound
18	CM02-A4-0009	0C:61:CF:CE:3A:07	Current Lower Bound
19	GW06-04	00:AA:20:24:04:30	Unbalanced Three-Phase
23	CM02-A4-0009	0C:61:CF:CE:3A:07	Current Upper Bound

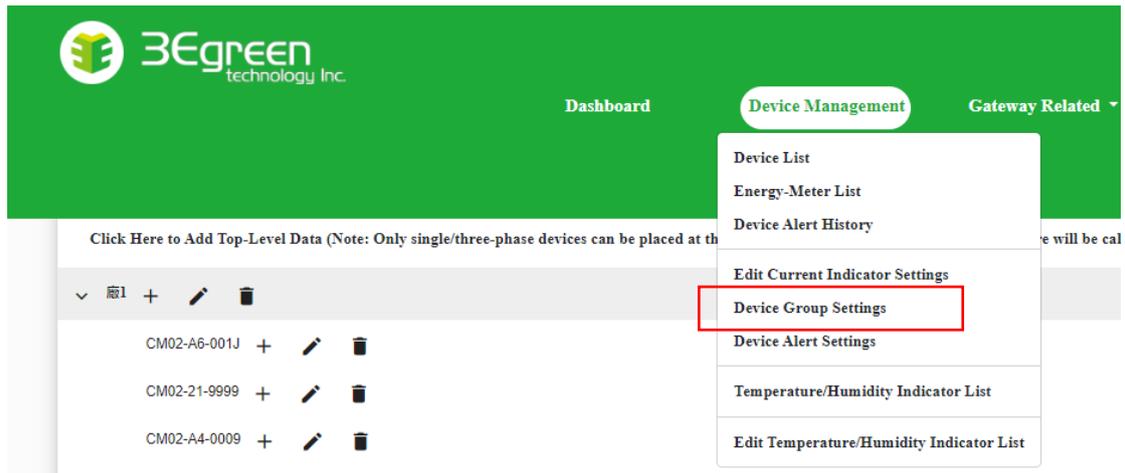
The 'Add Alert Setting' modal window includes the following fields and options:

- Device Name\* (Please Select a Configured)
- Alert Event Name\* (Current Upper Bound)
- Alert Value\* (1)
- Day of the Week (checkboxes for Mon, Tue, Wed, Thu, Fri, Sat, Sun)
- On the Hour (checkboxes for 00:00, 01:00, 02:00, 03:00, 04:00)

- You can "edit" and "delete" the corresponding alert settings. p.s. When the warning setting is still in place, directly removing the single-phase and three-phase settings may result in no warning or other unexpected errors, so special attention should be paid.

## 1.7 Setting Groups (linked demand detection and multi-layer plant power usage pages)

- Click "Device Management" and select "Device Group Settings"



3. Click the + in the upper left corner to add the highest-level data, click the + sign after the highest level to add the next level data... and so on. After clicking the + sign, the set single-phase and three-phase devices will be automatically brought in for selection. The number of layers can be unlimited, but at least one set single-phase and three-phase device must be set/selected at the bottom level to avoid system abnormalities, and it is recommended to set up 3~4 layers at most to express all relationships, such as company name/factory/workshop/line.

## 1.8 Electricity Price Setting (linked with demand detection and multi-layer plant area electricity usage page)

1. Click "Statistics" and select "Electricity Bill Estimation" from the drop-down box.

The screenshot shows the 3Egreen Technology Inc. dashboard. The 'Statistics' dropdown menu is open, and 'Electricity Bill Estimation' is highlighted with a red box. The main table displays electricity usage data for September 2024.

Category		Summer Month	Non-Summer Month	Contract Value
Basic Electricity Fee	Regular Contract	223.6		
	Mid-Peak Contract	166.9		
	Saturday Mid-Peak Contract	44.7		
	Off-Peak Contract	44.7		
	Subtotal	223.6 * 8 = 1788.80		

2. Select the type of contract signed with Taipower (e.g. high voltage electricity price/two-stage time price, low voltage electricity price/time price-three-stage...etc.), and fill in the contract value signed with Taipower.

The screenshot shows the 'Please Select Electricity Pricing Method' dropdown menu. The 'Three-Tier Time-of-Use Tariff' option is selected. The main table displays electricity usage data for September 2024, with input fields for contract values.

Category		Summer Month	Contract Value	Non-Summer Month	Contract Value
Basic Electricity Fee	Regular Contract	223.6	\$ <input type="text"/>	166.9	\$ <input type="text"/>
	Mid-Peak Contract	166.9	0	166.9	0
	Saturday Mid-Peak Contract	44.7	0	33.3	0
	Off-Peak Contract	44.7	0	33.3	0
	Subtotal	223.6 * 8 = 1788.80			

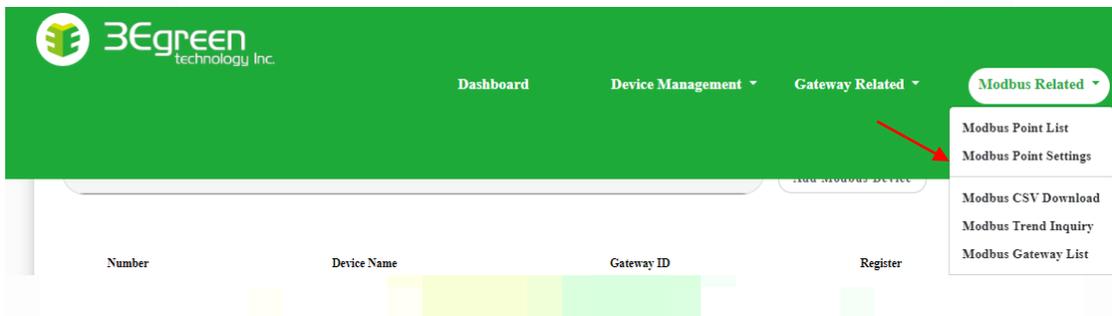
3. Click "Submit Query"

## 1.9 Modbus Device Configuration

1. Click "Modbus Point Settings":



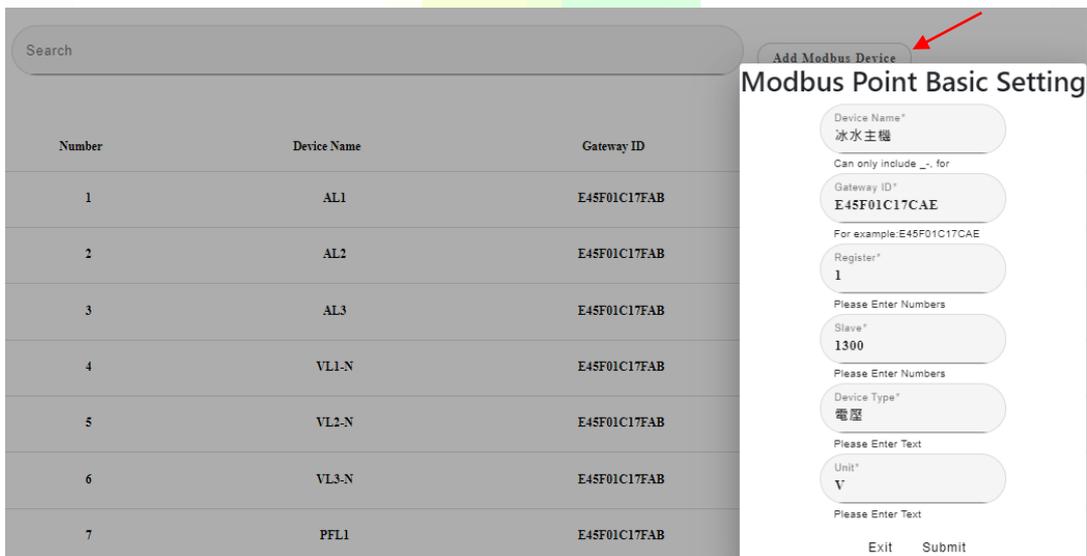
The screenshot shows the top navigation bar of the Gateway Server v3.3.2. The 'Modbus設備相關' (Modbus Device Related) menu is expanded, showing options: 'Modbus點位列表' (Modbus Point List), 'Modbus點位設定' (Modbus Point Settings), '設備儀表板' (Device Dashboard), and 'GW06-06 點位設定' (GW06-06 Point Settings). Below the navigation bar is a table with columns: '編號' (Number), '裝置名稱' (Device Name), '分片ID' (Shard ID), '寄存器地址' (Register Address), '輸出值' (Output Value), '單位' (Unit), and '操作' (Action). The table is currently empty, showing '0 of 0' items.



The screenshot shows the 3Egreen technology Inc. dashboard. The 'Modbus Related' menu is expanded, showing options: 'Modbus Point List', 'Modbus Point Settings', 'Modbus CSV Download', 'Modbus Trend Inquiry', and 'Modbus Gateway List'. A red arrow points to the 'Modbus Point Settings' option. Below the navigation bar is a table with columns: 'Number', 'Device Name', 'Gateway ID', and 'Register'.

2. Click "Add Modbus Device":

Enter the device name, shard ID (slave), register address (register), device type (custom), unit (custom), disconnection reminder notification (default).



The screenshot shows the 'Modbus Point Basic Setting' form. A red arrow points to the 'Add Modbus Device' button. The form fields are:

- Device Name\*: 冰水主機
- Gateway ID\*: E45F01C17CAE
- Register\*: 1
- Slave\*: 1300
- Device Type\*: 電壓
- Unit\*: V

The form also includes 'Exit' and 'Submit' buttons.

### 3. Send

You can see the configured Modbus devices and their corresponding output values. Click the edit and delete icons to perform the corresponding operations.

Number	Device Name	Value	Unit	Connection Status
1	AL1	0.000	A	Disconnected
2	AL2	0.000	A	Disconnected

## 1.10 Final Inspection System Settings

1. Check whether the "Database User" and "Database Password" are set correctly.
2. Check if the carbon emission coefficient is correct, the default is 0.495

**Database Host**  
database

**Database Port**  
3306

**Database User Name**  
3egreen

**Database Password**  
\*\*\*\*\*

**Database Time Zone**  
UTC

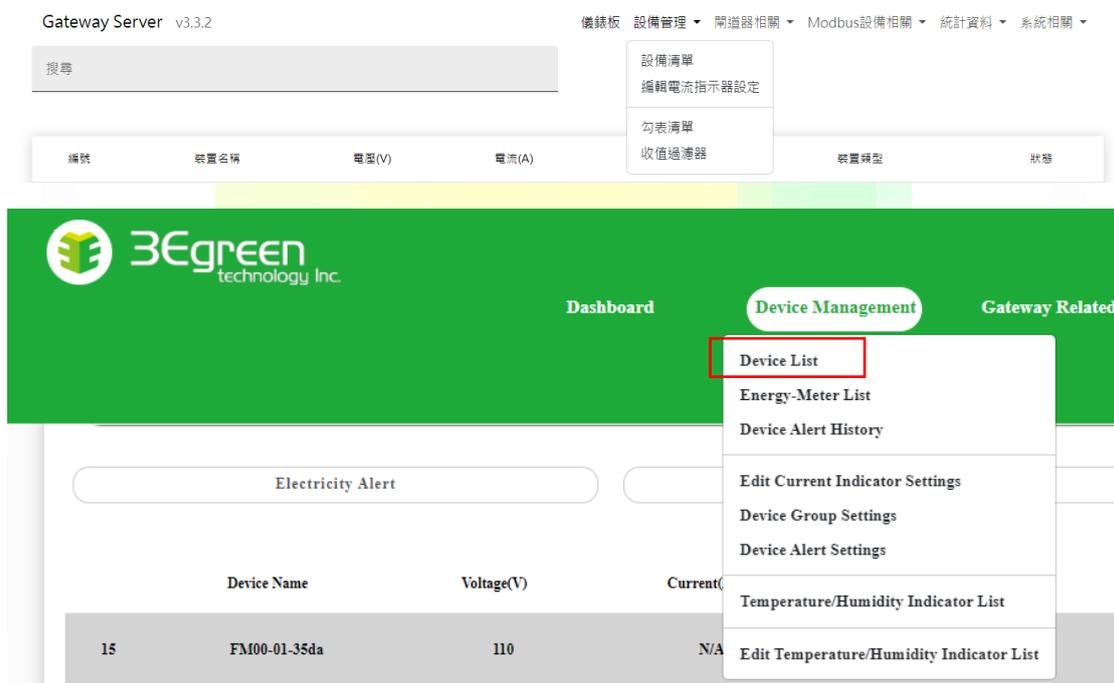
**MQTT Storage Handler Time Zone Deviation (The program is based on UTC+0, how many hours are deviated from this base)**  
8

**Carbon Emission Coefficient**  
0.495

# Chapter 2. Device List Settings

## 2.1 Setting Device List

1. Click "Device Management" and select "Device List" from the drop-down box:



2. You can see the set single-phase and three-phase connection status, real-time current and power, updated every 1 minute.

Specifications:

- 2.1 Connection status is divided into (Disconnected/Connected/Sleep (currently not supported on Raspberry Pi)).
- 2.2 The phase sub-device of the three-phase setting will be displayed in a collapsed manner and will expand after clicking.
- 2.3 The judgment of Disconnected is that the system has not received data for more than 6 minutes.
- 2.4 Three-phase judgment criteria: Connected > Sleep > Disconnected

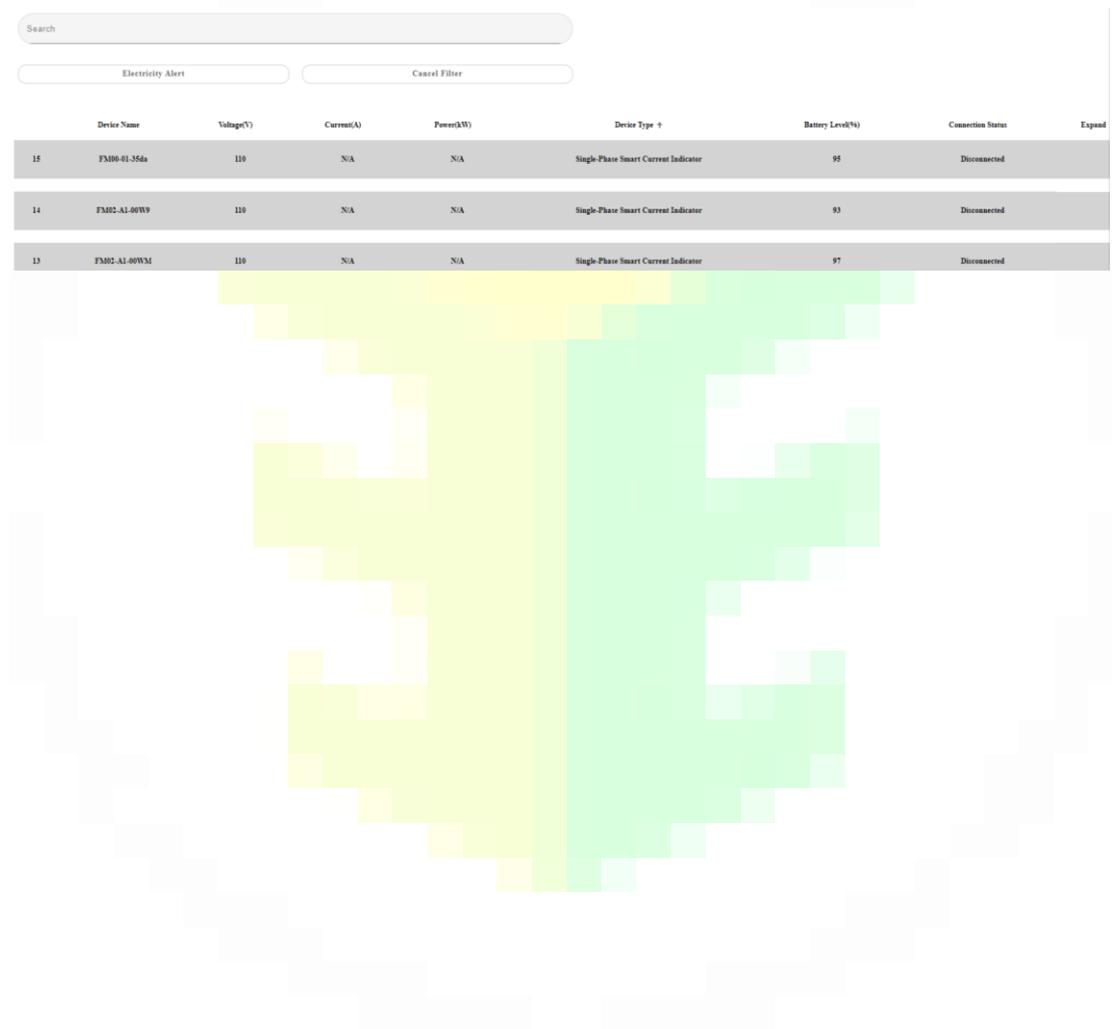
2.5 Three-phase power formula:

$$\sum_{i=1\sim 3} \frac{(PowerFactor_i \times individual\ current_i \times three\text{-}phase\ voltage\ setting)}{1.732}$$

2.6 Click on the three-phase device to see the bound phase sub-devices.

2.7 Click "Power Reminder" on the upper left to filter out three-phase and single-phase devices with lower power. Click "Cancel Filter" to restore the original page.

2.8 Click on the Column header to sort or use the Search Box to search.



The screenshot shows a web interface for device management. At the top, there is a search bar and two buttons: "Electricity Alert" and "Cancel Filter". Below these is a table with the following columns: Device Name, Voltage(V), Current(A), Power(W), Device Type, Battery Level(%), Connection Status, and Expand. The table contains three rows of data:

Device Name	Voltage(V)	Current(A)	Power(W)	Device Type	Battery Level(%)	Connection Status	Expand
FM06-01-356a	110	N/A	N/A	Single-Phase Smart Current Indicator	95	Disconnected	
FM02-A1-00W9	110	N/A	N/A	Single-Phase Smart Current Indicator	93	Disconnected	
FM02-A1-00W3	110	N/A	N/A	Single-Phase Smart Current Indicator	97	Disconnected	

Below the table, there is a large, semi-transparent heatmap overlay. The heatmap consists of a grid of colored squares in shades of yellow and green, with a darker green area in the center, suggesting a concentration of data or activity in that region.

## Chapter 3. Modbus Point List

### 3.1 Modbus Point List Settings

1. Go to Modbus Related and Click "Modbus Point List":

Number	Device Name	Value	Unit	Connection Status
1	AL1	0.000	A	Disconnected
2	AL2	0.000	A	Disconnected

2. You can see the Modbus connection status of the setting, the real-time value, updated every 1 minute.

## Chapter 4. Cloud Dashboard

### 4.1 Cloud Dashboard Homepage

1. Click Dashboard:

3Egreen technology Inc.

Dashboard Device Management Gateway Related Modbus Related Statistics System Related

Specifications:

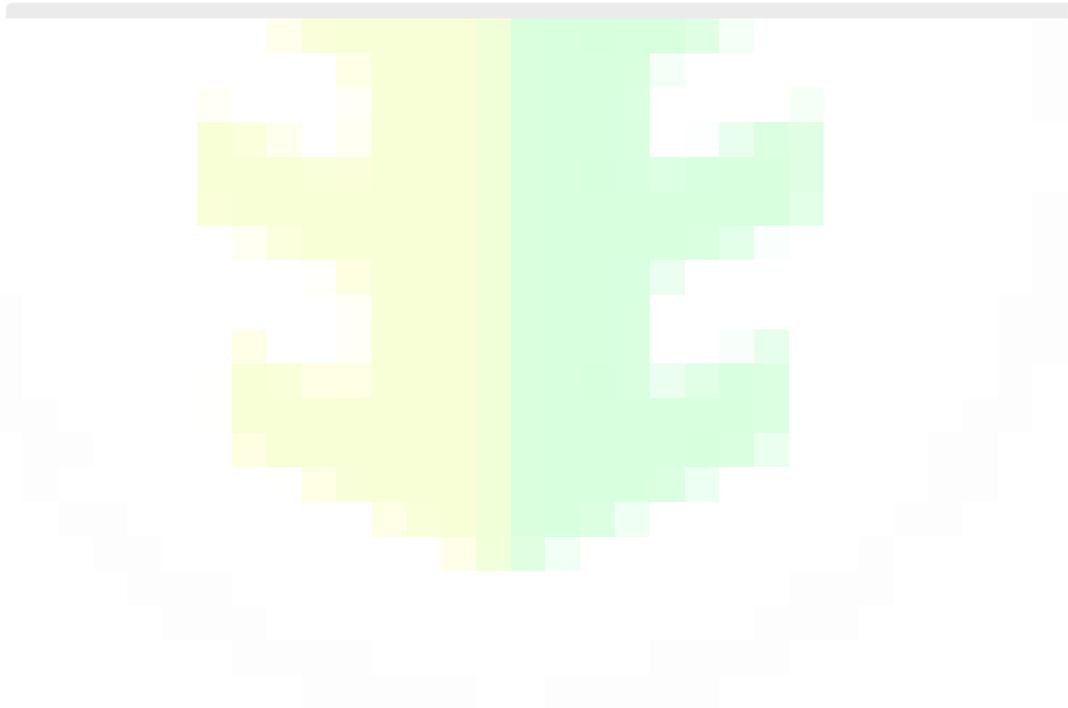
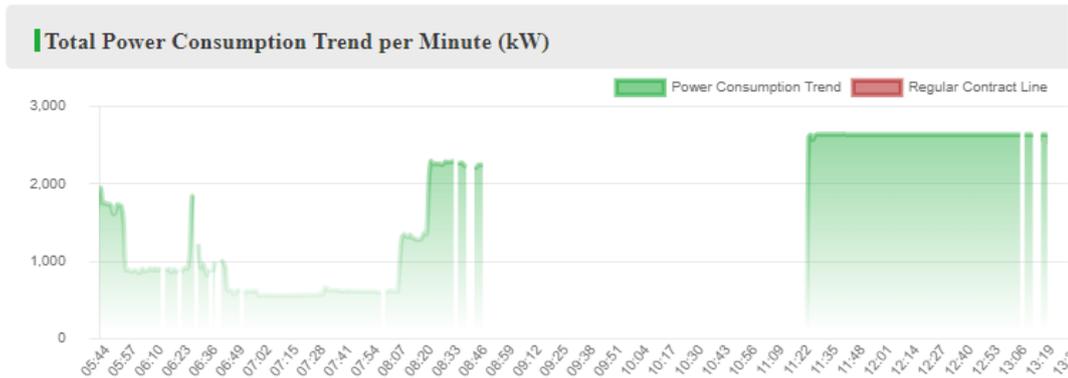
- 1.1 Updated every minute, you can see the total electricity trend (kw) per minute, real-time electricity consumption (kw), cumulative electricity consumption this month (kWh), cumulative carbon emissions this month (kg), and warning quantity.
- 1.2 If the system does not receive any data within 1 minute, the line will be disconnected, and a blank frame will be generated.
- 1.3 kWh calculation formula :  $\sum_{i=1 \sim n} \frac{kw}{60}$  Carbon emission calculation

1.4 formula :  $kWh \times \text{carbon emission coefficient set by the system}$

*Diagram operation method:*

1. The scroll wheel can be used to zoom in and out and holding down the left mouse button can "circle" the area you want to view.
2. Ctrl+ left mouse button to drag horizontally.

Last Update Time : 2024-09-30 14:58:33



## 4.2 CSV File Export

1. Go to Statistics, Click "CSV file export":

The screenshot shows a web interface with a green header. The 'Statistics' dropdown menu is open, and 'CSV File Export' is highlighted. The main form contains the following fields:

- Device Name: Please select Device Name (Default: All)
- Start Date: yyyy-mm-dd --:-- --
- End Date: yyyy-mm-dd --:-- --
- Interval Time: 1 Minute
- Export Data: CSV Download

A green button labeled 'Export CSV' is located at the bottom of the form.

2. Download options:

Device name (leave blank to select all, multiple selections are allowed), start date, end date, interval, export data type, export data table.

The screenshot shows the 'Export CSV' form with the following values:

- Device Name: Please select Device Name (Default: All)
- Start Date: 2024-09-29 03:14 PM
- End Date: 2024-09-30 03:14 PM
- Interval Time: 1 Minute
- Export Data: CSV Download

A green button labeled 'Export CSV' is located at the bottom of the form.

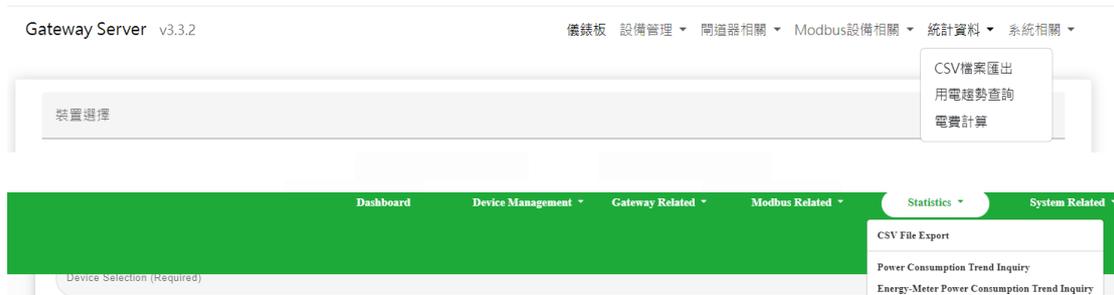
### 3.MQTT-Sort by MAC CSV format

	A	B	C	D	E	F	G	H	I
1	Device ID	MACAddress	Time Stamp	Current	Voltage	Power(kw)	Temperatu	Rssi	Battery
2	CM02-A4-0009	0C:61:CF:CE:3A:07	2024/9/29 15:20	8	110	0.88	N/A	-78	88
3	CM02-A4-0009	0C:61:CF:CE:3A:07	2024/9/29 15:21	8	110	0.88	N/A	-77	88
4	CM02-A4-0009	0C:61:CF:CE:3A:07	2024/9/29 15:22	8	110	0.88	N/A	-78	88
5	CM02-A4-0009	0C:61:CF:CE:3A:07	2024/9/29 15:23	8	110	0.88	N/A	-78	88
6	CM02-A4-0009	0C:61:CF:CE:3A:07	2024/9/29 15:24	8	110	0.88	N/A	-78	88
7	CM02-A4-0009	0C:61:CF:CE:3A:07	2024/9/29 15:25	8	110	0.88	N/A	-78	88
8	CM02-A4-0009	0C:61:CF:CE:3A:07	2024/9/29 15:26	8	110	0.88	N/A	-78	88



## 4.3 Current Trend Inquiry

1. On Statistics Click “Power Consumption Trend Inquiry”.



2. Options:

Device selection (single-phase or three-phase device that has been set, required), data start time (required), data end time (required), can choose every minute or every hour (default is every minute) Specification:

1. Three-phase power formula: 
$$\sum_{i=1\sim 3} \frac{(PowerFactor_i \times I \times V)}{1.732}$$

2. The three-phase device will show the power trend of itself and the phase sub-devices.

3. The hourly calculation is the average result of each hour. Therefore, if the current fluctuation varies greatly every hour, it will be different from the result calculated every minute.

Reference image for operation mode:

1. The scroll wheel can be zoomed
2. Press and hold the left mouse button to "circle" the area you want to view
3. Ctrl+ mouse button to drag horizontally

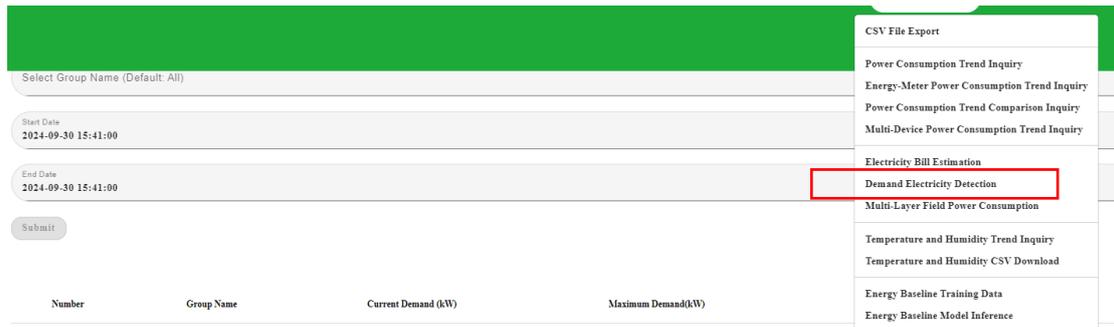


3. Download data (same as CSV download, sorted by device).

#	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
1	Device Alias	MACAddress	Time Stamp	Current	Voltage	Current Po	Power(w)	Temperatu	Rssi	Battery															
2	大塚石磨台	LIKUMarble	5/6/2024 15:09	155.061	380	58923.12	58.923	N/A	-71	93															
3	大塚石磨台	LIKUMarble	5/6/2024 15:10	150.029	380	57010.94	57.011	N/A	-69	93															
4	大塚石磨台	LIKUMarble	5/6/2024 15:11	148.219	380	56323.29	56.323	N/A	-70	93															
5	大塚石磨台	LIKUMarble	5/6/2024 15:12	147.529	380	56061.05	56.061	N/A	-71	93															
6	大塚石磨台	LIKUMarble	5/6/2024 15:13	163.936	380	62295.58	62.296	N/A	-69	93															
7	大塚石磨台	LIKUMarble	5/6/2024 15:14	176.931	380	67233.81	67.234	N/A	-69	93															
8	大塚石磨台	LIKUMarble	5/6/2024 15:15	147.644	380	56104.85	56.105	N/A	-68	93															
9	大塚石磨台	LIKUMarble	5/6/2024 15:16	151.882	380	57714.99	57.715	N/A	-70	93															
10	大塚石磨台	LIKUMarble	5/6/2024 15:17	158.04	380	60055.31	60.055	N/A	-70	93															
11	大塚石磨台	LIKUMarble	5/6/2024 15:18	163.719	380	62213.31	62.213	N/A	-68	93															
12	大塚石磨台	LIKUMarble	5/6/2024 15:19	197.373	380	75001.92	75.002	N/A	-67	93															
13	大塚石磨台	LIKUMarble	5/6/2024 15:20	160.037	380	64234.06	64.234	N/A	-69	93															
14	大塚石磨台	LIKUMarble	5/6/2024 15:21	191.024	380	72589.11	72.589	N/A	-70	93															
15	大塚石磨台	LIKUMarble	5/6/2024 15:22	187.201	380	71136.25	71.136	N/A	-69	93															
16	大塚石磨台	LIKUMarble	5/6/2024 15:23	195.219	380	74183.16	74.183	N/A	-69	93															
17	大塚石磨台	LIKUMarble	5/6/2024 15:24	229.018	380	87026.82	87.027	N/A	-70	93															
18	大塚石磨台	LIKUMarble	5/6/2024 15:25	215.496	380	81888.52	81.889	N/A	-70	93															
19	大塚石磨台	LIKUMarble	5/6/2024 15:26	193.922	380	73690.27	73.69	N/A	-70	93															
20	大塚石磨台	LIKUMarble	5/6/2024 15:27	200.525	380	76199.37	76.199	N/A	-69	93															
21	大塚石磨台	LIKUMarble	5/6/2024 15:28	196.625	380	74717.41	74.717	N/A	-71	93															
22	大塚石磨台	LIKUMarble	5/6/2024 15:29	231.833	380	88096.36	88.096	N/A	-68	93															
23	大塚石磨台	LIKUMarble	5/6/2024 15:30	237.917	380	90408.42	90.408	N/A	-70	93															
24	大塚石磨台	LIKUMarble	5/6/2024 15:31	208.549	380	79248.45	79.248	N/A	-69	93															
25	大塚石磨台	LIKUMarble	5/6/2024 15:32	209.138	380	79472.38	79.472	N/A	-68	93															
26	大塚石磨台	LIKUMarble	5/6/2024 15:33	194.585	380	73942.29	73.942	N/A	-69	93															
27	大塚石磨台	LIKUMarble	5/6/2024 15:34	235.76	380	89588.93	89.589	N/A	-69	93															
28	大塚石磨台	LIKUMarble	5/6/2024 15:35	229.771	380	87312.92	87.313	N/A	-70	93															
29	大塚石磨台	LIKUMarble	5/6/2024 15:36	222.381	380	84504.91	84.505	N/A	-68	93															
30	大塚石磨台	LIKUMarble	5/6/2024 15:37	216.837	380	82398.23	82.398	N/A	-69	93															
31	大塚石磨台	LIKUMarble	5/6/2024 15:38	208.457	380	79205.95	79.206	N/A	-69	93															
32	大塚石磨台	LIKUMarble	5/6/2024 15:39	234.658	380	89170.22	89.17	N/A	-69	93															
33	大塚石磨台	LIKUMarble	5/6/2024 15:40	223.675	380	84996.32	84.996	N/A	-69	93															
34	大塚石磨台	LIKUMarble	5/6/2024 15:41	201.689	380	76641.68	76.642	N/A	-68	93															

## 4.4 Demand Electricity Detection

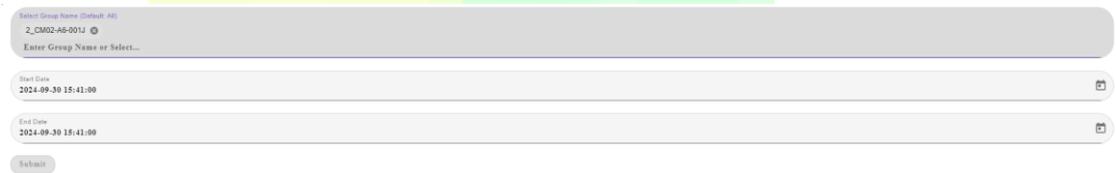
1. Click "Statistics" and select "Demand Electricity Detection" from the drop-down box.



Number	Group Name	Current Demand (kW)	Maximum Demand(kW)
--------	------------	---------------------	--------------------

### Demand Trend Per Minute(W)

2. Select the configured group (all selected by default), start time (required), end time (required), and click Submit.



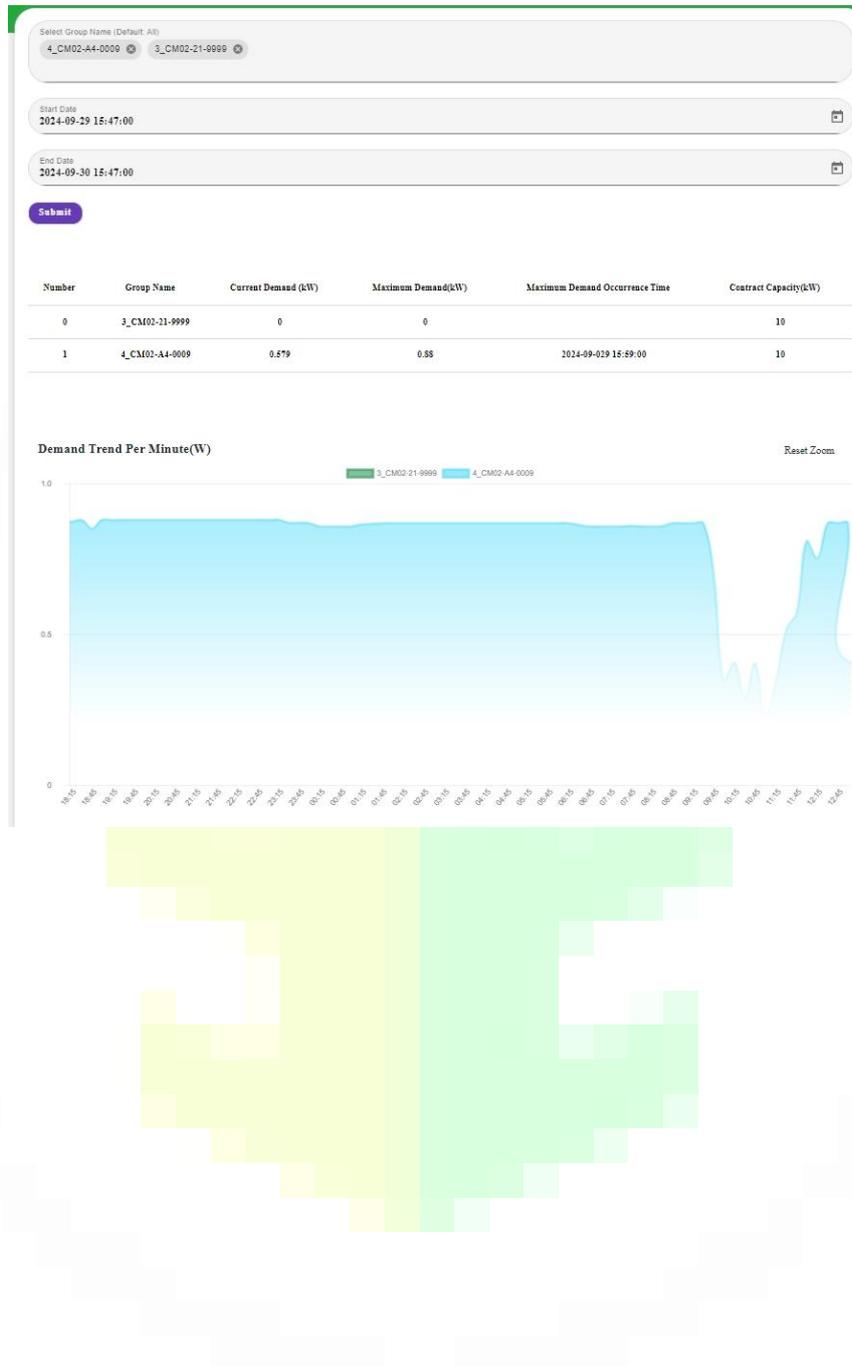
3. After submission, it includes a presentation table and a curve graph

Specifications:

1. The selected group will show the demand in the table and curve.

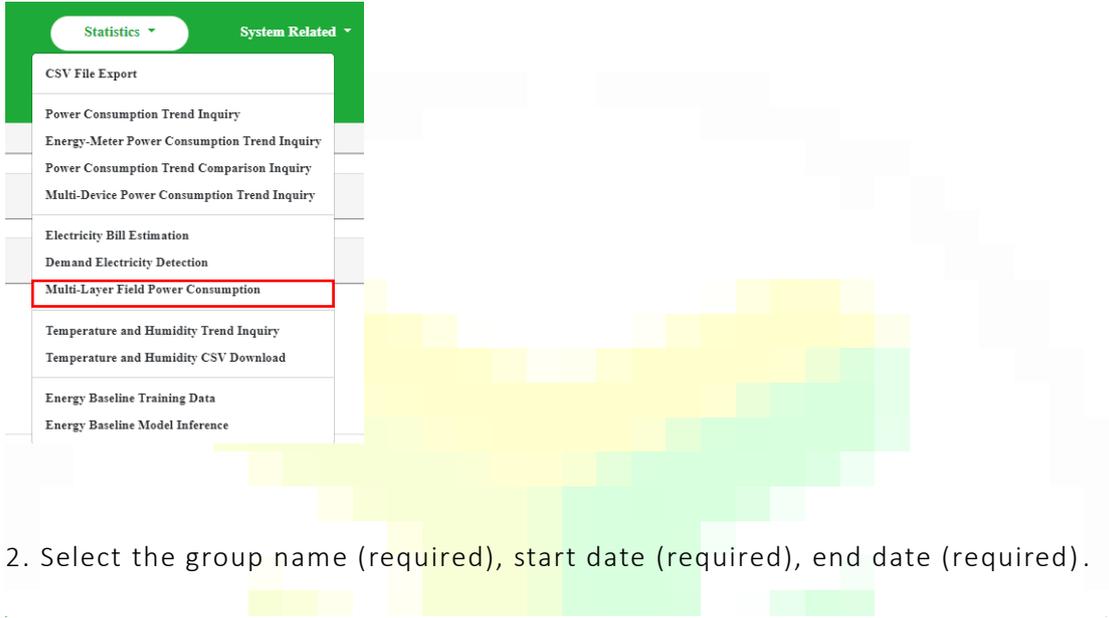
2. Demand calculation formula:  $\sum_{i=1}^{15} \frac{kw_i}{15}$ , which means the average power every 15 minutes.

3. The interval between each line is 15 minutes.



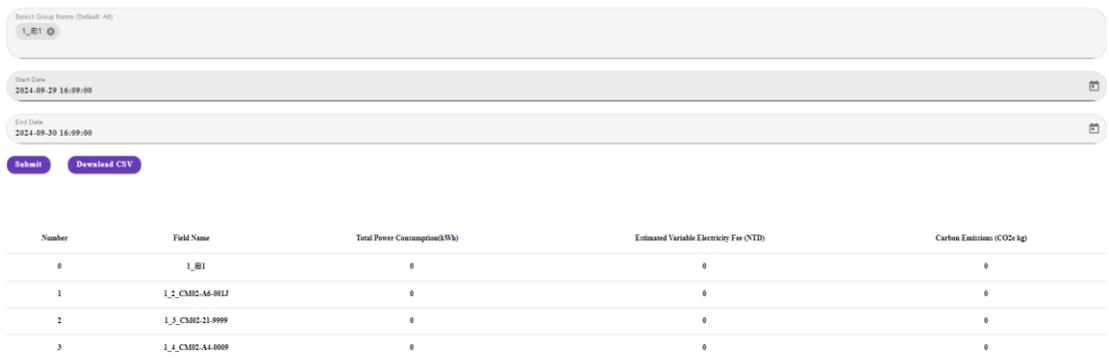
## 4.5 Multi-layer Field Electricity

1. Click "Statistics" and select "Multi-Layer Field Power Consumption" from the drop-down box.



The screenshot shows a green header with 'Statistics' and 'System Related' dropdowns. A white dropdown menu is open, listing various options. 'Multi-Layer Field Power Consumption' is highlighted with a red border. Below the menu, a blurred background shows a heatmap visualization.

2. Select the group name (required), start date (required), end date (required).



The screenshot shows a form with three input fields: 'Select Group Name (Default: All)' with a dropdown menu showing '1\_E1', 'Start Date' with '2024-09-29 16:09:00', and 'End Date' with '2024-09-30 16:09:00'. Below the fields are 'Submit' and 'Download CSV' buttons. A table is visible below the form.

Number	Field Name	Total Power Consumption(kWh)	Estimated Variable Electricity Fee (NTD)	Carbon Emissions (CO2e kg)
0	1_E1	0	0	0
1	1_2_CME2-A6-001J	0	0	0
2	1_3_CME2-21-9999	0	0	0
3	1_4_CME2-A4-0059	0	0	0

3. After pressing Submit, a chart of the selected group and its sub-layers will appear, including only the pie chart of the sub-layers of the group (for easy comparison of the power usage of the sub-layers).

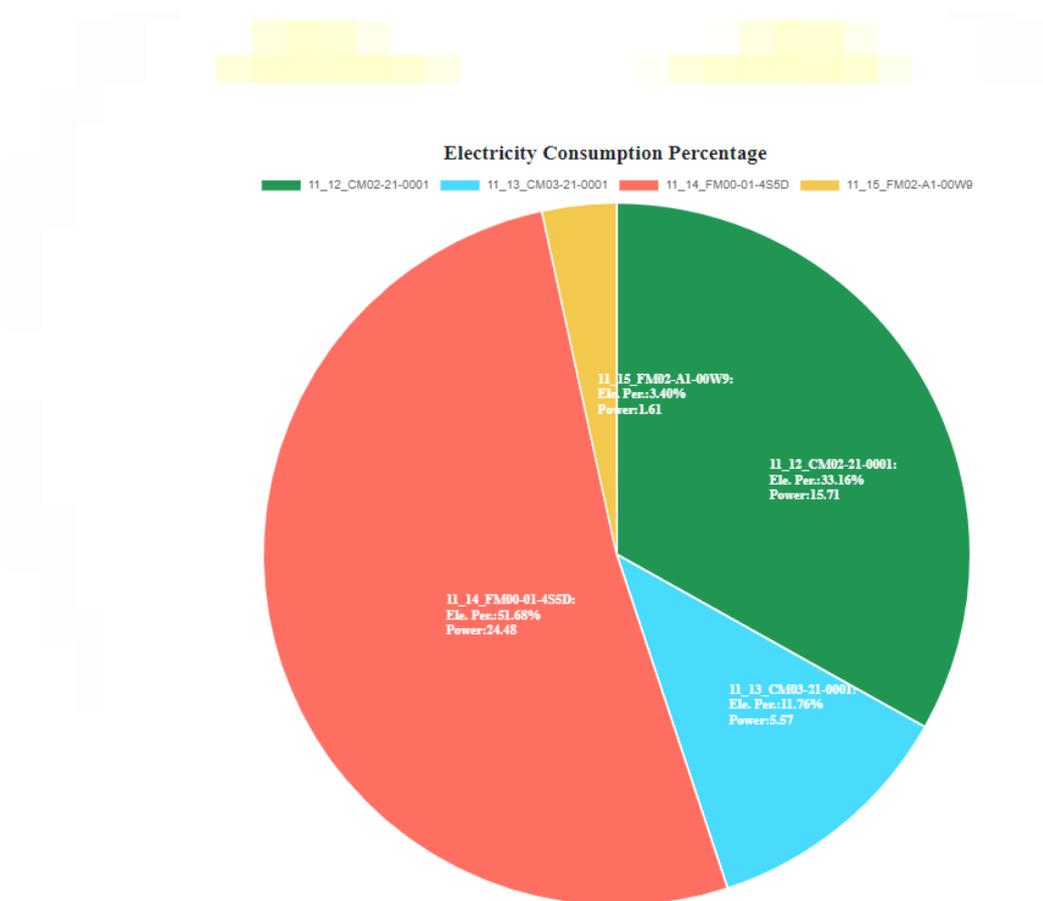
Specifications: (Note the example below is for Taiwan Utility Provider: Taipower)

1. The estimated mobile electricity bill refers to the Taipower contract type selected in the setting stage to calculate the mobile electricity bill. For detailed electricity bill calculation formula, please refer to Taipower's official website and the "Electricity Bill Trial Calculation" page of this system.

<https://www.taipower.com.tw/upload/6638/2023033115202259611.pdf>

2. The kWh and carbon emission calculation formulas are the same as IV. Cloud Dashboard.
3. The pie chart shows the percentage of electricity consumption (kWh), and text prompts of percentage and electricity will be added to the pie chart.

Number	Field Name	Total Power Consumption(kWh)	Estimated Variable Electricity Fee (NTD)	Carbon Emission (CO2t kg)
0	11_f001_1	47.37	176.25	23.46
1	11_12_CM02-21-0001	15.71	53.15	7.78
2	11_13_CM03-21-0001	5.57	21.23	2.76
3	11_14_FM00-01-4SSD	24.48	83.61	12.12
4	11_15_FM02-A1-00W9	1.61	6.26	0.8



4. Click Download CSV to get the CSV file of the middle table.

1	A	B	C	D	E
2	position	groupName	totalPower	totalElePrice	totalCarbon
3	0_1	場區1	60.47	225.52	29.92
4	1_1_2	測試三相	22.09	79.12	10.93
5	2_1_3	測試三相	22.09	79.12	10.93
6	3_1_4	小電流	16.29	67.28	8.06
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					

## 4.6 Electricity Bill Calculation

1. Click "Statistics" and select "Electricity Bill Estimation" from the drop-down box.

Please Select Electricity Pricing Method

Three-Tier Time-of-Use Tariff Tariff Start Year/Month

2024年09月 Submit Query

Category		Summer Month	Contract Value	Non-Summer Month	Contract Value
Basic Electricity Fee	Regular Contract	223.6	300	166.9	300
	Mid-Peak Contract	166.9	0	166.9	0
	Saturday Mid-Peak Contract	47.2	0	33.3	0
	Off-Peak Contract	47.2	0	33.3	0
Subtotal		= 0.00			

2. Select the "Electricity Price Starting Year/Month", the rest should have been selected/filled in during the initial setup phase.

3. Will calculate the contract electricity bill, mobile electricity bill and penalty, as well as the total amount for the month.

Specification:

1. The electricity price is automatically calculated based on the data collected by the system in the current month. For the contract electricity fee/mobile

electricity fee and default penalty formula, please refer to Taipower's official website formula or for Overseas customers your local utility provider.

<https://www.taipower.com.tw/upload/6638/2023033115202259611.pdf>

Category					Summer Month	Power(kWh)	Amount	Non-Summer Month	Power(kWh)	Amount	
Variable Electricity Fee	Monday to Friday	Peak Time	Summer Month	16:00-22:00	7.03	0	0.00	-	-	-	
			Summer Month	09:00-16:00 22:00-24:00	4.39	0	0.00	-	-	-	
		Mid-Peak Time	Non-Summer Month	06:00-11:00 14:00-24:00	-	-	-	4.11	0	0.00	
			Off-Peak Time	Summer Month	00:00-09:00	1.91	0	0.00	-	-	-
		Off-Peak Time	Non-Summer Month	00:00-06:00 11:00-14:00	-	-	-	1.75	0	0.00	
			Saturday	Mid-Peak Time	Summer Month	09:00-24:00	2.04	0	0.00	-	-
	Non-Summer Month	06:00-11:00 14:00-24:00			-	-	-	1.89	0	0.00	
	Off-Peak Time	Summer Month		00:00-09:00	1.91	0	0.00	-	-	-	
		Non-Summer Month		00:00-06:00 11:00-14:00	-	-	-	1.75	0	0.00	
	Sunday and Off-Peak Days	Off-Peak Time	All Day	1.91	0	0.00	1.75	0	0.00		
	Subtotal										

#### Electricity Calculation

Month	Month Classification	Contract Electricity Fee	Variable Electricity Fee	Excess Penalty	Total Amount of the Month
8	Summer Month	67080	0	0	67080

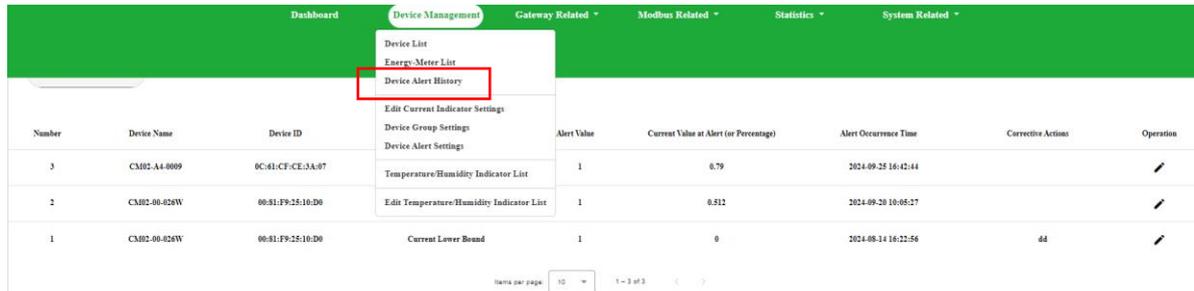
#### Estimate of Maximum Demand Excess Penalty

Occurrence Time	Maximum Demand(kW)	Contract Capacity(kW)	First Stage Excess Penalty	Second Stage Excess Penalty	Total Excess(kW)
	0	0	0	0	0

The estimated electricity fee amount is for reference only. The actual electricity fee amount is subject to the Taipower bill. When calculating electricity fees, the operations are all less than two decimal places. The actual web page displays two decimal places, so there will be an error of ±0.01.

## 4.7 Device Alert History

1. Click "Device Management" and select "Device Alert History" from the drop-down box.



The screenshot shows the 'Device Management' section of a web application. A dropdown menu is open under 'Device Management', with 'Device Alert History' highlighted. Below the menu is a table with the following data:

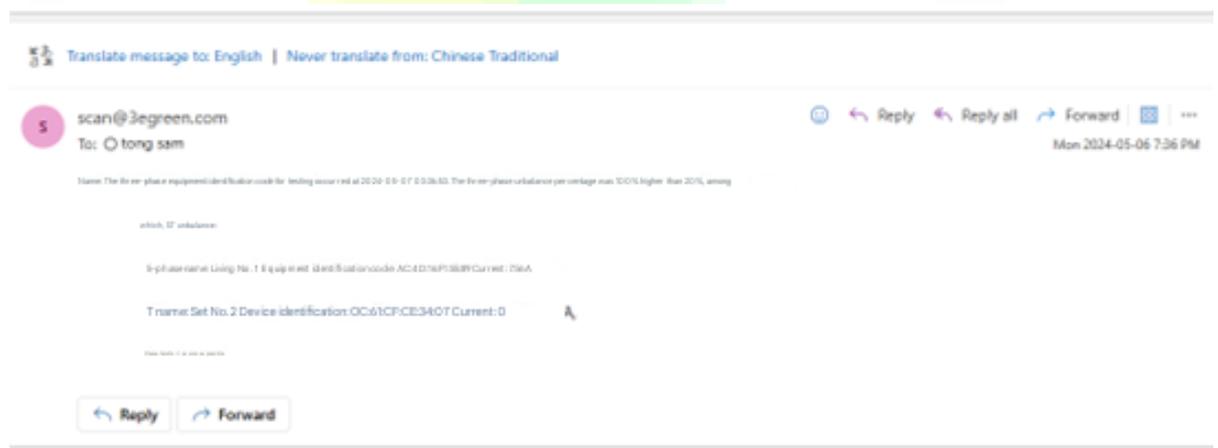
Number	Device Name	Device ID	Alert Value	Current Value at Alert (or Percentage)	Alert Occurrence Time	Corrective Action	Operation
3	CM02-A4-0009	0C41:CF:CE:3A:97	1	0.79	2024-09-25 16:42:44		
2	CM02-00-024W	00:51:F9:25:10:D0	1	0.512	2024-09-20 10:05:27		
1	CM02-00-024W	00:51:F9:25:10:D0	1	0	2024-08-14 16:22:56	dd	

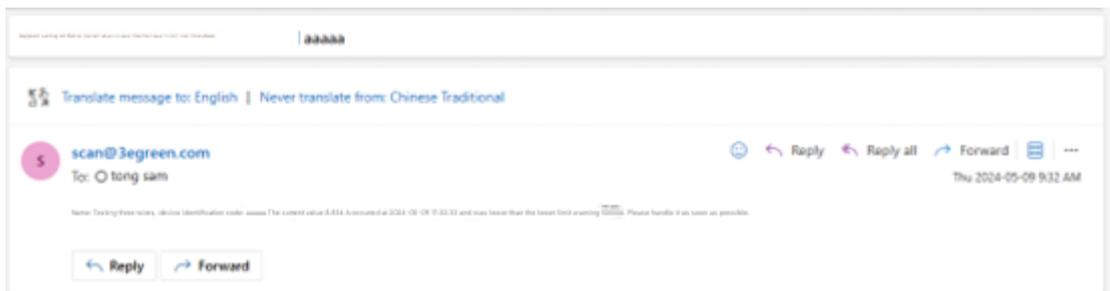
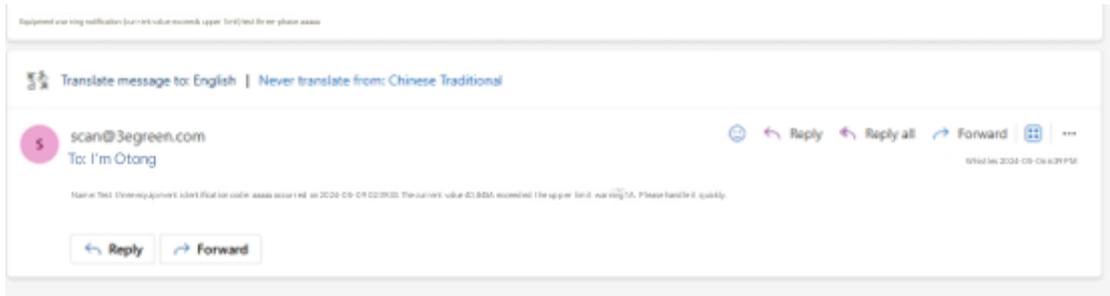
At the bottom of the table, there is a 'Items per page' dropdown set to '10' and a pagination indicator '1 - 3 of 3'.

2. When the trigger alarm occurs, the current value or (percentage) and the time when the alarm occurs will be recorded.

Specifications:

1. When an alert occurs, the user must edit the improvement measures before the alert is closed. Otherwise, the alert will be sent once a day for three consecutive days, which means a total of four emails will be received (unless the device is turned off, the current value is 0, or other abnormal conditions cause the connection to be disconnected).
2. After editing the improvement measures, if there is an abnormal situation again, a new event will be generated, and the sending logic is as shown in 1.
3. Three email formats for reference will be available in the future.





## 4.8 API Service

Adress <http://localhost:3000/api-docs/#/>

Power related: API

<https://docs.google.com/spreadsheets/d/1BQGnjffXtZa5fTWKM6TbLzO875oZ6gQ3992bvzrvj3Q/edit?userstoinvite=z11711017@gmail.com&sharingaction=manageaccess&role=writer#gid=1384142561>