



# 3Egreen technology Inc.

## Smart Clamp Meter



**3EGREEN TECHNOLOGY, INC.**

[www.3egreen.com](http://www.3egreen.com)

# Net zero carbon emissions start-up with IoT

EU announced the Carbon Reduction Plans which products need to be provided the carbon emission data in 2023 and paid carbon tax in 2027. How to manage carbon emissions effectively is a matter that many companies worry about it.

It's easy to find out which one causes high carbon emissions with IOT data analysis in 3Egreen, and helps enterprises to solve their problems so that achieve "carbon neutrality" effectively.

## 01 Carbon Inventory

Find out what the carbon emissions of factories, machines and products are. If a corporate has a good results for carbon inventory, it can establish corporate image in social responsibility and low-carbon impelement.

## 02 IOT management

Hook the smart clamp meter and connect the platform with data analysis and management. Calculate the carbon emission of each equipment from the data so that find out the high carbon emission machine easily according to the visual chart tool.

## 03 Carbon Neutrality

Arrange the data into the reports through platform monitoring, regular review and improvement for the related to the issues, which is conducive to maintain a low-carbon state at any time and then achieving carbon neutrality.

01

Internet of Things

02

Detect and collect the data

03

Carbon emission detection

04

5G communication transmission

05

Cloud data analysis

06

Cross-system integration platform

## Several benefits



Improve Management Efficiency



Reduce Manufacturing Cost

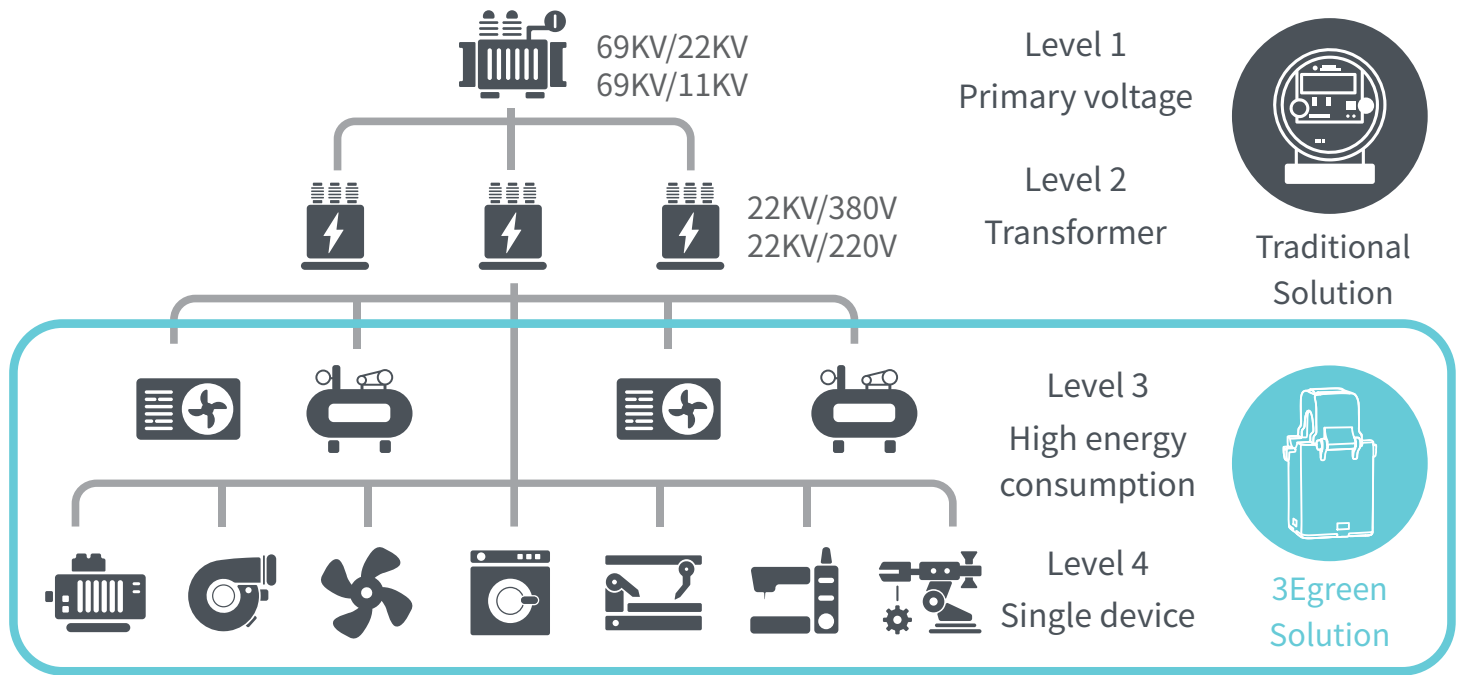


Save Time



Without Technical Staff

# Electricity Hierarchy Of Manufacturing



## Solutions



### Easy to install

Smart sensors can be installed with wireless transmission and without downtime and power off.



### Carbon Emissions Calculator

Calculate the carbon emission coefficient with the platform data. It is convenient to improve that after the carbon emission data is collected and sorted.



### Complete Data Analytics

Through the analysis data of the platform, you can get information such as power consumption trend, machine utilization rate, machine status, etc.



### Real-time monitoring

The data is updated in every 4 seconds, and it's easy to manage the power consumption status of the machine anytime any where. Immediate notification when an alert is triggered.

## Case



Hotel



Government



Factory



Hospital



School

★ Above information is only part of our clients

The power consumption data of each machine is presented with IOT solution which is wireless transmission, simple installation and automatic recharging. It will help customers who have some kind of power consumption management problems to find the root cause.

**The problems can be solved as following below**

Electricity is wasted / Reduce scrap / worried about the risk of industrial safety / too much manpower on maintenance / Hard to install sensors when the machine cannot be shut down and powered off.

## Feature Of Products /Services Contents



**Utilization Analysis**



**Wireless Transmission**



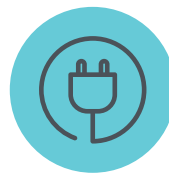
**Self-Charging**



**Demand Monitoring**



**Data Analysis**



**Electricity Management**



**Abnormal Detection**

01

### **Technology Revolution**

With wireless transmission, 3Egreen solve the main problem: Complexity from building electricity management system and construction

02

### **Smart & Efficient Way To Manage**

When uploading Machine data, System could analyze and Visualize With different dashboard and charts.

03

### **Customized Service**

Based on clients' requirement, 3Egreen offers customized system & functions.

**Smart Clamp Meter**



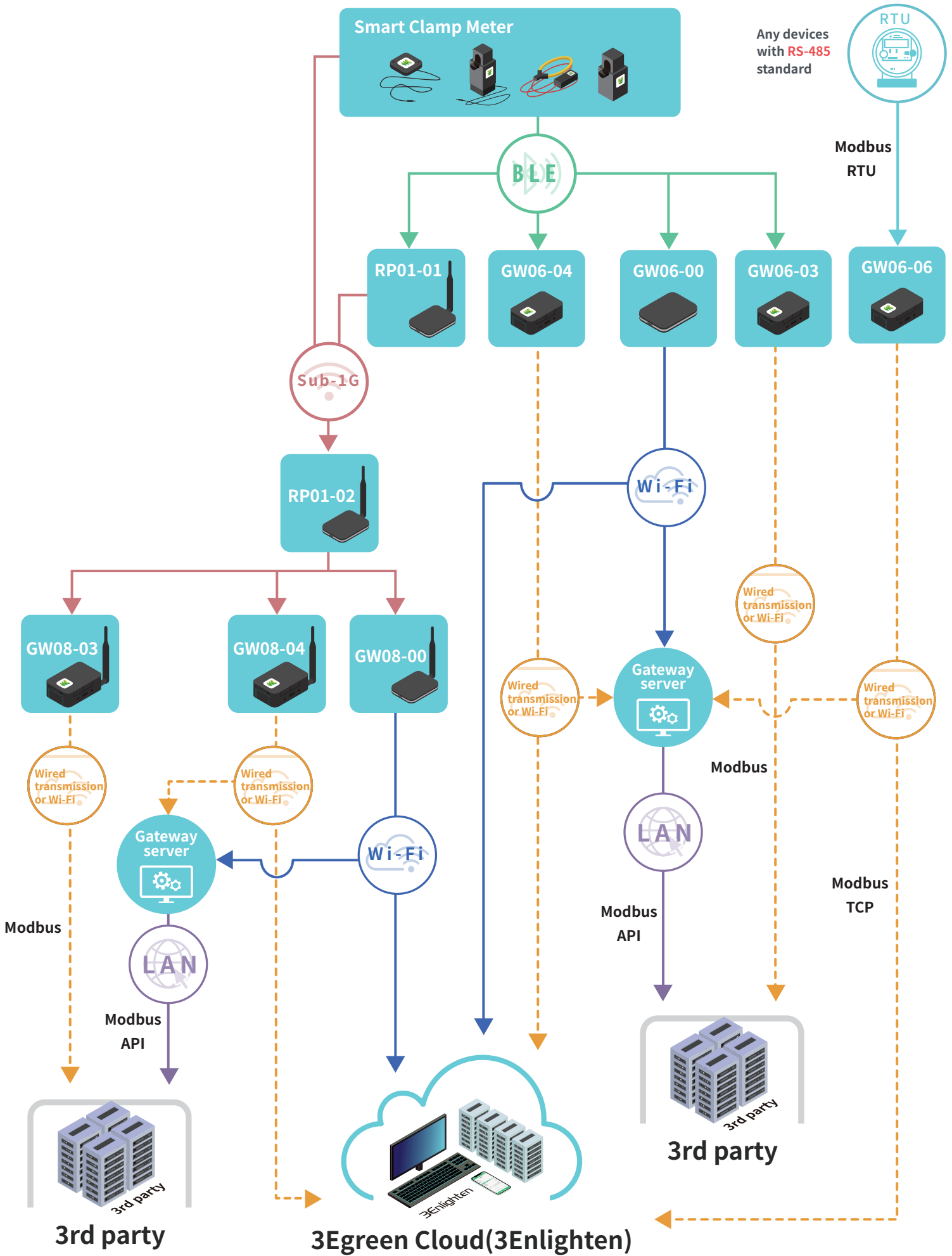
**Gateway**



**cloud platform**



# System Architecture



# Hardware & Equipment

- Smart Clamp Meter / Gateway



# Smart Clamp Meter

## AC Current Meter



Type:CM02

Detection range:AC 0.6A ~ 100A(wire diameter 16mm)

Power supply:Battery/ Rechargeable Battery/Plug (DC)



Type:CM03

Detection range:AC 2A ~ 250A(wire diameter 24mm)

Power supply:Battery/ Rechargeable Battery/Plug (DC)



Type:CM04

Detection range:AC 3A ~ 350A(wire diameter 35mm)

Power supply:Battery/ Rechargeable Battery/Plug (DC)

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## AC Current Meter-Micro Current



Type:CM02-04

Detection range:AC 0.05A ~ 15A(wire diameter 16mm)

Power supply:Battery/ Rechargeable Battery/Plug (DC)



Type:CM02-06

Detection range:AC 0.001A ~ 0.5A(wire diameter 16mm)

Power supply:Battery/ Rechargeable Battery/Plug (DC)



# Smart Clamp Meter

## AC Current Meter- Flexible



Type:FM02

Detection range:AC 2A ~ 1000A(wire diameter 80mm)

Power supply: Battery/ Rechargeable Battery/Plug (DC)



Type:FM03

Detection range:AC 3A ~ 2000A(wire diameter 105mm)

Power supply: Battery/ Rechargeable Battery/Plug (DC)



Type:FM04

Detection range:AC 5A ~ 3000A(wire diameter 180mm)

Power supply: Battery/ Rechargeable Battery/Plug (DC)

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## AC Current Meter With Temperature



Type:CM03-05

Detection range:AC 2A ~ 250A(wire diameter 24mm)

Temperature range:0°C- 100°C (line length 2m)

Power supply: Rechargeable Battery



Type:CM04-05

Detection range:AC 3A ~ 350A(wire diameter 36mm)

Temperature range:0°C- 100°C (line length 2m)

Power supply: Rechargeable Battery



# Smart Clamp Meter

## AC Current Meter- Flexible



Type: CM02-07

Detection range: DC 0.4A ~ 20A (wire diameter 16mm)

Power supply: Battery



Type: CM02-08

Detection range: DC 0.4A ~ 40A (wire diameter 16mm)

Power supply: Battery

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## Temperature Meter



Type: TM01

Temperature range: 0°C ~ 100°C

Power supply: Battery

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## Dye-sensitized cell series



Model size: 15x15/11x11/5.5x11/5.5x5.5cm<sup>2</sup>

Environmental Illuminance: Over 150Lux (Indoor)

Through ecology-drive to remain the battery capacity

 [Formosa Plastics Dye-sensitized cell \(DSC\)](#)

# Gateway



Type:GW08-00( bond with RP01)  
Wireless Tech:Sub-1G to WiFi (2.4G)  
Power Supply:Plug

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Type:RP01( bond with GW08-00/GW08-04)  
Wireless Tech:BLE to Sub-1G  
Power Supply:Plug

---



Type:GW06  
Wireless Tech:BLE to WiFi (2.4G)  
Power Supply:Plug

---



Type:GW06-03/GW08-03  
Wireless Tech:BLE to Modbus TCP  
Sub-1G to Modbus TCP  
Power Supply:Plug

---



Type:GW06-04/GW08-04  
Wireless Tech:BLE to WiFi  
(WiFi 2.4G/5G/Ethernet)  
Power Supply:Plug

---



Type:GW06-06  
Wireless Tech:Modbus RTU to Modbus TCP  
Power Supply:Plug

# 3Egreen Cloud

3Enlighten

The numerical values, serial numbers and icons in the content are all indicative, and all content is based on the actual screen.

# 3Egreen Cloud-3Enlighten



3Egreen Cloud Platform provides various dashboard interfaces.

The comprehensive dashboard allows customers to view the power consumption data of the machines quickly, it's easy for all at a glance whatever it's carbon emission data or power consumption distribution.

The alarm dashboard provides to monitor the current connection status of each machine (connection, disconnection, or warning), and also view the alarm history as well.



You can select the time interval and equipment you want to see and will see the trend graph to check the excess aging power consumption (orange block) after inquiring . The operating hour function can assist and remind customers to schedule for the maintenance, overhaul and elimination.

If a corporate has a good results for carbon inventory, it can establish corporate image in social responsibility(CSR) and low-carbon implemement, and also have a deep understanding of the carbon footprint of each process.

The time-sharing graph in the middle provide you to see the power consumption in different periods to compare the operating time of the machines and find out the abnormal parts. You can observe the usage and ranking of the equipment in different groups with the pie chart function.

# Utilization Page

- Today
- Time Duration
- This Month

From

Select Time



To

Select Time



	Name	Current Device	Morning	Noon	Night	Today
1	Machine01	Stop (0.00kW)	Standby:0.00% Normal Operation:9.15% High Speed Operation:73.94% Stop:16.90%	Standby:0.64% Normal Operation:22.83% High Speed Operation:32.86% Stop:43.66%	Standby:0.14% Normal Operation:10.84% High Speed Operation:39.12% Stop:49.90%	Standby:0.15% Normal Operation:8.95% High Speed Operation:30.84% Stop:26.73%
2	Machine02	High Speed Operation (12.57kW)	Standby:0.42% Normal Operation:19.15% High Speed Operation:54.51% Stop:25.56%	Standby:0.43% Normal Operation:15.68% High Speed Operation:20.54% Stop:63.35%	Standby:1.46% Normal Operation:8.55% High Speed Operation:41.42% Stop:48.58%	Standby:0.63% Normal Operation:8.71% High Speed Operation:26.31% Stop:31.01%

Real-time utilization sheet can show working condition of each machine by different work shifts .

# Demand Monitoring

## Demand Monitoring

Download

Group	current Demand(kW)	Max Demand(kW)	Max Demand Time	Default Demand(kW)
Machine	114.50	145.40	2020-12-30 20:19:43	200
Auxiliary furnace	76.30	258.60	2021-03-08 03:49:29	400
Furnace	53.00	220.80	2020-11-30 07:02:16	400
Air compressor	26.60	54.50	2019-11-06 07:33:44	400

## Time Setting

Devices

Devices

From

Select Time

To

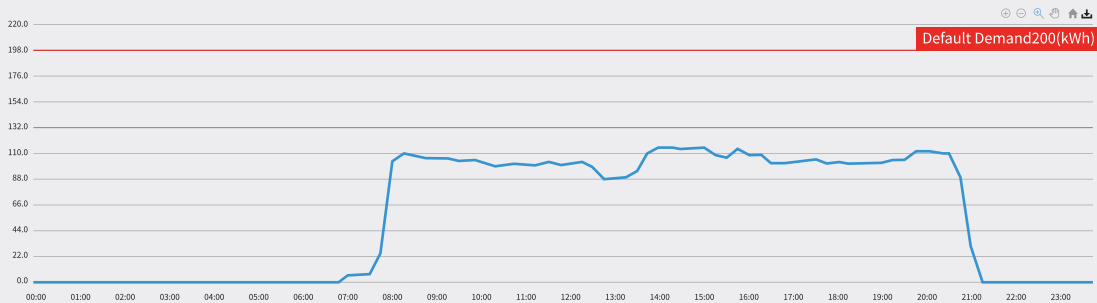
Select Time

Max Demand(kW)

115.9kW

Max Demand Time

2021-07-01 14:15:06



Demand monitoring can integrate all power groups to a "total amount" , and user can know real-time demand ( KW ) , Max demand , and the proportion when max power usage happened .

(Point on the line is 15mins average number)

# Alert Management

## 11 Alert Settings

Average Current

Phase Current Lack

Phase Abnormal

Device Power On

Device Power Off

RealTime Current

RealTime Power

RealTime Temperature

RealTime Humidity

Working Time Period

Idle Time Period

Current average exceed the limit

Devices Name\*

Please choose device

Event Name\*

Event Name

Current UP Limit(A)\*

Current UP Limit(A)

Alert Frequency

Once

Alert Level

0

Comment

Comment

\*Different types of alerts have different input items

## Alert Event List

Device	Voltage(V)	Current(A)	Power(W)	Type	Runing Time	Status	Actions
Machine01	220	0.0	0	Multi Phase meter	0.0	Alert	
Machine02	220	0.0	0	Multi Phase meter	0.0	Alert	
Machine03	220	11.0	4,149	Multi Phase meter	216.0	Normal	

## Alert Event History

	Event Name	Alert Type	Happened Time
1	Machine01 Current Overload	Current Overload	2022-03-03 19:55:40
2	Machine01 Current Overload	Current Overload	2022-04-12 08:27:46
3	Machine02 Current Overload	Current Overload	2022-04-15 18:33:23

You can check the alarm setting list which is newly added. When the alarm condition is triggered, the list will be displayed in red.

The warning notices that have occurred in the past will be recorded in the warning history record, which is convenient for subsequent inspections.



# Reporting System

From: Select Month [ ]

To: Select Month [ ]

Choose Show Type: **All** | Machine | Auxiliary furnace | Furnace | Air compressor

Print | Download

Power Usage Analytics: Client: 3egreen, Time interval: 2021-01-01 00:00:00~2021-02-28 23:59:59

Price: Peak: 5, Half-Peak: 3.5, Off-Peak: 2.5

日期	機台09	機台08	機台02	機台01	機台03	機台10	機台07	機台04	機台05	機台06	總用電量	預估電費	尖峰用電	半尖峰用電	離峰用電	總用電量(kWh)
2021-01-01 00:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00
2021-01-01 0:0:23	0.00	0.00	0.00	0.00	0.03	0.00	0.27	0.00	0.27	0.00	0.81	2	0.08	0.26	0.47	0.81
2021-01-01 199:46	222.72	248.50	223.76	141.86	166.45	156.80	105.01	87.19	85.11	1,636.86	6,423	701.13	578.91	356.82	1,636.86	

### Group Detail

Usage Distribution

Usage Ranking

Rank	Group	peak Consumption (kWh)	Half-Peak Consumption (kWh)	Off-Peak Consumption (kWh)	Total Consumption (kWh)	Estimated	Percentage
01	Furnace06	4,387.50	3,490.50	5,406.90	13,284.90	47,671	40.90
02	Furnace05	2,344.80	2,108.80	2,507.80	6,961.40	25,374	21.40
03	Furnace02	1,592.30	1,451.50	2,53.00	5,096.80	18,174	15.70

Weekly Usage Trend

Monthly Usage Trend

Usage Ranking (Time Distribution)

Time Distribution	Peak Consumption (kWh)	Half-Peak Consumption (kWh)	Off-Peak Consumption (kWh)	Total Consumption (kWh)	Estimated Cost
2020-12-27~2021-01-02	0.00	0.00	0.00	0.00	0
2021-01-03~2021-01-09	2,213.34	1,789.69	2,427.35	6,426.38	23,384
2021-01-10~2021-01-16	2,052.09	1,875.90	2,398.12	6,326.10	22,821

Usage Ranking (Monthly)

Time Distribution	Peak Consumption (kWh)	Half-Peak Consumption (kWh)	Off-Peak Consumption (kWh)	Total Consumption (kWh)	Estimated Cost
2021-01	7,493.26	6,537.75	8,515.58	22,546.58	81,637
2021-02	3,147.11	2,577.09	4,243.53	9,967.73	35,364

Auto Report function can generate a few integrated graphs and calculate power weekly or monthly amount, and system will show the information by single device and groups, including usage rank, alert events, estimated cost, and soon.

User can download more specific data (csv. file) and export all these charts.

# Price Simulation And Optimize

3Egreen

- Dashboard
- Device Status
- Statistics
- Device Management
- Alert Management
- Applications
  - Multi Phase Diagnostics
  - Abnormal Detection
  - ISO 50001 Documents
  - Aging Power
  - Price Simulation**
  - Price Optimize Simulation

## Date Setting

Group:

From:

To:

## Voltage

- Low
- High
- Very High

## Time Type

- Two-Step
- Three-Step

## High-Two-Step

[Download](#)

category				Summer Time	Contract Value	Price	Non summer time	contract Value	Price
Basic Price	General Contract		Each kW Per Month	223.6	100	22,360.00	166.9	100	16,690.00
	Non Summer Contract			-	-	-	166.9	0	0.00
	sat Half-Peak Contract			44.7	0	0.00	33.3	0	0.00
	Off-Peak Contract			44.7	0	0.00	33.3	0	0.00
Subtotal				22,360.00/30*2=1,490.67			16,690.00/30*0=0.00		
category				Summer Time	Consumption(kWh)	Price	Non summer time	Consumption(kWh)	Price
Mon to Fri	Peak Time	07:30-22:30	Each kW	3.29	2792	9,185.68	3.17	0	0.00
		00:00-7:30 22:30-24:00		1.41	34	47.94	1.31	0	0.00
	Half-Peak Time	07:30-22:30		1.97	0	0.00	1.87	0	0.00
		00:00-7:30 22:30-24:00		1.41	0	0.00	0.31	100	0.00
	Off-Peak Time	07:30-22:30		1.41	0	0.00	1.30	0	0.00
		07:30-22:30		1.41	0	0.00	1.30	0	0.00
Subtotal				0.00kWh	2,826.00kWh	9,233.62	0.00kWh	0.00kWh	0.00

## Over Limit Penalty Simulation-Summer Time

Basic Price			Over Limit Penalt		
Basic Price	Max Demand	Total Contract	Over Limit Block 1	Over Limit Block 2	Over Limit Yotal
2021-07-02 14:30:33	100.00kW	100.00kW	0.00kW	0.00kW	0.00kW
Penalty Amount			0.00*223.6-2=0.00	0.00*223.6*3=0.00	(0.00+0.00)/30*2=0.00

## Total Price

Summer Time			Non Summer Time			Total
Contract Price		Over Limit Penalty	Contract Price		Over Limit Penalty	
1,490.67	9,233.62	0.00	0.00	0.00	0.00	10724.29

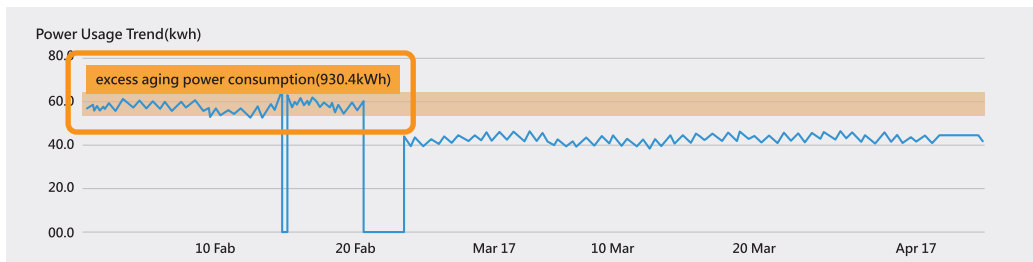
## Price Optimize Simulation

	00-01	01-02	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14
2021-07-01	Consumption 0.02 Price(Dollar) 0	Consumption 0.02 Price(Dollar) 0	Consumption 0.02 Price(Dollar) 0	Consumption 0.02 Price(Dollar) 0	Consumption 0.02 Price(Dollar) 0	Consumption 0.02 Price(Dollar) 0	Consumption 0.42 Price(Dollar) 0	Consumption 23.90 Price(Dollar) 32	Consumption 107.13 Price(Dollar) 352	Consumption 105.05 Price(Dollar) 345	Consumption 101.14 Price(Dollar) 332	Consumption 100.92 Price(Dollar) 329	Consumption 96.70 Price(Dollar) 315	Consumption 100.83 Price(Dollar) 329
2021-07-02	Consumption 0.02 Price(Dollar) 0	Consumption 0.01 Price(Dollar) 0	Consumption 0.01 Price(Dollar) 0	Consumption 0.02 Price(Dollar) 0	Consumption 0.01 Price(Dollar) 0	Consumption 0.02 Price(Dollar) 0	Consumption 0.33 Price(Dollar) 0	Consumption 11.83 Price(Dollar) 15	Consumption 89.34 Price(Dollar) 292	Consumption 103.67 Price(Dollar) 338	Consumption 114.28 Price(Dollar) 375	Consumption 115.80 Price(Dollar) 378	Consumption 116.80 Price(Dollar) 381	Consumption 115.68 Price(Dollar) 378

Based on Taiwan Power Company's bill charge, user can see every hour's usage and estimated cost by single machine, and system can simulate the cost and results in different production plans.

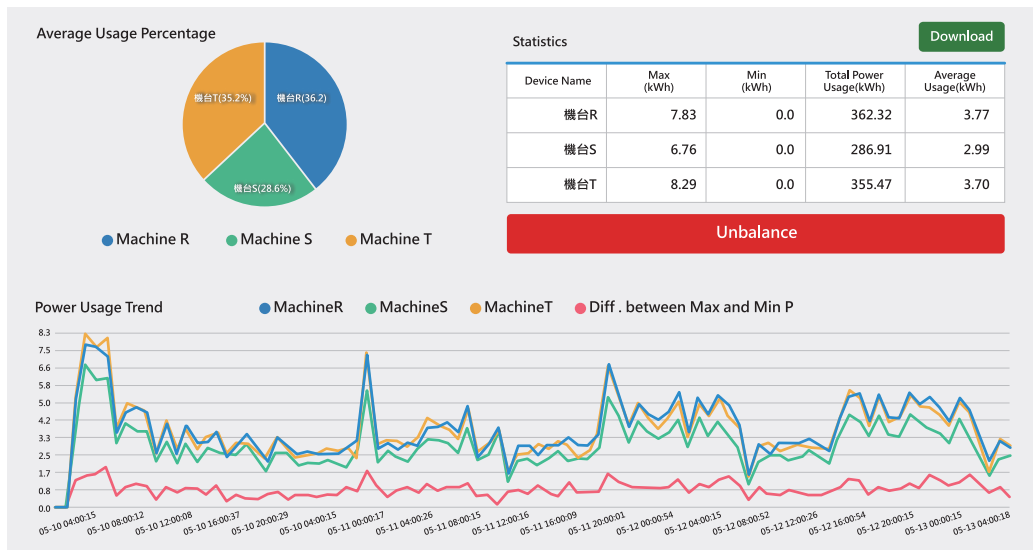
# Case Study

## Case1: Improve Pump Efficiency



This customer found that the machine was less than 5 years old with 3Egreen platform, but the power consumption was higher than rated power. Subsequent they asked the provider for maintenance and inspection, it found that the important parts of the motor were worn out, and the power consumption returned to normal after the replacement.

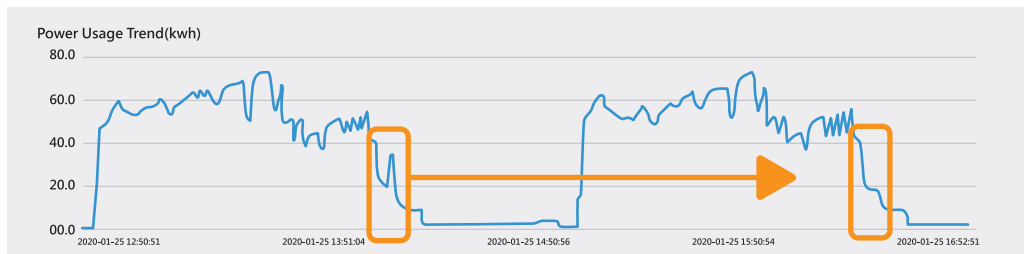
## Case2: Three-Phase Unbalance (Abnormal Detection)



Three-phase unbalanced will cause 3 issues below

- ① Reduced efficiency
- ② Accelerated aging
- ③ Workplace safety issues

## Case 3: Abnormal Data in Production

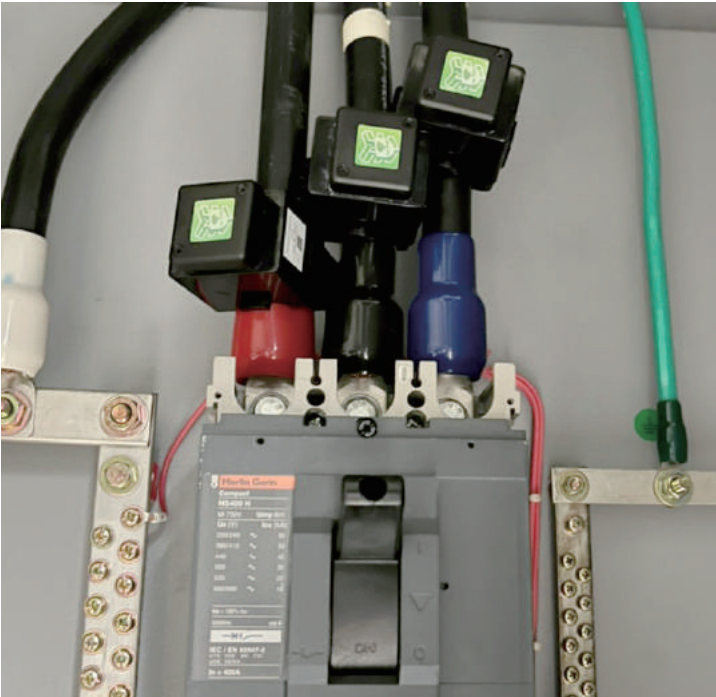


The customer found abnormal data of abnormal drop when cooling down through the smart system installed.

Subsequent it was found that the protection mechanism was activated in the parameter setting of the machine, which caused the cooling process system to continuously supply power to the equipment to heat up.

After modifying the setting, the data will return to be smooth descending line with the normal level.

# Installation Pictures



CM02/CM03/CM04  
(wire diameter < 35 mm)



FM02/FM03/FM04  
(wire diameter ~ 180 mm)



Wireless Tech  
(WiFi、BLE、Sub-1G)





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