

AUX

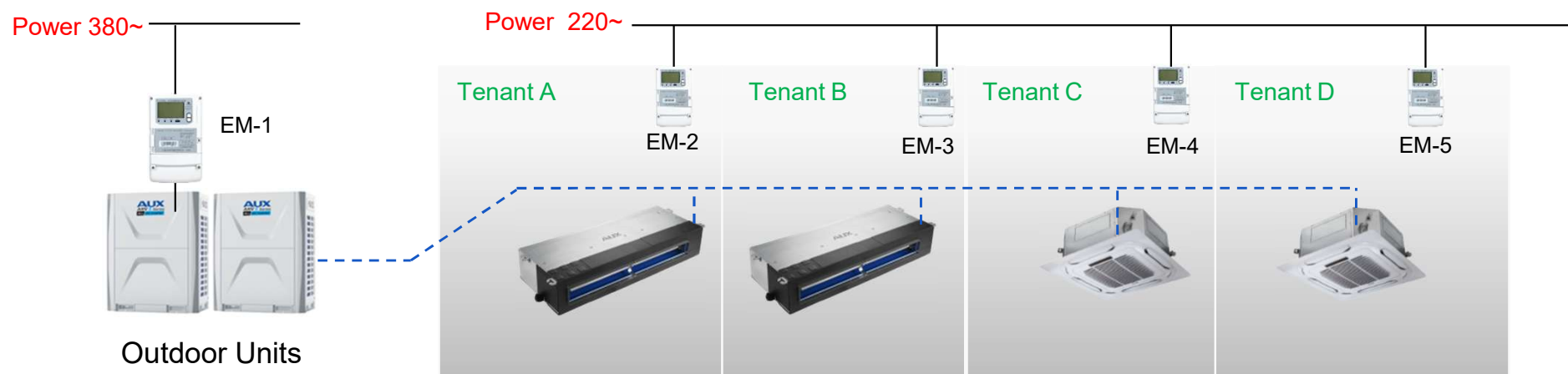
PPD

Tenant billing solution



1) Power Proportional Distribution - PPD

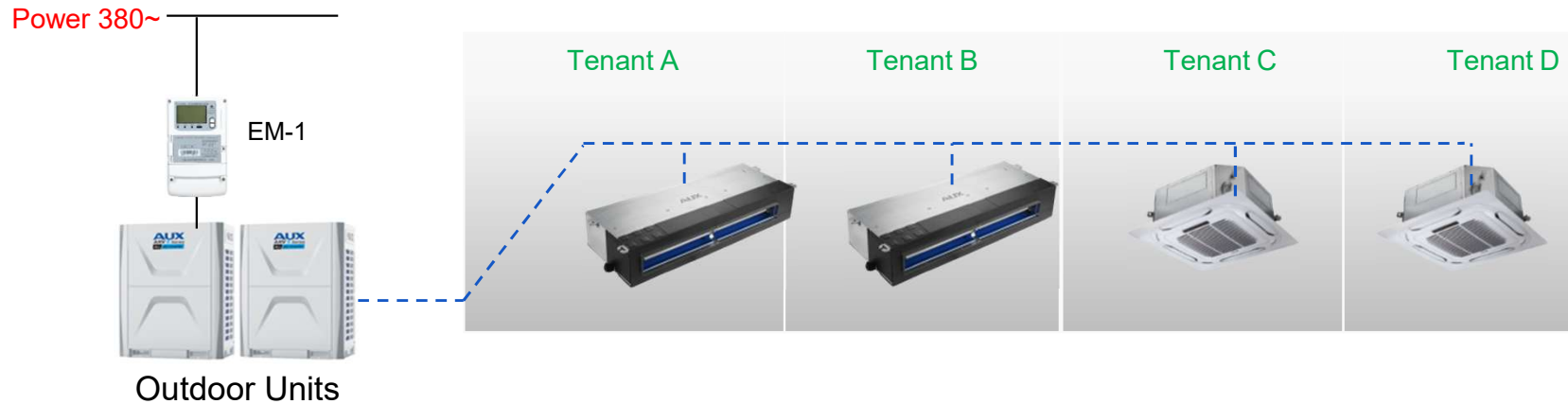
A function that proportionally distributes the total power used by the air conditioners in a rental building, measured by using an electricity meter among the tenants. This function is very suitable for ARV System.



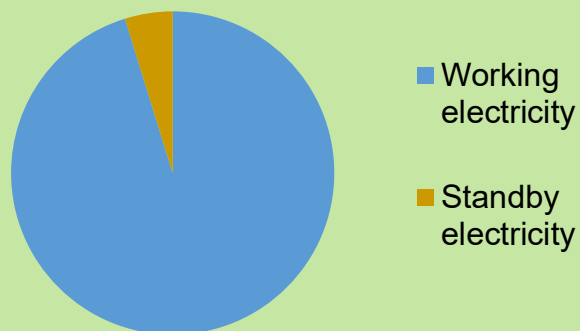
Electricity on EM-1 will be distributed to different tenants by the PPD software

Electricity on EM-2~EM-5: Contains ARV IDU and other indoor electric device power consumption, not include ARV ODU power consumption

2) Power Proportional Distribution – Principle 1



Total electricity on EM-1



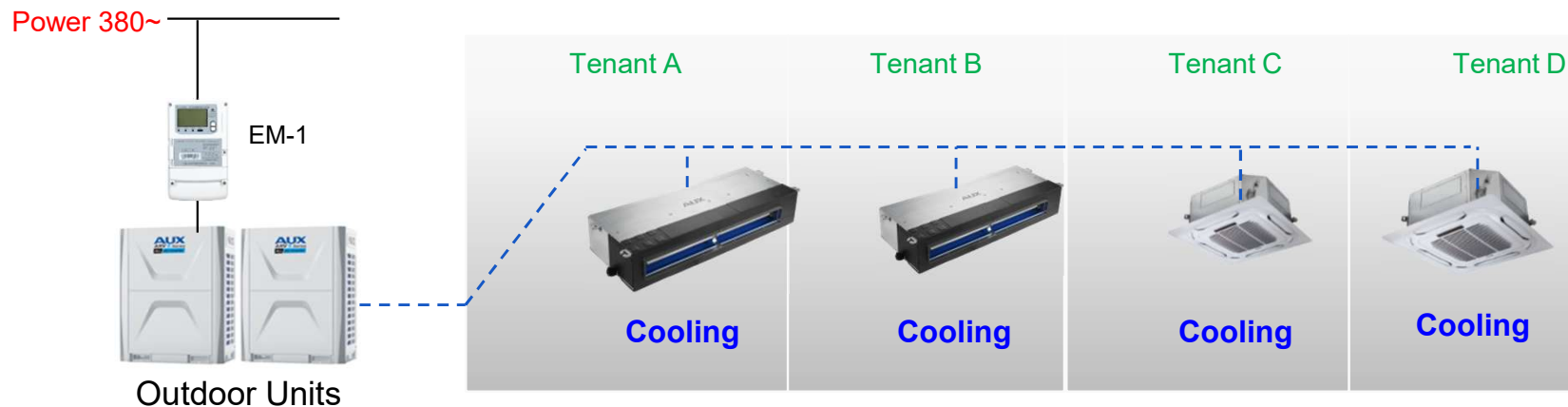
1. Working : Indoor units cooling or heating

Consumed by compressors and outdoor fans in outdoor units.

2. Standby: All Indoor units are turned off or reach the set point

Consumed by outdoor PCB, compressor driver PCB and heat belt
(About 3~7KWh a day, depends on the HP of Outdoor units).

2) Power Proportional Distribution – Principle 2



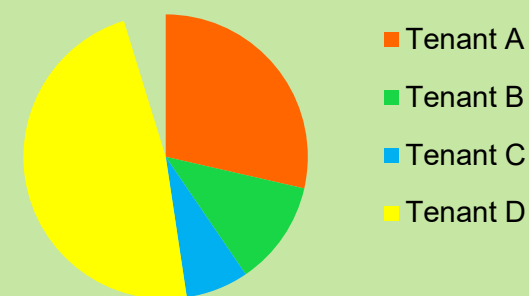
Working electricity
on EM-1



$$\text{Working Electricity} \times \frac{\text{Each Tenant's IDU running capacity}}{\text{All tenants's all IDUs running capacity}}$$

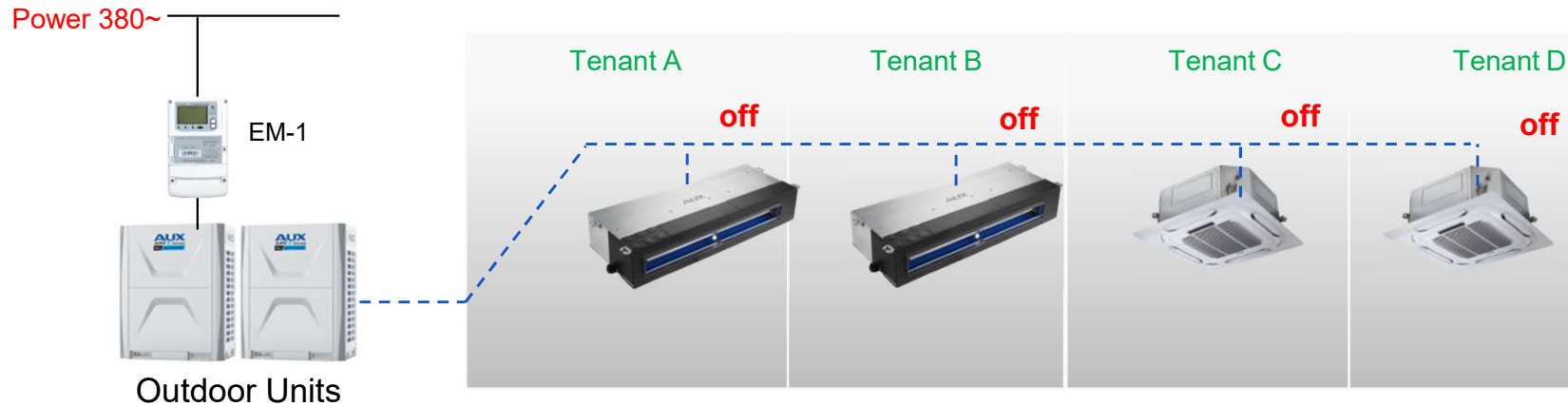
Note: Running capacity depending on rated capacity, fan speed, room temperature, set temperature, EXV pulse, running time

Working Electricity of Tenant

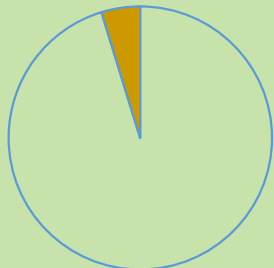


2) Power Proportional Distribution – Principle 3

AUX



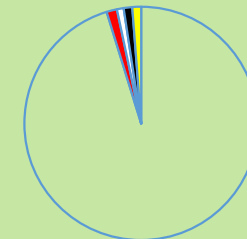
Standby Electricity on EM-1



$$\text{Standby Electricity} \times \frac{\text{Each Tenant's IDU rated capacity}}{\text{All tenants' all IDUs rated capacity}}$$

Note: Rated capacity will be showed on the nameplate

Standby electricity of tenant



- Tenant A
- Tenant B
- Tenant C
- Tenant D

3) Power Proportional Distribution - Example

AUX

Power 380~

20kw.h

Outdoor Units

Tenant A

Tenant B

Tenant C

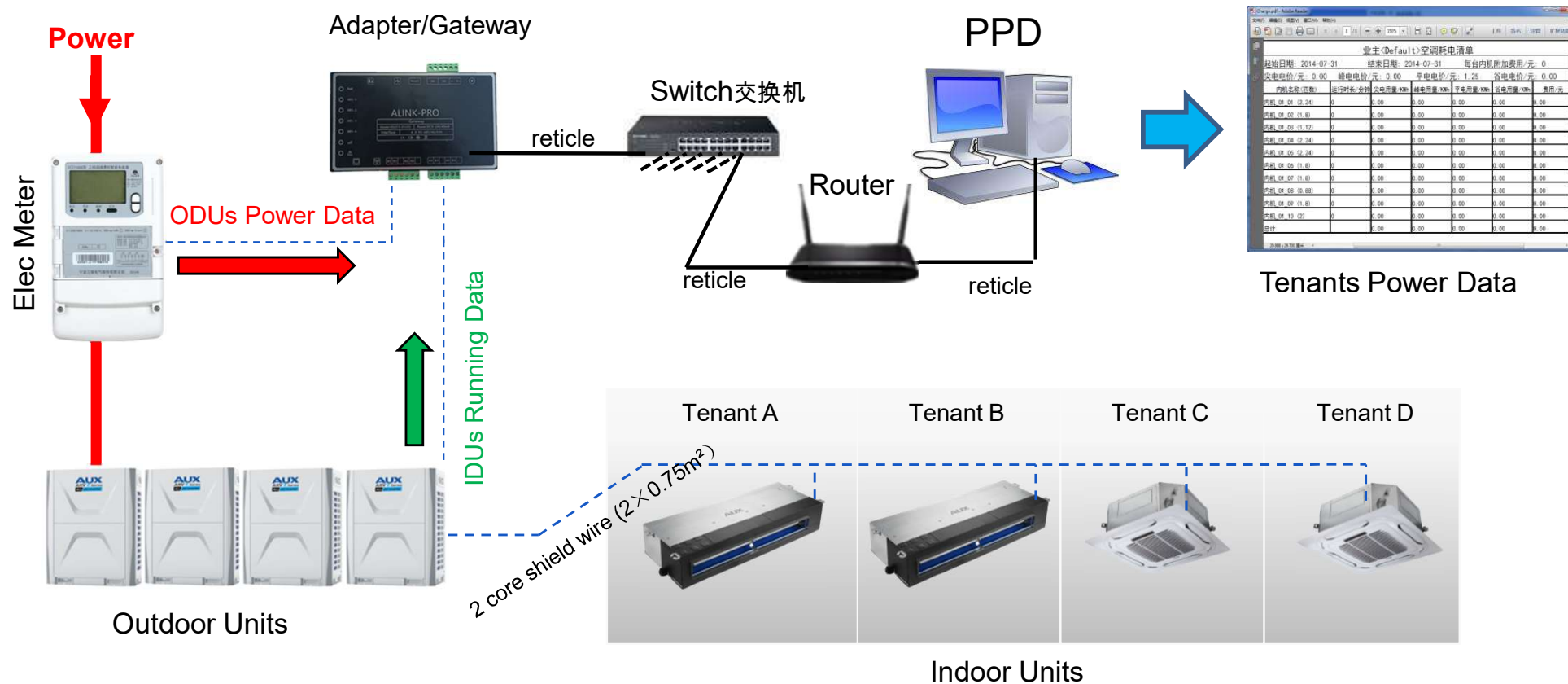


IDU Rated capacity (nameplate)	8kw	4.5kw	4.5kw
Operation mode	Cooling	Cooling	Cooling
Room temperature	28°C	28°C	21°C
Set temperature	20°C	20°C	20°C
Fan speed	High (100%)	High (100%)	High (100%)
EXV Specification	Same size		
EXV pulse	250pulse(52%)	250pulse(52%)	80Pulse(17%)
Running time	5min	5min	5min
Running capacity (kw)	7kw	4kw	1.5kw
Tenant electricity (kw.h)	11.2	6.4	2.4

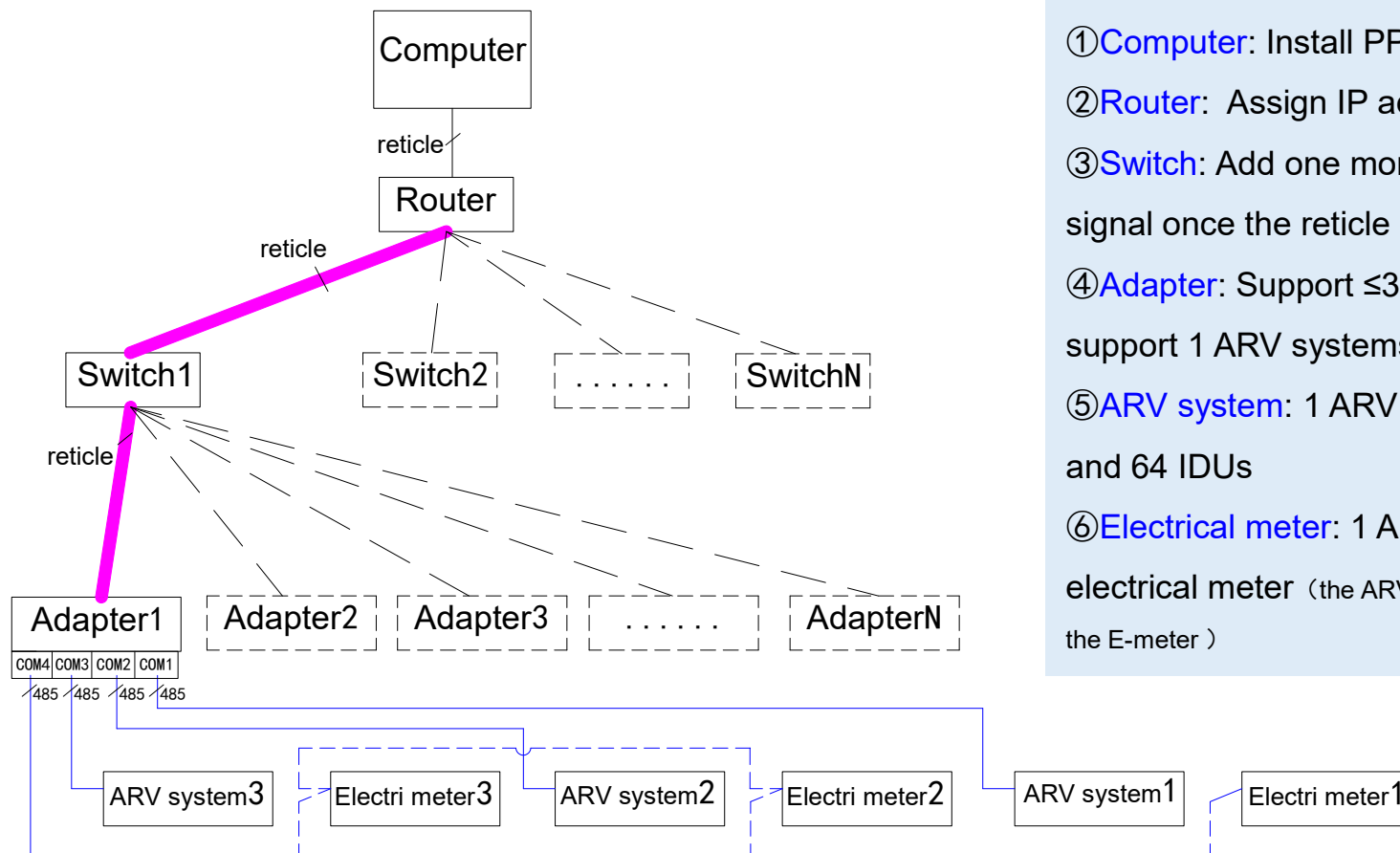
$$20 \times \frac{7}{(7+4+1.5)}$$

4) Overall Solution Diagram - 1

AUX

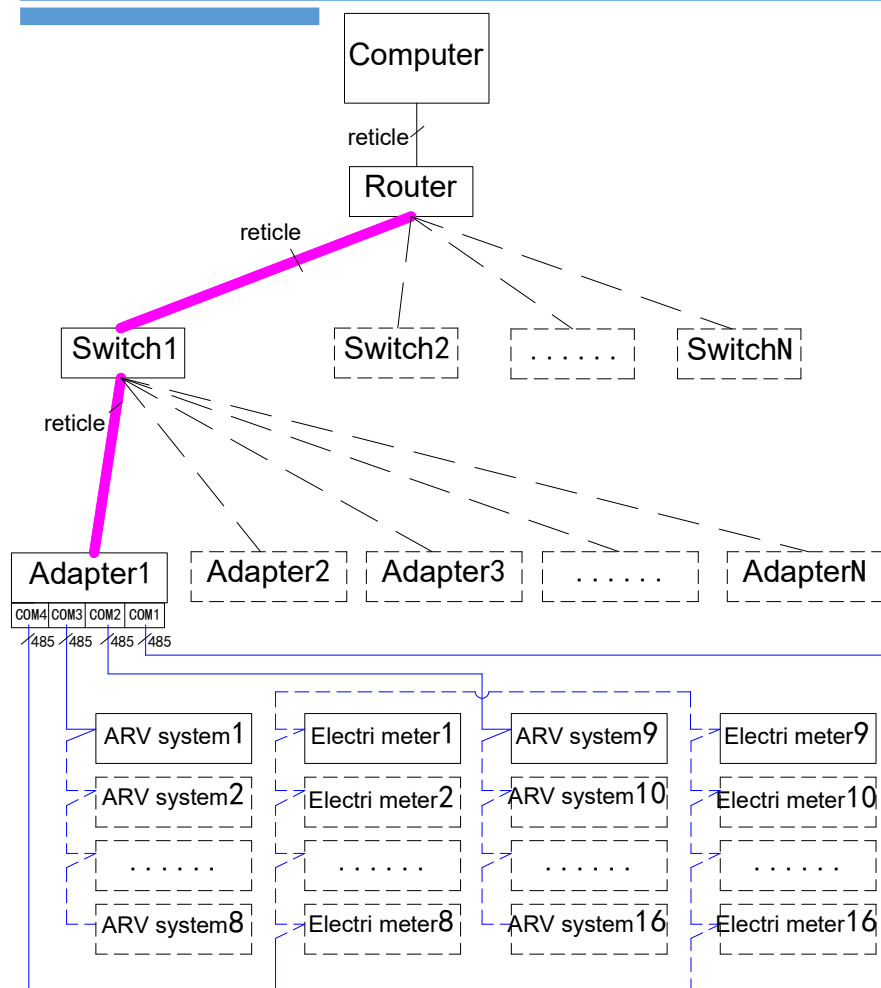


4) Overall Solution Diagram - 2



- ① **Computer**: Install PPD software
- ② **Router**: Assign IP address
- ③ **Switch**: Add one more switch to Strengthen the signal once the reticle distance $> 100\text{m}$
- ④ **Adapter**: Support ≤ 3 ARV systems, Each COM (1~3) support 1 ARV systems (ARV6, ARV5, Individual ARV, MINI ARV)
- ⑤ **ARV system**: 1 ARV system contain max 4 ODUs and 64 IDUs
- ⑥ **Electrical meter**: 1 ARV system connect to one electrical meter (the ARV system's maximum current $\leq$ capacity of the E-meter)

4) Overall Solution Diagram - 3



Difference between diagram 3 and diagram2:

④ **Adapter**: [same adapter]

1. Support ≤ 24 ARV systems, Each COM (1~3) support **8** ARV systems (ARV8 series, no need adapters between these ARV systems) ;

2. Support Max **512** ARV indoor units

Necessary to meet above 2 conditions at the same time

5) Equipment List - 1

No	Name	standard	Reference picture	Qty	Supplier
1	Router	TPLINK		≥1	self-purchase
2	Switch	TPLINK		According to demand	
3	Reticle	/		According to demand	
4	Registered jack	/		According to demand	

5) Equipment List - 2

No	Name	Standard	Reference picture	Qty	Supplier
5	Power distribution cabinet	/		According to demand	self-purchase
6	2 core shield wire	$2 \times 0.75\text{mm}^2$		According to demand	
7	Computer	windows10		1	

5) Equipment List - 3

No	Name	standard	Reference picture	Qty	Supplier
8	Electrical Meter	1. Code: 16430043000001 DTZY188 2. Max current of the E-meter 100A 3. Power: 380V~ 3ph 4. Communication: RS485 5. Protocol: DL/T 645-2007 6. Baud rate: 9600 7. Verification method: even verification 8. Working condition: - 25 °C ~ 55 °C, humidity: 45% ~ 75% 9. Dimension: 290mm × 170mm × 85mm		Same as the Qty of ARV system	AUX or self-purchase (necessary to meet the protocol requirement)
9	Adapter/ Gateway	Code: 16348002000001 CM-PTD/A02		≥1/3×Qty of ARV systems	AUX
10	PPD software	Code:16430026000019		1	AUX

5) Equipment List - 4

No	Name	standard	Reference picture	Qty	Supplier
11	Electrical Meter (Developing)	1. Model: S34U18 CT 2. Max current of the E-meter $\geq 1.1 \times$ the ARV system's maximum current 3. Communication: RS485 4. Baud rate: 9600, 5. "even parity" by number of systems		Same as the Qty of ARV system	AUX or self-purchase (necessary to meet the protocol requirement)
12	Current transformer (Developing)	BH-0.66 300/5A		$\geq 3 \times$ Qty of Electrical meter	AUX or self-purchase

6) Adapter/Gateway

AUX



1. Model: CM-PTD/A02
2. Power: DC 9~24V, 400mA
3. Communication: RS485
4. LAN (DHCP to obtain IP automatically)
5. Working condition: -25°C~55°C, 45%~75%
6. Dimension: 178mm × 115mm × 85mm

7) Electrical meter - 1



1. Model: DTZY188
2. Power: 380V~ 3ph
3. Current: Max 100A
4. Communication: RS485
5. Protocol: **DL/T 645-2007**
6. Baud rate: 9600
7. Verification method: even verification
8. Working condition: -25°C~55°C, 45%~75%
9. Dimension: 290mm×170mm×85mm

7) Electrical meter – 2 (Connect to current transformer type)



(Developing)

1. Model: S34U18 CT
2. Power: 230/400V~ 3ph
3. Current: 300/600A
4. Communication: RS485 3.
5. Baud rate: 9600
6. "even parity" by number of systems
7. Working condition: -25°C~55°C, 45%~75%
8. Dimension: 285mm×170mm×80mm

8) Current transformer

AUX

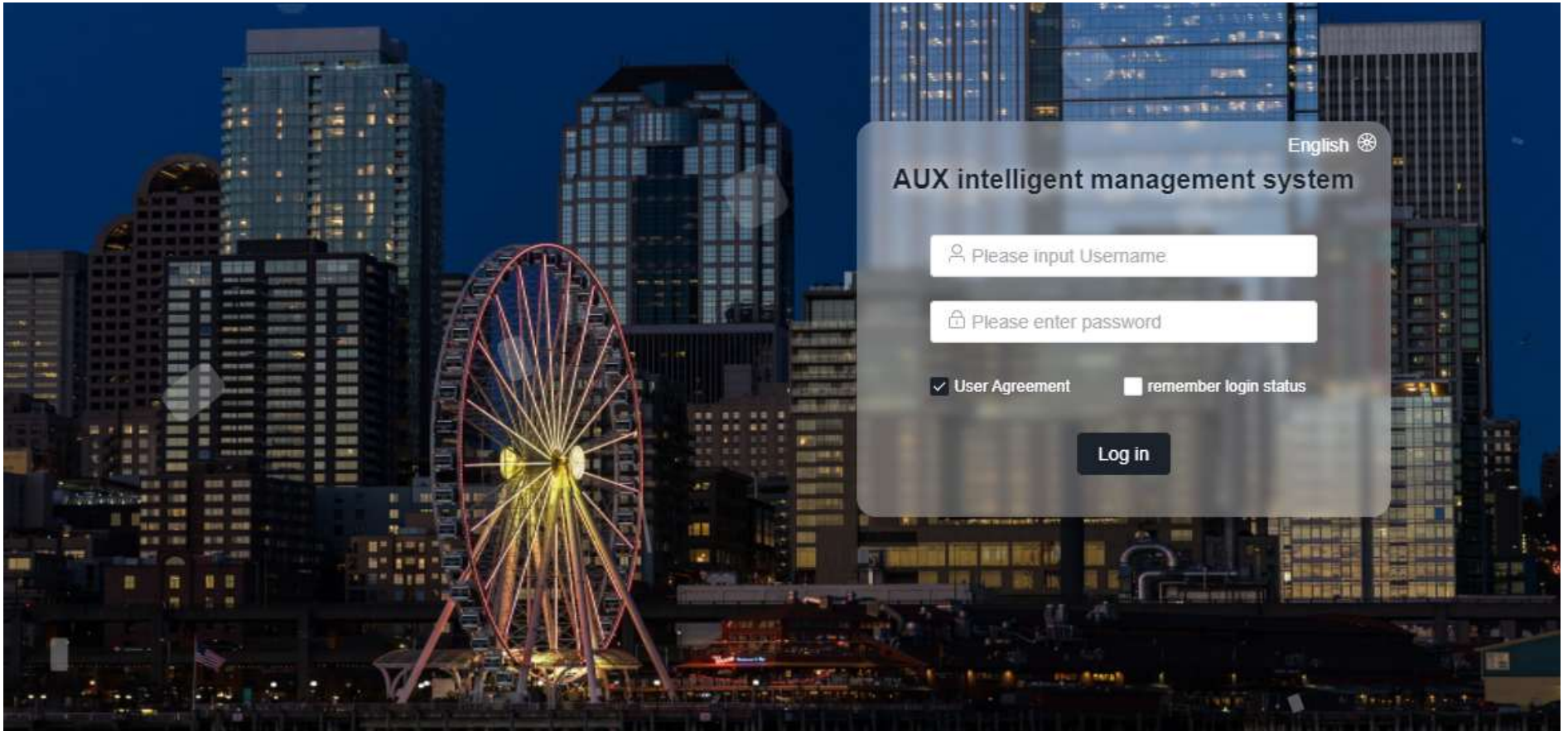


(Developing)

1. Model: BH-0.66 300/5A
2. Current ratio: 300/5A
3. Frequency: 50HZ
4. Accuracy: 0.5
5. Number of turns: 1 turns
6. Working condition: -25°C~55°C, 45%~75%
7. Dimension: 98mm×75mm×42mm

9) PPD software – 1.1 login interface

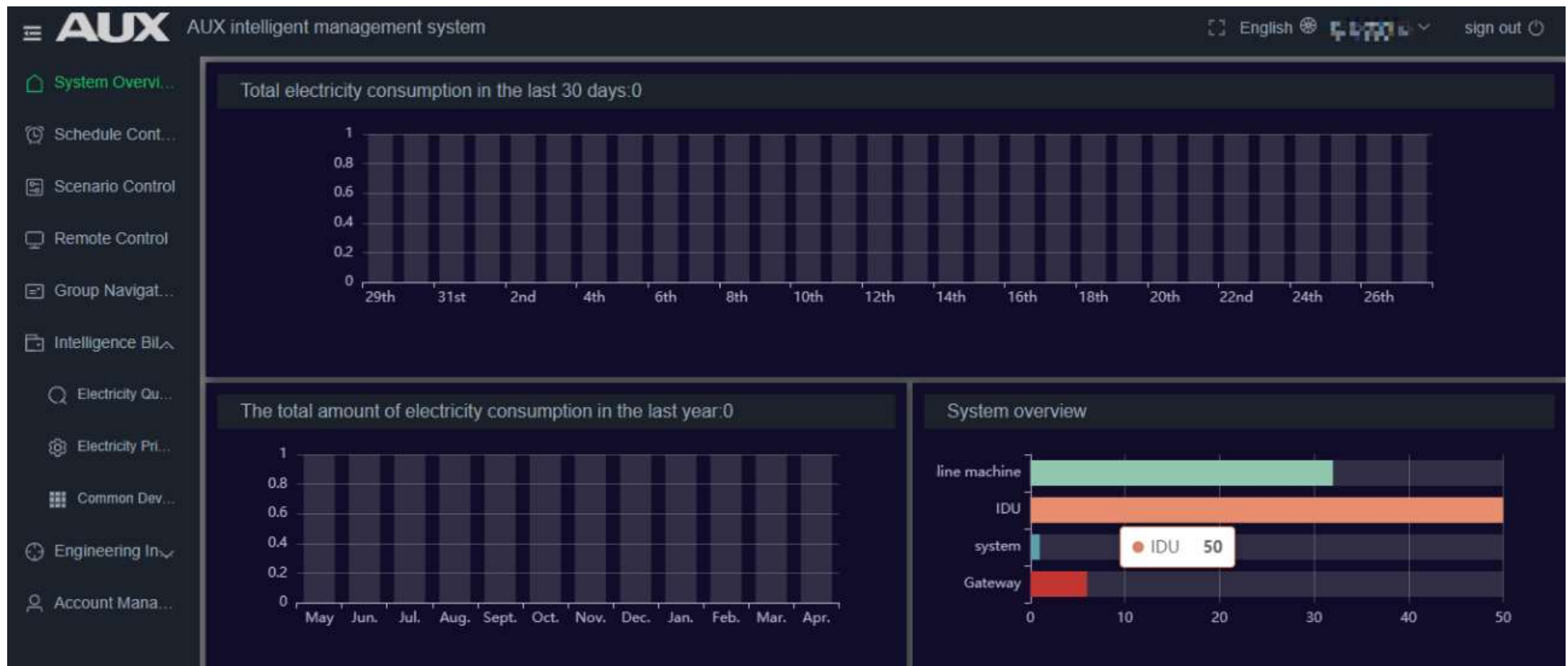
AUX



9) PPD software – 1.2 System overview



Show total electricity consumption and total system information (Qty)



8) PPD software – 2.1 Schedule control



AUX intelligent management system

System Overvi...

Schedule Cont...

Scenario Control

Remote Control

Group Navigat...

Intelligence Bil...

Engineering In...

Account Mana...

English

sign out

Schedule Control

Please enter a keyword

New ScheduleBatch Delete

☐	Schedule Name	Remark Information	Operation
☐	meeting room off		edit delete
☐	office room1 -off		edit delete
☐	metting room on		edit delete
☐	office room 1-on		edit delete

8) PPD software – 2.2 Schedule control



AUX intelligent management system

System Overvi...

Schedule Cont...

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Engineering In...

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Agenda Details

Name: meeting room 1

Remark:

Add Control

Batch Delete

Type

Monday, Tuesday, Wednesday, Thursday, Friday — 09:00

	Parameter name	Control Value	Remark Information	Enable	Operation
☐	Set Swing Wind	On		☒	
☐	Power	On		☒	
☐	Temperature setting lock	Lock		☒	
☐	Power lockout	Lock		☒	
☐	Indoor set temperature	24		☒	
☐	Set wind speed	Medium wind speed		☒	
☐	Set Mode	Cooling		☒	
☐	Mode setting lock	Lock		☒	

Scheduled device bound:

Add Device

Bound device

Grouped Devices

862195052816886

485-1

System-1

Device-1

Device-2

Device-3

Device-4

Device-5

8) PPD software – 3.1 Scenario control



AUX intelligent management system

English

sign out

System Overvi...

Schedule Cont...

Scenario Control

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Engineering In...

Account Mana...

Scenario Control

Please enter a keyword

New ScenarioBatch executionBatch delete

☒	Scenario Name	Remarks	operate
☒	meeting room		Execute edit delete
☒	office room		Execute edit delete

8) PPD software – 3.2 Scenario control



AUX

AUX intelligent management system

System Overvi...

Schedule Cont...

Scenario Control

Remote Control

Group Navigat...

Intelligence Bil...

Engineering In...

Account Mana...

Scenario Details

Name: meeting room

Remark:

Add Control

Batch delete

Execution Control

☐	Parameter name	Control Value	Remarks	Enable	operate
☐	Temperature setting lock	Lock		☒	
☐	Set wind speed	Low wind speed		☒	
☐	Indoor set temperature	24		☒	
☐	Set Mode	Cooling		☒	
☐	Set Swing Wind	On		☒	
☐	Mode setting lock	Lock		☒	
☐	Power	On		☒	
☐	Power lockout	Lock		☒	

Bound context device:

Add Device

Bound device

Grouped Devices

Please enter a keyword

862195052816886

485-1

System-1

Device-1

Device-2

Device-3

Device-4

862195052849093

485-2

System-1

Device-3

Device-4

Device-5

Device-6

Device-7

8) PPD software – 4.1 Remote Control



Show all IDUs running status

The screenshot displays the AUX intelligent management system v1.0.2 interface. On the left is a dark sidebar with navigation options: System Overview, Schedule Control, Scenario Control, Remote Control (highlighted in green), Group Navigation, Intelligence Bit, Engineering In, Electricity me..., Gateway Ma..., load power, and Account Mana... The main content area has a top header with 'English', 'Admin', and 'sign out' links. Below this, there's a 'Device Path' section showing '862195052816613 / COM-1 / System-1' and a dropdown menu set to 'all'. A 'Please enter a keyword' search bar is also present. The central part of the interface shows a grid of IDU machine status cards. The first row contains three cards for machines 1, 2, and 3, all showing a setpoint of 16°C and indoor temperatures of 23.5°C, 24.2°C, and 24.2°C respectively. The second row contains three cards; machines 4 and 5 are in a 'Shutdown' state, while machine 6 shows a setpoint of 16°C and an indoor temperature of 23.4°C. The third row shows the top of a card for machine 7 with a setpoint of 16°C and an indoor temperature of 23.3°C. A sidebar on the left lists the device hierarchy: 862195052816613 > COM-1 > System-1 (with devices 1-7) and COM-2 > System-1 (with devices 1-4). An 'Open Batch Control' button is located in the top right corner.

AUX intelligent management system v1.0.2

English Admin sign out

Device Path : 862195052816613 / COM-1 / System-1 all Open Batch Control

Please enter a keyword

862195052816613

COM-1

System-1

- Device-1
- Device-2
- Device-3
- Device-4
- Device-5
- Device-6
- Device-7

COM-2

System-1

- Device-1
- Device-2
- Device-3
- Device-4

16 °C 23.5°C indoor COM1-system1-IDU machine1 Device-1

16 °C 24.2°C indoor COM1-system1-IDU machine2 Device-2

16 °C 24.2°C indoor COM1-system1-IDU machine3 Device-3

Shutdown COM1-system1-IDU machine4 Device-4

Shutdown COM1-system1-IDU machine5 Device-5

16 °C 23.4°C indoor COM1-system1-IDU machine6 Device-6

16 °C 23.3°C indoor

8) PPD software – 4.2 Remote Control



The screenshot displays the AUX intelligent management system interface. On the left, a sidebar menu includes options like System Overview, Schedule Control, Scenario Control, Remote Control (highlighted), Group Navigation, Intelligence Bill, Engineering In, and Account Management. The main panel shows a list of devices under 'System-1', with 'Device-3' selected. A 'Remote Control' modal is open, showing settings for 'COM1-system1-IDU machine3 Device-3'. The settings include:

- * Power: On
- * Set Mode: Cooling
- * Indoor set temperature: 21
- * Set wind speed: High wind speed
- * Fan speed setting lock: Not locked
- * Power lockout: Not locked
- * Mode setting lock: Not locked
- * Temperature setting lock: Not locked

The background interface also shows a list of devices (Device-1 to Device-13) and a 'Shutdown' button at the bottom right.

8) PPD software – 5 Group Navigation



The screenshot displays the AUX intelligent management system interface. On the left is a dark sidebar with navigation options: System Overview, Schedule Control, Scenario Control, Remote Control, Group Navigation (highlighted in green), Intelligence Bit, Engineering In, and Account Management. The main area has a dark header with the AUX logo and the text 'AUX intelligent management system'. Below the header, there's a 'Create root group' button and a search bar labeled 'Please enter a keyword'. A tree view on the left shows a hierarchy: 'build 1 - floor -1' (expanded) containing 'office 1' (selected), 'build 1 - floor -2', and 'build 1 - floor -3'. To the right of this tree, three room icons are shown, labeled 'Room 1', 'Room 2', and 'Room 3'. In the top right corner of the main area, there are filters: 'all(3)' and 'Fault'. On the far right, a 'Save Changes' dialog box is open, featuring a close button (X) and two tabs: 'Ungrouped devices' (active) and 'Devices in group'. The 'Ungrouped devices' tab contains a search bar 'Please enter a keyword' and a list of devices with checkboxes and expand/collapse icons. The devices listed are: 862195052816886, 485-1, 485-3, 862195052849531, 862195052849093, 862195052851628, 862636050673092, and 862195052851321.

AUX intelligent management system

Create root group

Please enter a keyword

- build 1 - floor -1
 - office 1**
 - build 1 - floor -2
 - build 1 - floor -3

Room 1 Room 2 Room 3

all(3) Fault

Save Changes X

Ungrouped devices Devices in group

Please enter a keyword

- ☐ 862195052816886
 - ☐ 485-1
 - ☐ 485-3
- ☐ 862195052849531
- ☐ 862195052849093
- ☐ 862195052851628
- ☐ 862636050673092
- ☐ 862195052851321

8) PPD software – 6 Electricity inquiry



AUX AUX intelligent management system English sign out

Electricity Inquiry

Search Date: 2022-04-27 17:08:2 - 2022-04-28 17:08:4 Billing method: All IDU share ODU consume Search

Filter: Account, Account Name, Gateway or Group Set invalid IDU Export Excel

By Account By IDU

prepaid account	user contact	user name	Number of IDU	Total power (kWh)	Tr Operation
liujia			5	0.00	0. Use Record Export
liushiyong			7	0.00	0. Use Record Export
fshgen			3	0.00	0. Use Record Export

AUX Intelligent Management System Air Conditioning Bill

prepaid account	liujia	user contact	user name						
report cycle	2022-05-24 14:53:16 - 2022-05-25 14:53:16								
IDU number	Running power	Running electricity bill	ODU running power	ODU electricity bill	Electricity in the public area	Public area electricity bill	Total power (kWh)	Total cost (yuan)	
1	0	0	0.24	0.24	0	0	0.24	0.24	
2	0	0	0.2	0.2	0	0	0.2	0.2	
3	0	0	0.22	0.22	0	0	0.22	0.22	
4	0	0	0.57	0.57	0	0	0.57	0.57	
5	0	0	0.24	0.24	0	0	0.24	0.24	
6	0	0	0.15	0.15	0	0	0.15	0.15	
Total electricity consumption (kWh)	6								
Total cost (yuan)	6								
print date	2022-05-25 14:53:24								

8) PPD software – 7 Electrical meter setting



AUX intelligent management system

English

sign out

Schedule Cont...

Scenario Control

Remote Control

Group Navigat...

Intelligence Bil

Electricity Qu...

Electricity Pri...

Common Dev...

Engineering In

Electricity me...

Gateway Ma...

Account Mana...

Electricity meter Settings

Please enter the gateway number

If there is a system that is not bound to the meter, it may affect the billing result!

Gateway	System	Connection method	Communication of ODU electricity meter	ODU electricity meter number	ODU mutual inductance ratio	Operation
862195052849531	COM-1-system1	The ODU is connected to the electricity meter, and all IDUs are connected to civil power	Offline	000000001111	1:1	edit

NEW FUTURE

THANKS FOR ALL

AUX

