User Manual of the Energy Consumption Management Function

1. Introduction

1.1. Significance

Nowadays, as customers have an increasing demand for improving energy efficiency in their buildings, to visualize the energy consumption of each building has become an important step for them to comprehensively understand the energy consumption in order to finally achieve energy-saving management. In this case, Tuya provides customers with an entire set of solutions to visualize the energy consumption for better management, based on the industry standards for statistics on energy consumption by subentry, excellent interaction logic, and convenient configuration methods.

1.2 Core benefits

- Convenient debugging for projects: You can configure the energy management features in no-code mode even if you lack proficiency in debugging and programming.
- Standard measurement rules: Energy consumption data is collected based on four subentries and 28 sub-types, in accordance with the industrial standards.
- Various data presentation methods: Tuya provides multiple graphical displays of data to meet the needs of different customers on data viewing.

1.3. Data source

Statistical data is obtained from two types of devices: devices that can meter energy consumption and devices with built-in features to record energy consumption data. Data from the first type of devices is collected after the device usage is allocated. The currently supported categories of metering devices are as follows:

- Standard category—electrical engineering (mainly smart metering socket)

- Standard category—energy saving (circuit breaker)
- Standard category—energy saving (smart electricity meter)

Note: For more information about the types of device usage, see section 2.4.2 "Usage of metering devices."

You do not need to allocate usage to the second type of devices. Such devices are automatically associated with the corresponding energy consumption subentries based on their categories.

1.4 Important notes

- Only the SaaS platforms of the advanced and professional editions contain the energy consumption management module.
- The accuracy of data in the energy consumption management module depends on your configuration. For example, if you configure an electricity meter for lighting energy consumption to meter the energy consumption of air conditioning, the data may be inaccurate.

2. Configuration guidance

To configure the energy consumption management function, you need to perform four steps. The following figure shows the configuration procedure.

Instructions:

1. Create a project. Set the project name, configure area structures, and import the drawings.

2. Set the area usage, that is, to determine whether the area is an office area or a public walkway.

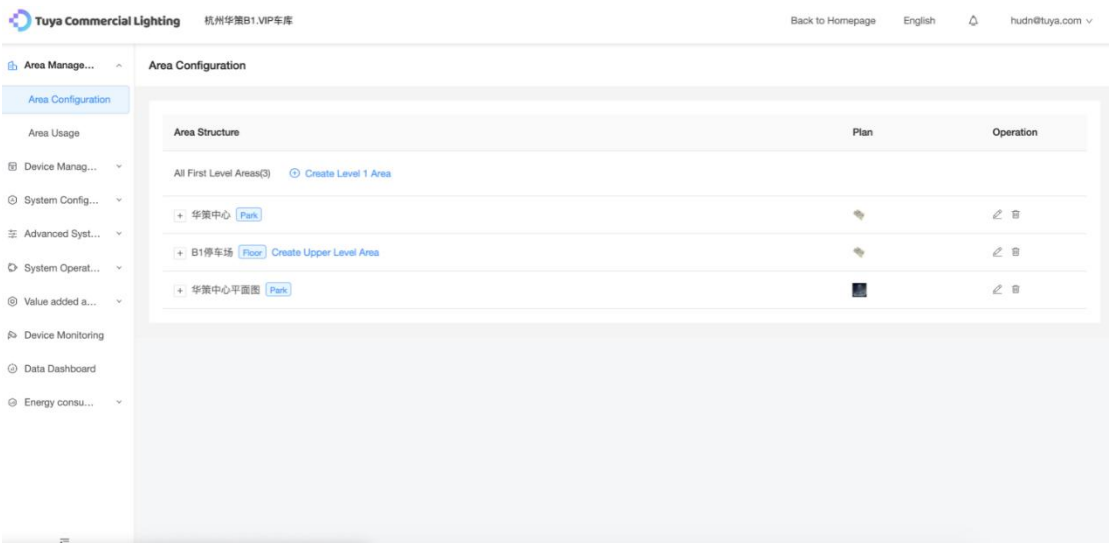
Skip this step if your project does not involve any lighting devices with built-in metering features.

3. Allocate the metering devices to the corresponding areas. We recommend that you allocate the devices to the area with the **Floor** attribute.

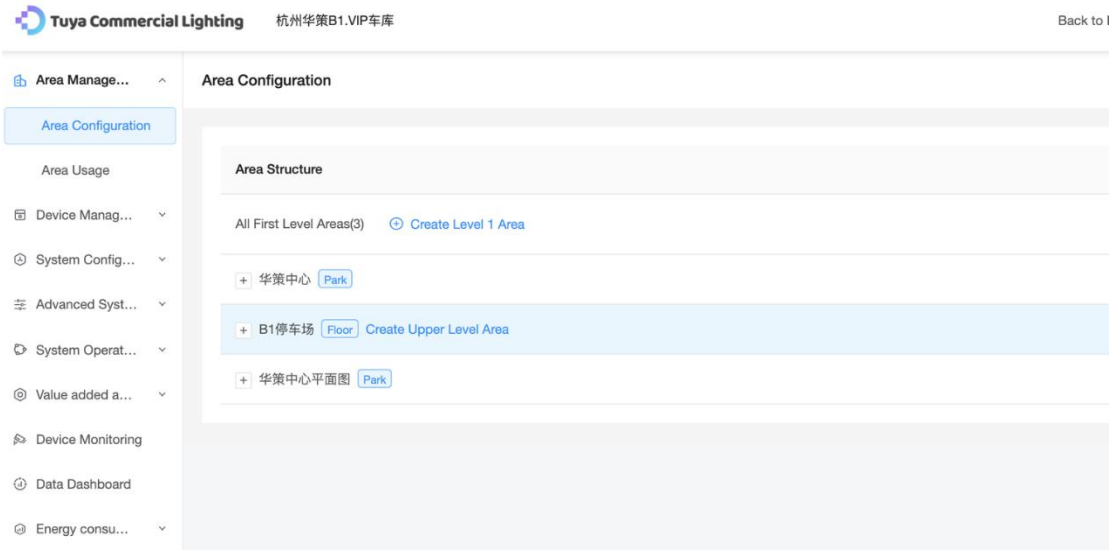
4. Allocate usage to the metering devices, that is, determine whether the data collected by the metering devices are from lighting or air conditioning scenes, to complete the configuration process.

2.1 Area Configuration

Go to **Area Management** > **Area Configuration**. In the **Area Structure** section, you can create areas at four levels, namely, **Park**, **Building**, **Floor**, and **Room**, based on the actual architectural situation. Create an area structure tree and import the floor drawings, which are mandatory when you create a project.



You can click an upper-level area to view the lower-level areas under this area. You can also modify or delete the created area.



To create an area, click the corresponding button and set the following parameters in the panel that appears:

- **Area Name**.
- **Area Attribute**. Valid values: **Park**, **Building**, **Floor**, and **Room**.
- (Optional) **Plan**.

Then click **Save**.

Note: Configurations related to the **Area Usage** and **Device Usage** functions depend on the architectural drawing you upload. Therefore, obtain a complete architectural drawing if possible and import it to the project before project implementation.

Edit Level 2 Area

* Area Name: B1.VIP公共

* Area Attribute: Building

Plan

Upload attachment

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supported format: .pdf .jpg .jpeg .png

Cancel Save

2.2 Area Usage

You can configure the corresponding area usage for the area with the **Floor** attribute. This step is required only when the project uses lighting devices with metering functions.

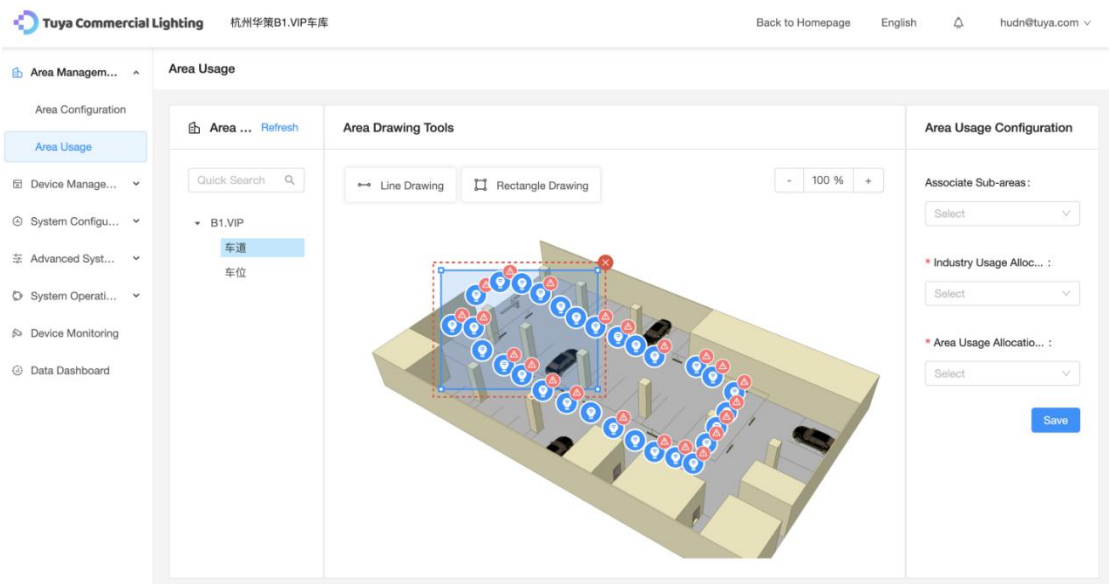
Go to **Area Management** > **Area Usage** and select an area from the area structure to view the architectural drawing.

For areas whose attribute is **Park**, **Building**, or **Floor**, you can click **Line Drawing** or **Rectangle Drawing** in the **Area Drawing Tools** pane to configure the area usage. You must draw a closed loop that does not overlap with the existing one and set the following parameters in the **Area Usage Configuration** pane:

- **Associate Sub-areas**.
- **Industry Usage Allocation**. This parameter is unavailable for areas whose attribute is **Park** or **Building**.
- **Area Usage Allocation**. This parameter is unavailable for areas whose attribute is **Park** or **Building**.

Then click **Save**.

Note: In the drawing, a closed-loop indicates a commonly used area.



2.3. Device Allocation

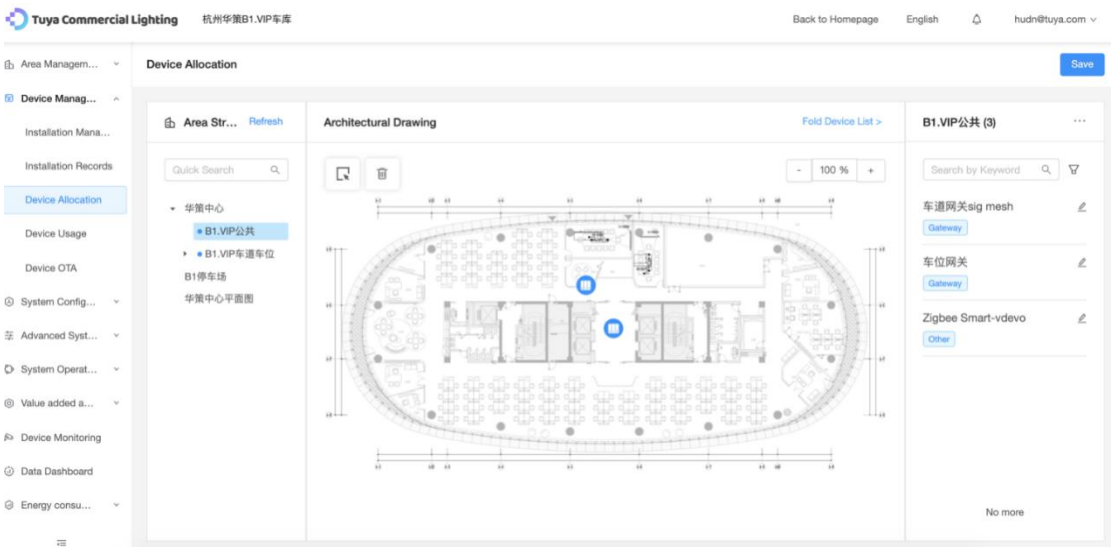
Go to **Device Management** > **Device Allocation**. On the **Device Allocation** page, you can select an area to view the device allocation in the current area and allocate devices to the current area.

You can click **Unfold Device List** and click and drag the unallocated devices to the architectural drawing in the current area.

Devices that meter energy consumption and devices with built-in metering features must be allocated to the configured area based on their actual location. Otherwise, the energy consumption data may be inaccurate. For example, if you have installed an electricity meter in the Level 3 area in the project, you must also click and drag the electricity meter to the same area in the system.

Inaccurate allocation of devices will cause errors in data classification. For example, energy consumption data of the Level 3 area will be mistakenly collected as that of other areas.

We recommended that you allocate devices that meter energy consumption to the area with the **Floor** attribute.



2.4 Device Usage

2.4.1. Device Usage Allocation

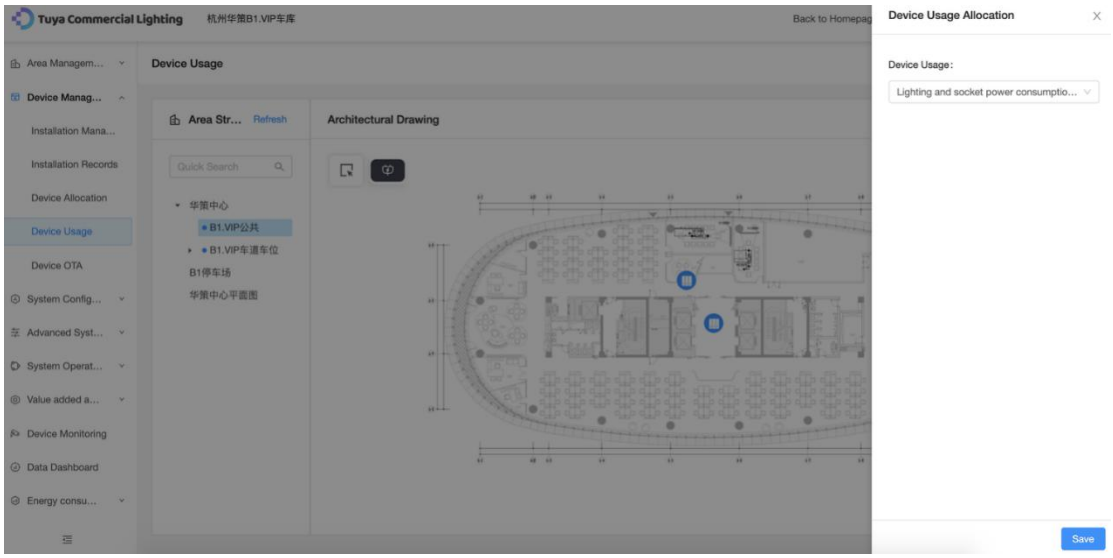
If your project uses devices that meter energy consumption, you must allocate usage to each device after you allocate the devices to corresponding areas. Device usage includes measurement of the total energy consumption, and lighting or air conditioning electricity consumption. Then the data collected by the metering devices are automatically added to the energy consumption subentry.

To allocate device usage, perform the following steps:

1. Go to **Device Management** > **Device Usage**.
2. Select an area to view the metering devices allocated to the area.

3. Click the device icon. In the **Device Usage Allocation** panel, select the type of energy consumption for the device to meter and click **Save**.

Note: Data collected by metering devices without usage is automatically added to the sub-type of **Other power consumption**, which will cause data inaccuracy. We recommended that you allocate the device usage based on the actual situation.



2.4.2. Usage of metering devices

If your project uses metering devices to meter energy consumption, you must allocate the device usage to each device in order to sort the data and display them in the corresponding subentry. The following table describes the device usage.

Assume that your project uses a smart electricity meter to monitor the lighting energy consumption in the office area. In this case, you can set the device usage to indoor lighting in a non-public area, as described in the following table. The data collected by this device will be added to the subentry of lighting electricity consumption.

Device category	Energy consumption subentry	Usage of metering devices
1. Standard category—electrical engineering 2. Standard category—energy saving (circuit breaker) 3. Standard category—energy saving (smart electricity meter)		Total energy consumption within an area
	Lighting and Socket	Indoor non-public lighting
		Indoor non-public sockets
		Indoor public lighting and socket power consumption
		Outdoor landscape lighting power consumption
	HVAC-Heating Ventilation Air Conditioning	Cold-heat central plant system
		Refrigeration pump and heating pump
		Refrigeration pump
		Refrigeration tower
		Air conditioning box and fresh air unit
		Fan coil unit
		Decentralized air-conditioning
	Motive equipments power consumption	Elevator power consumption
		Fire protection power consumption
		Water supply and drainage system power consumption
		Power consumption of ventilation for non-air conditioning purposes
	Special power consumption	Information center equipment
		Air conditioning special for the information center
		Laundry shop equipment
		Air-conditioning special for the laundry shop
		Kitchen equipment
		Air-conditioning special for the kitchen
		Entertainment and fitness center equipment
		Air-conditioning special for the entertainment and fitness center
		Electric water boiler power consumption
		Other power consumption
		Power consumption for external use

Note: After you complete the configuration, the system automatically collects and displays energy consumption data based on your configuration.

For more information about the configuration procedure, see *Tuya Commercial Lighting SaaS User Manual* (https://www.yuque.com/iborym/ammsbs/tknvfe).

3. Operation guidance

Currently, the energy consumption management module displays data on energy consumption in multiple dimensions.

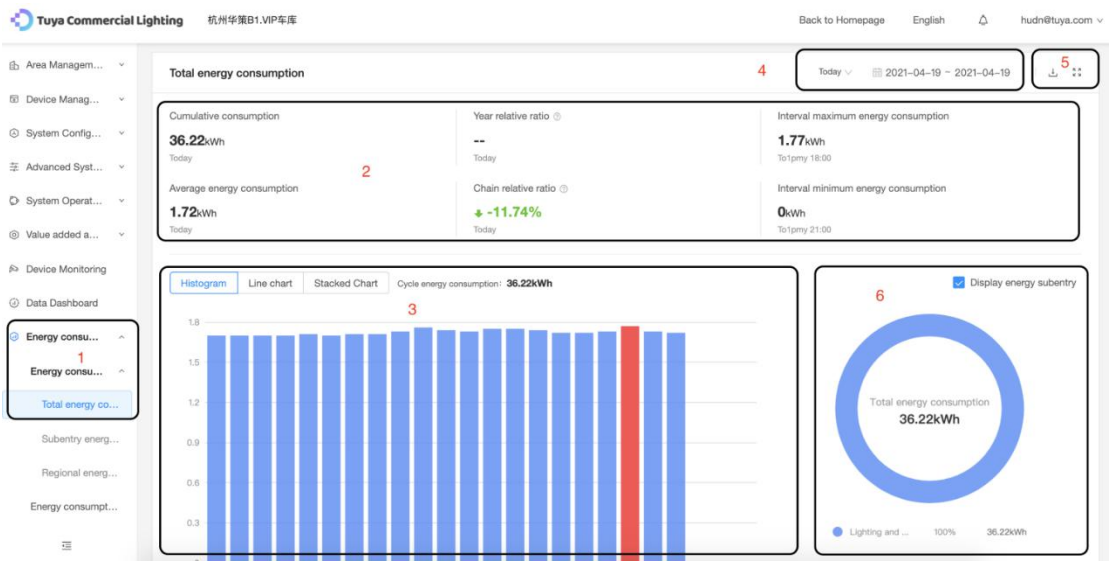
3.1 Total energy consumption

Go to **Energy consumption management** > **Energy consumption panel** > **Total energy consumption**. The following table describes the functions on this page.

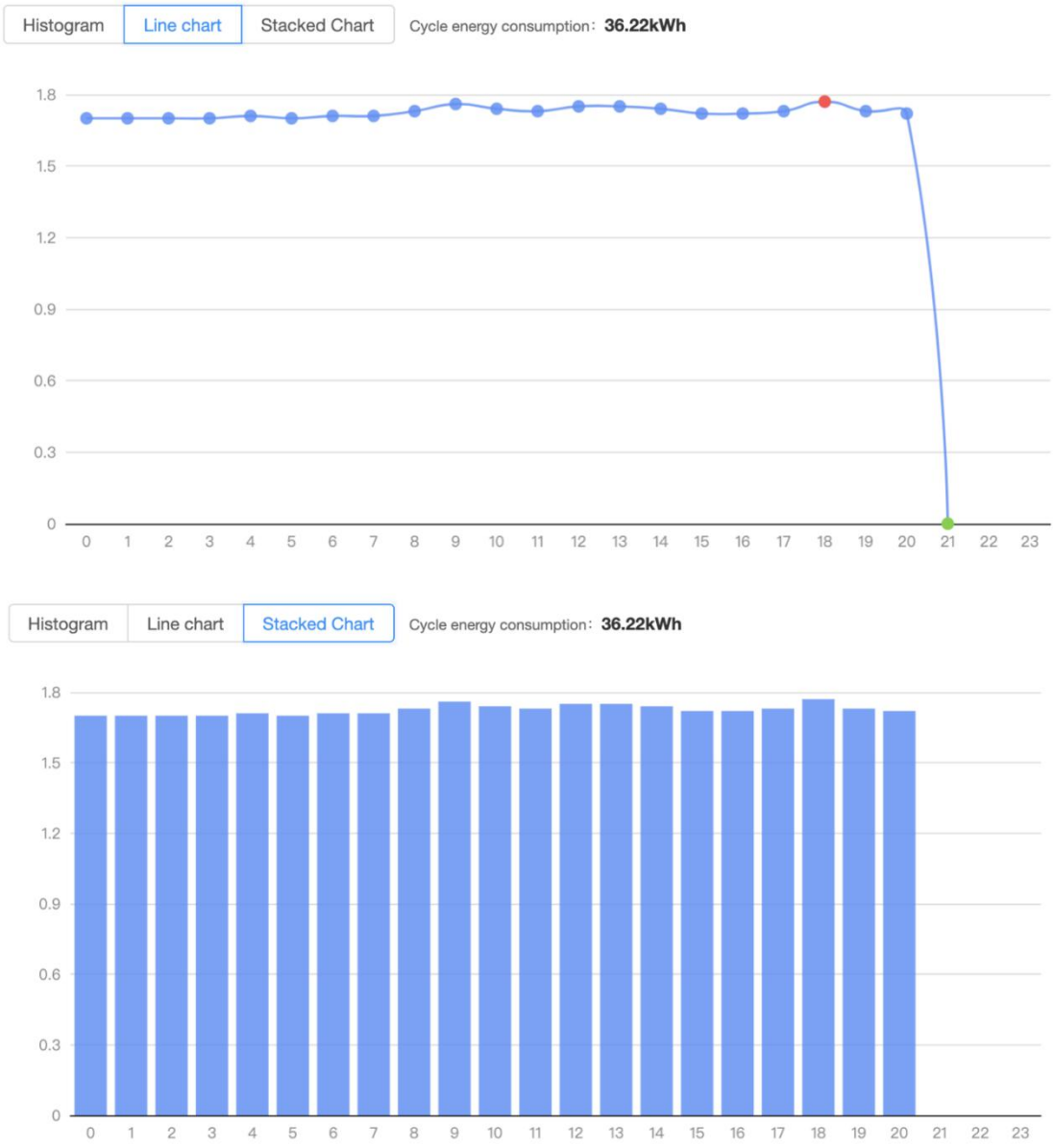
Page	Function	Description
Total energy	Data visualization	Supports the switch between the histogram, line chart, and

consumption		stacked chart.
	Energy consumption details	Displays data including the cumulative consumption, average energy consumption, year relative ratio, chain relative ratio, interval maximum energy consumption, and interval minimum energy consumption.
	Time-based data display	Allows you to query data generated today, in this week, in this month, or in this year. Data is displayed based on the time dimension you select.
	Energy consumption subentry	Displays the proportion of each energy consumption subentry in a pie chart.
	Report download	Takes a screenshot of the current page and saves it to the local computer in PDF format.
	Full-screen mode	Displays the current page in full-screen mode.

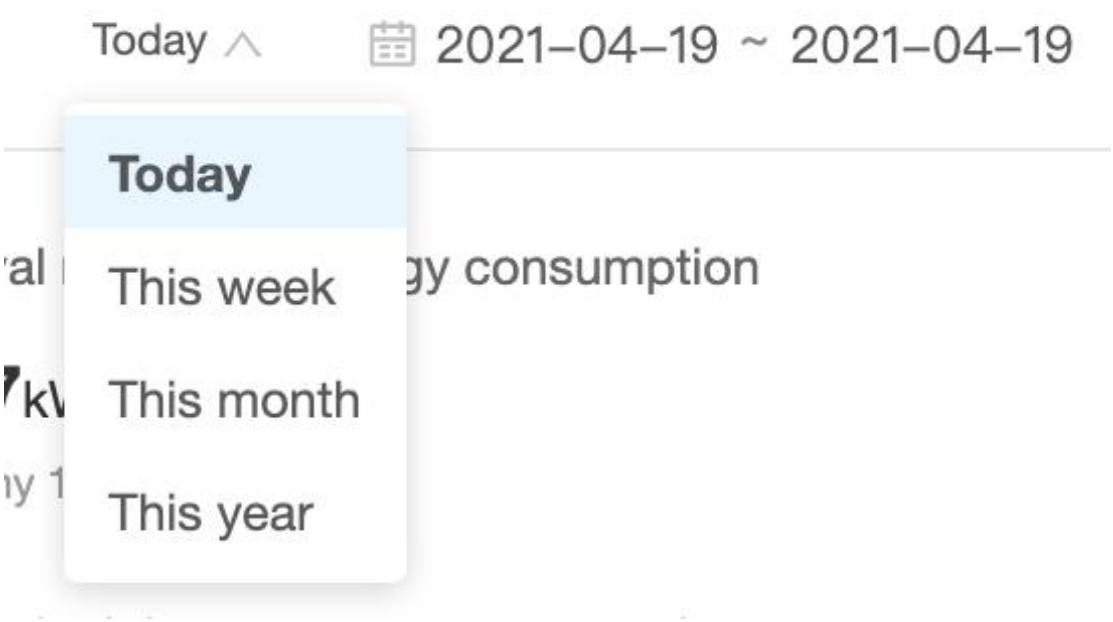
- The energy consumption details section, numbered as 2 in the following figure, displays the following data based on the time dimension you select: **Cumulative consumption**, **Average energy consumption**, **Year relative ratio**, **Chain relative ratio**, **Interval maximum energy consumption**, and **Interval minimum energy consumption**.



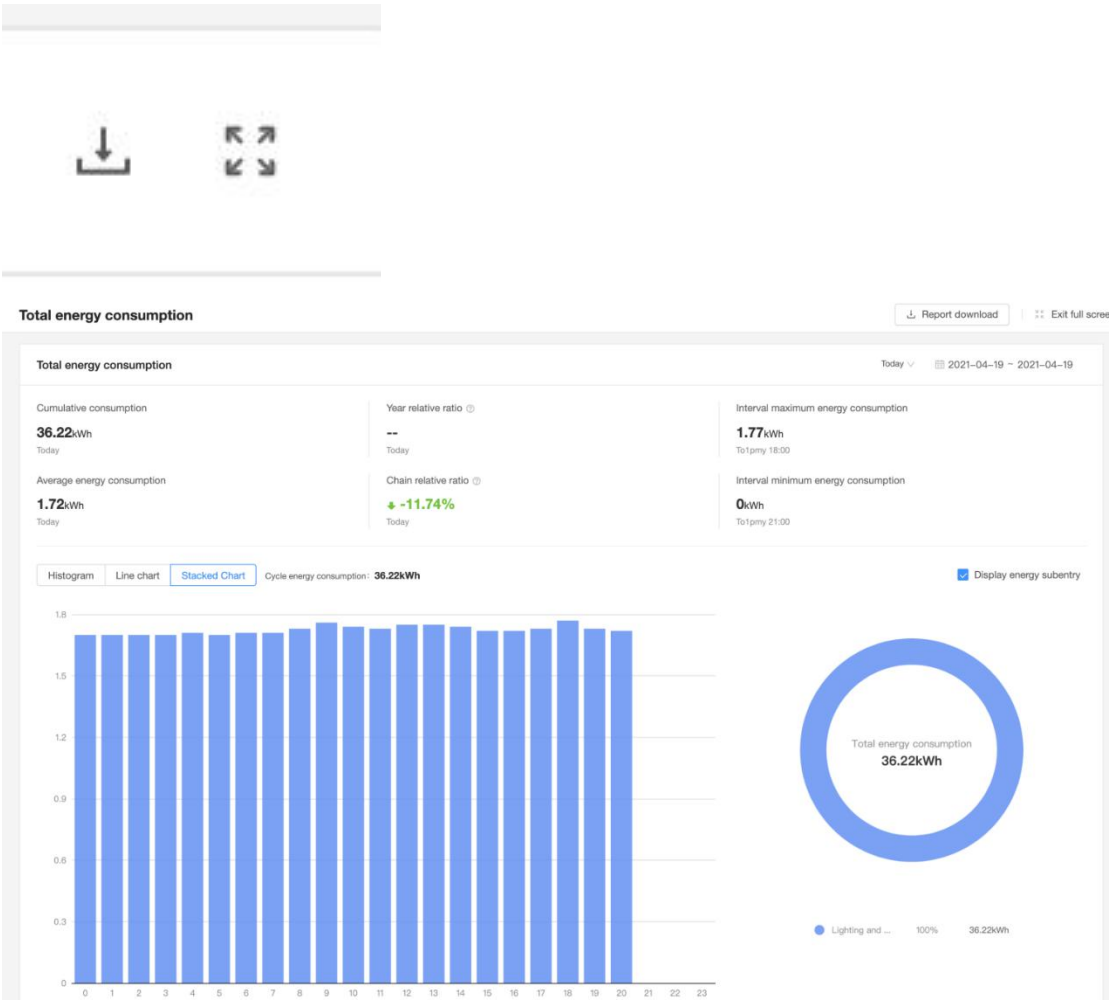
- The general energy consumption section, numbered as 3 in the preceding figure, supports three types of graphic displays: histogram, line chart, and stacked chart. Data of energy consumption are displayed based on the selected time dimension. Supported time dimensions include today (24 hours), this week (seven days), this month (30 or 31 days), and this year (12 months).
- On the stacked chart, you can move the pointer over a column to view the data of each energy consumption subentry.
- On the histogram or line chart, the column or the point that represents the highest energy consumption is displayed in red, and that represents the lowest energy consumption is in blue.



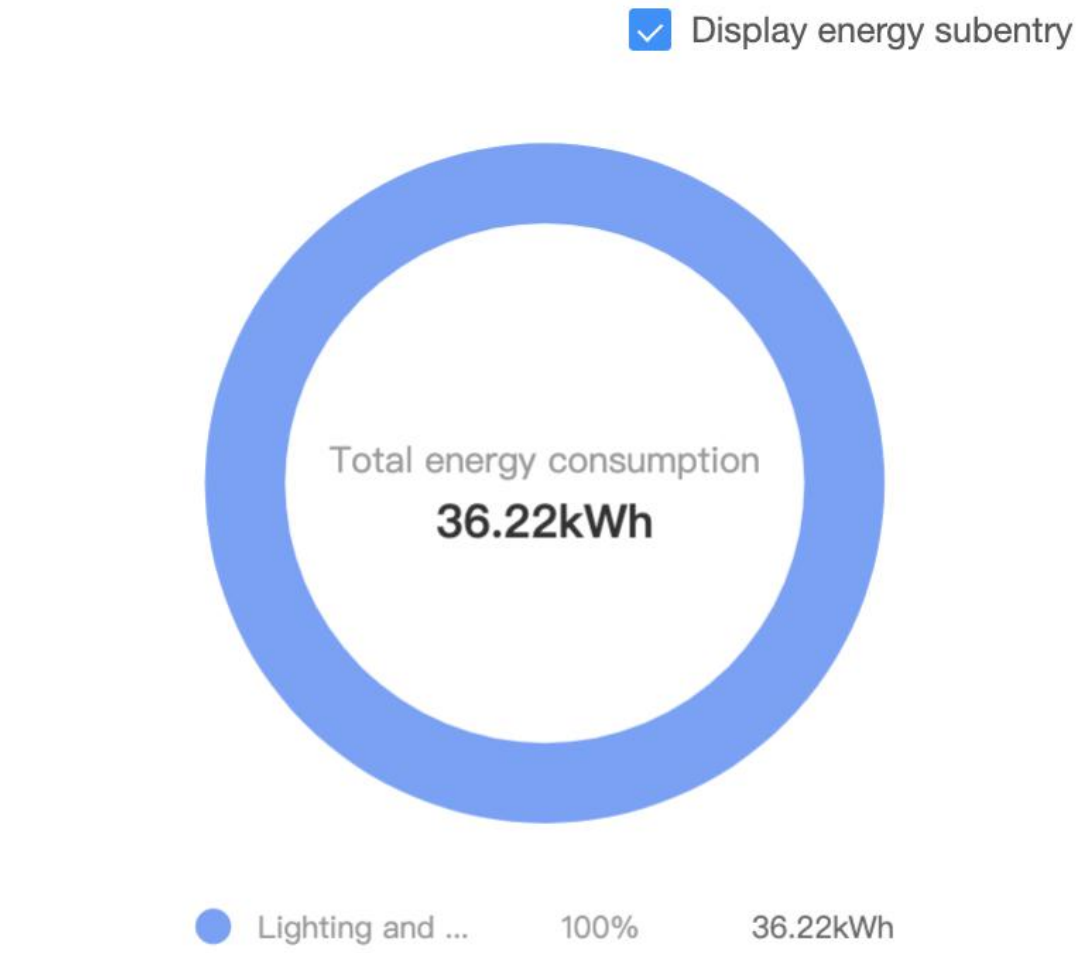
- In the section numbered as 4 in the preceding figure, you can select a time dimension to query and view the data. The time dimension includes **Today**, **This week**, **This month**, and **This year**.

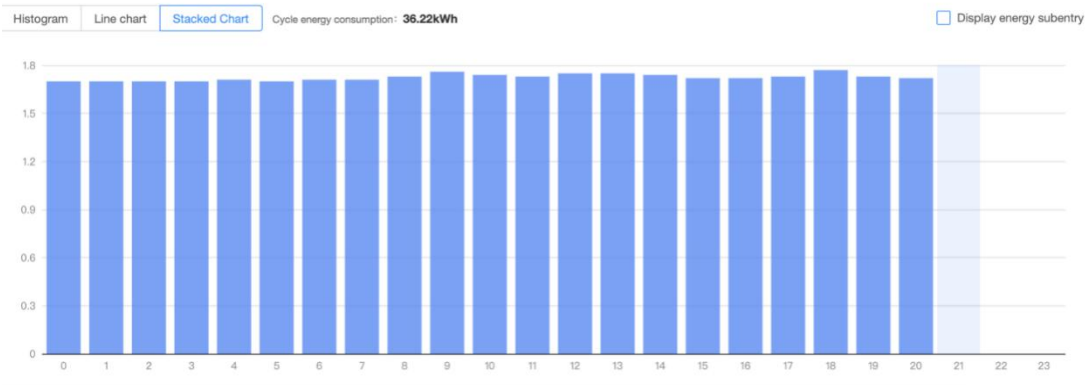


- Report download: Click the **Report download** icon in the top right corner as shown in the following figure to take a screenshot of the current page and save it to the local computer in PDF format.
- Full-screen mode: Click the **Full screen** icon in the top right corner as shown in the following figure to enter the full-screen mode. In this case, the left-side navigation pane is automatically hidden. You can click the **Exit full screen** icon to exit the full-screen mode. Then, the **Report download** and **Full screen** icons are displayed in the original formats, as shown in the section numbered as 5.



- The section numbered as 6 in the preceding figure uses a chart to display the data of each energy consumption subentry and the proportion of data in the current project. You can deselect or select **Display energy subentry** in the top right corner to hide or show the chart. The size of the section numbered as 3 is adjusted accordingly.





3.2 Energy consumption subentry

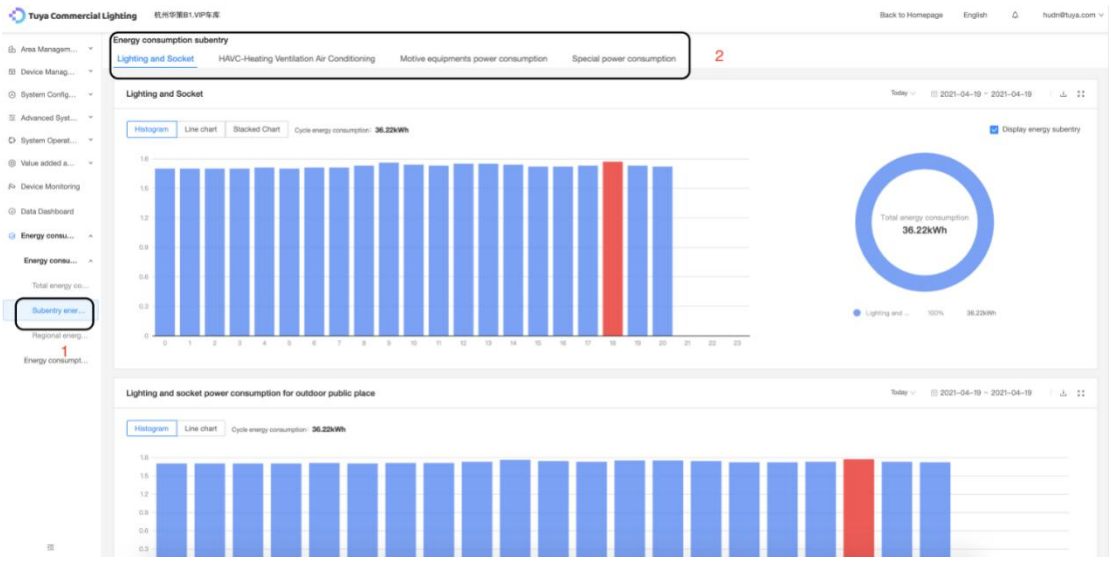
Go to **Energy consumption management** > **Energy consumption panel** > **Subentry energy consumption**. The **Energy consumption subentry** page displays the data on energy consumption

based on the subentry, such as lighting and air conditioning. The functions on this page are similar to those on the **Total energy consumption** page.

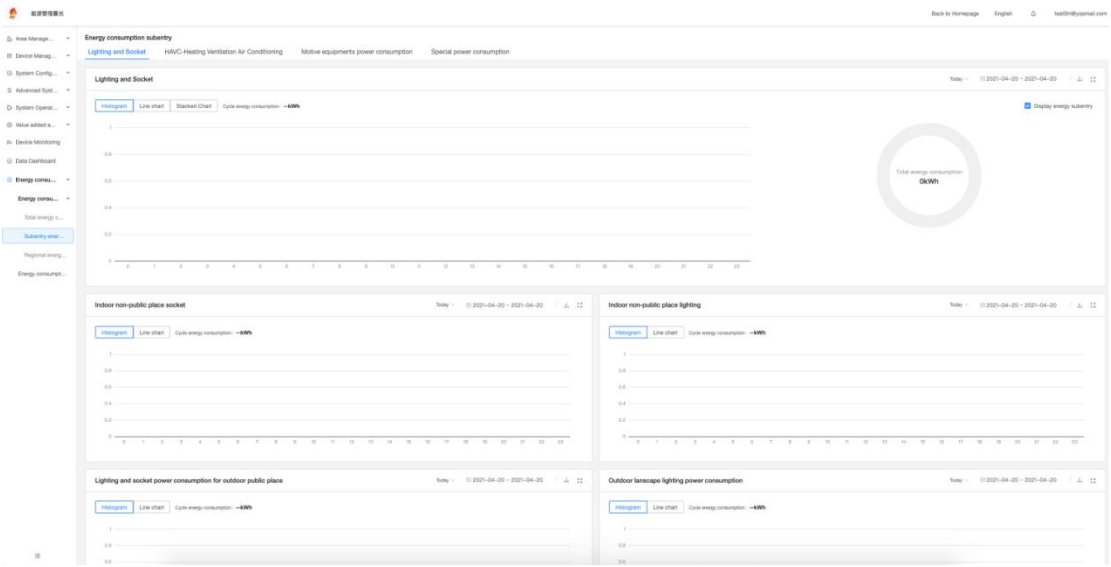
Page	Function	Description
Energy consumption subentry	Subentry selection	Allows you to query data based on the following subentries: **Lighting and Socket**, **HVAC-Heating Ventilation Air Conditioning**, **Motive equipments power consumption**, and **Special power consumption**. You can also view data of different sub-types under each subentry.
	Data visualization	Supports the switch between the histogram, line chart, and stacked chart.
	Energy consumption details	Displays data including the cumulative consumption, average energy consumption, year relative ratio, chain relative ratio, interval maximum energy consumption, and interval minimum energy consumption.
	Time-based data display	Allows you to query data generated today, in this week, in this month, or in this year. Data is displayed based on the time dimension you select.
	Energy consumption subentry	Displays the proportion of each energy consumption subentry in a pie chart.
	Report download	Takes a screenshot of the current page and saves it to the local computer in PDF format.
	Full-screen mode	Displays the current page in full-screen mode.

For more information about how to perform operations on the **Energy consumption subentry** page, see section 3.1 "Total energy consumption." This section mainly introduces the features of the four subentry tabs on this page.

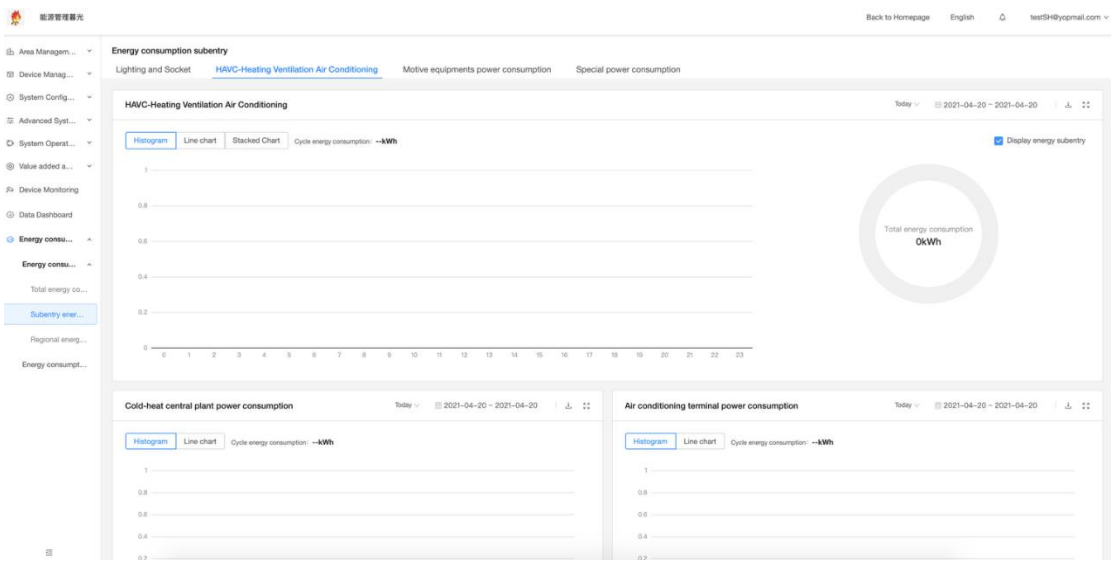
On the **Energy consumption subentry** page, you can respectively click the four tabs to view the data of each subentry and data of different sub-types under each subentry. The following part describes the rules for classification and data sources.



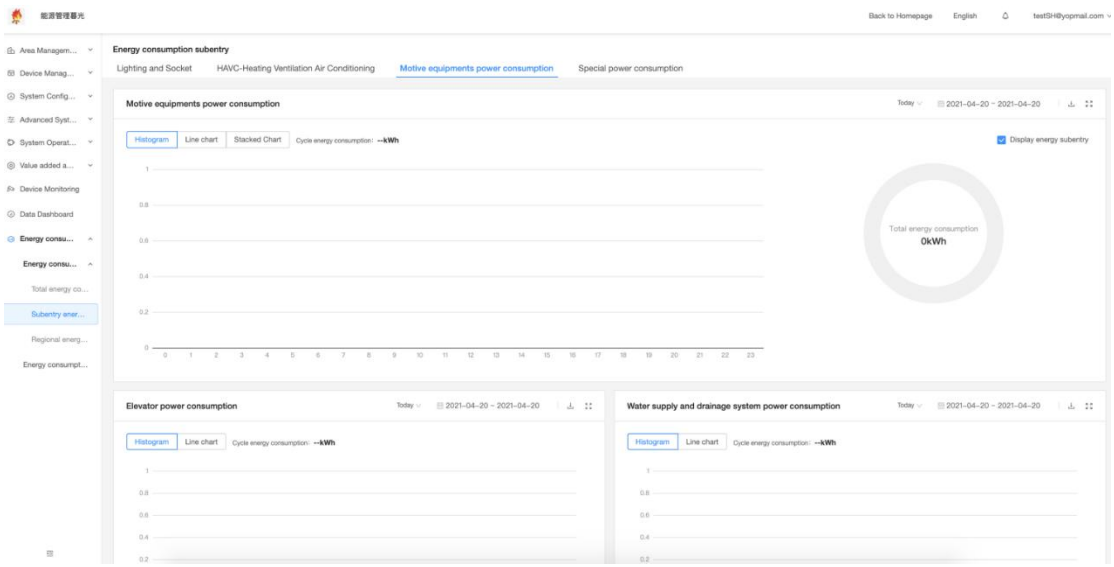
- **Lighting and Socket** tab: displays energy consumption data in the current subentry and data of the following sub-types: **Outdoor landscape lighting power consumption**, **Indoor non-public place socket**, **Lighting and socket power consumption for outdoor public place**, and **Indoor non-public place lighting**. Data is collected from metering devices based on the device usage and devices with built-in metering features.



- **HVAC-Heating Ventilation Air Conditioning** tab: displays energy consumption data in the current subentry and data of the following sub-types: **Air conditioning terminal power consumption** and **Cold-heat central plant power consumption**. Data is collected from metering devices based on the device usage and devices with built-in metering features.

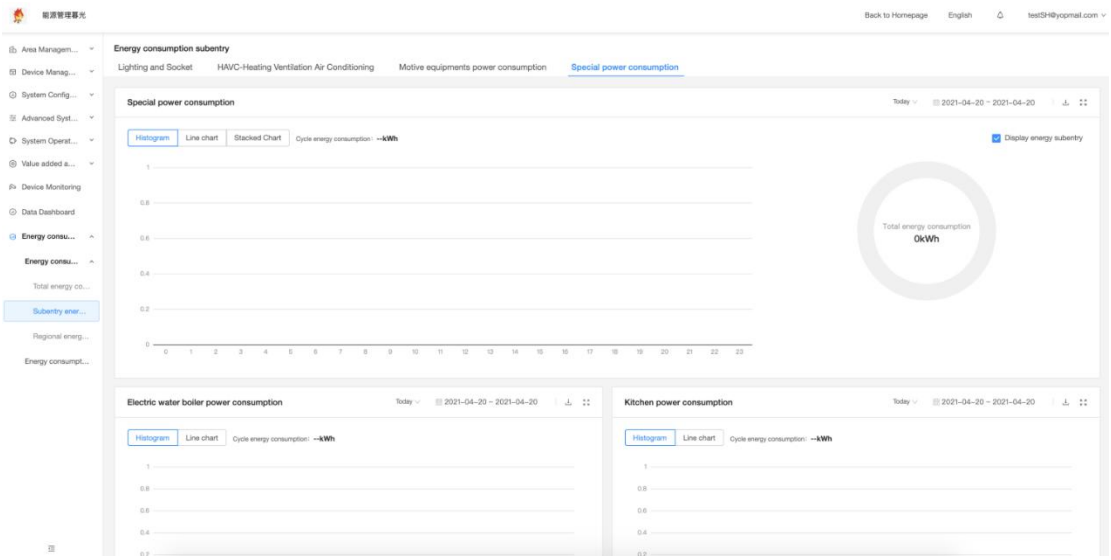


- **Motive equipments power consumption** tab: displays energy consumption data in the current subentry and data of the following sub-types: **Fire protection power consumption**, **Water supply and drainage system power consumption**, **Ventilation for non-air conditioning purpose power consumption**, and **Elevator power consumption**. Data is collected from metering devices based on the device usage.



- **Special power consumption** tab: displays energy consumption data in the current subentry and data of the following sub-types: **Laundry shop power consumption**, **For external use power consumption**, **Entertainment and fitness center power consumption**, **Information center power consumption**, **Electric water boiler**

power consumption, **Kitchen power consumption**, and **Other power consumption**. Data is collected from metering devices based on the device usage.



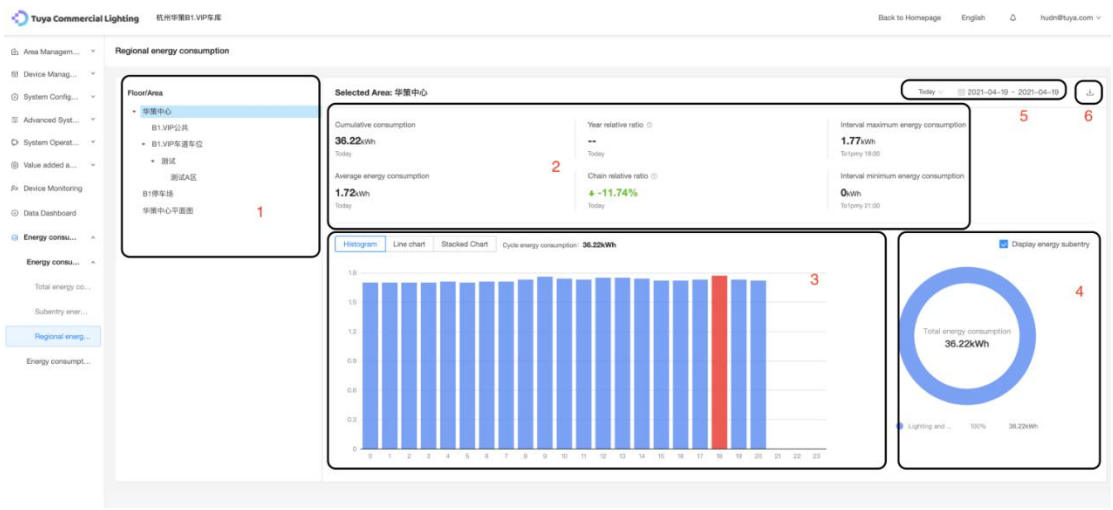
3.3 Regional energy consumption

Go to **Energy consumption management** > **Energy consumption panel** > **Regional energy consumption**. The **Regional energy consumption** page displays data based on the attribute of areas, such as floor or room. The following table describes the functions on this page.

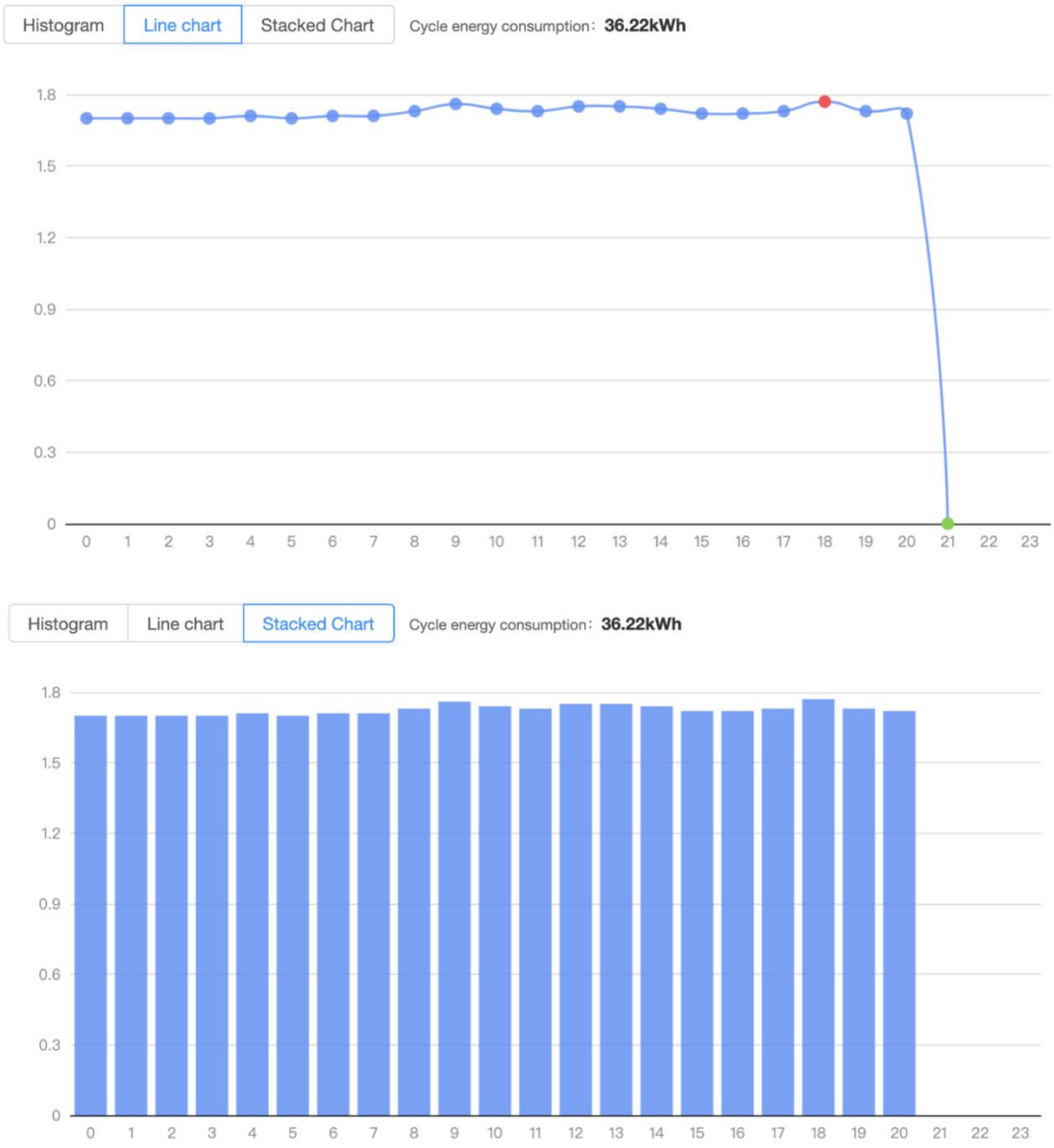
Page	Function	Description
Regional energy consumption	Area selection	Allows you to select an area and view the energy consumption data of the selected area.
	Data visualization	Supports the switch between the histogram, line chart, and stacked chart.
	Energy consumption details	Displays data including the cumulative consumption, average energy consumption, year relative ratio, chain relative ratio, interval maximum energy consumption, and interval minimum energy consumption.
	Time-based data display	Allows you to query data generated today, in this week, in this month, or in this year. Data is displayed based on the time dimension you select.
	Energy consumption	Displays the proportion of each energy consumption subentry

	subentry	in a pie chart.
	Report download	Takes a screenshot of the current page and saves it to the local computer in PDF format.

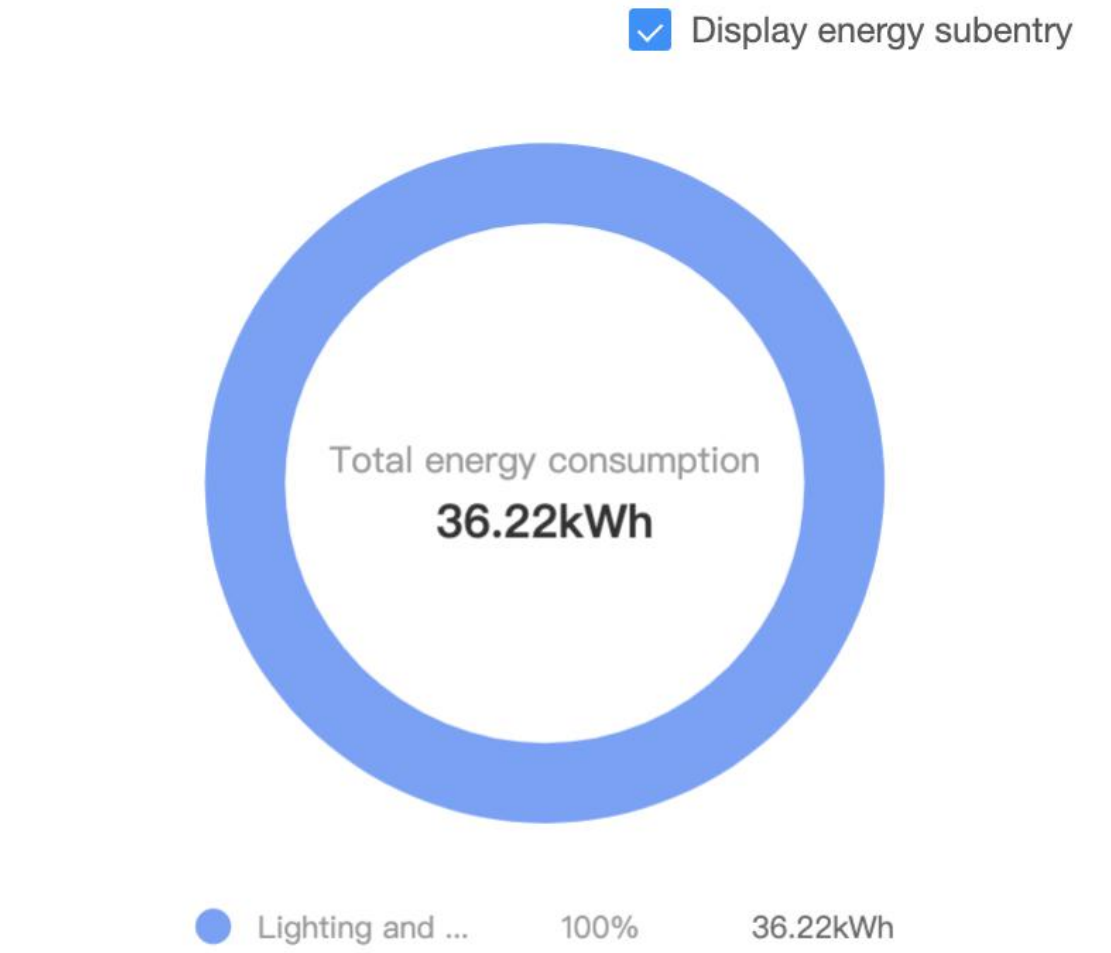
- **Floor/Area** pane: Click an area to view the energy consumption data, such as total energy consumption and subentry-based energy consumption, of this area on the right side. You can select only one area at a time.
- The energy consumption details section, numbered as 2 in the following figure, displays the following data based on the time dimension you select: **Cumulative consumption**, **Average energy consumption**, **Year relative ratio**, **Chain relative ratio**, **Interval maximum energy consumption**, and **Interval minimum energy consumption**.

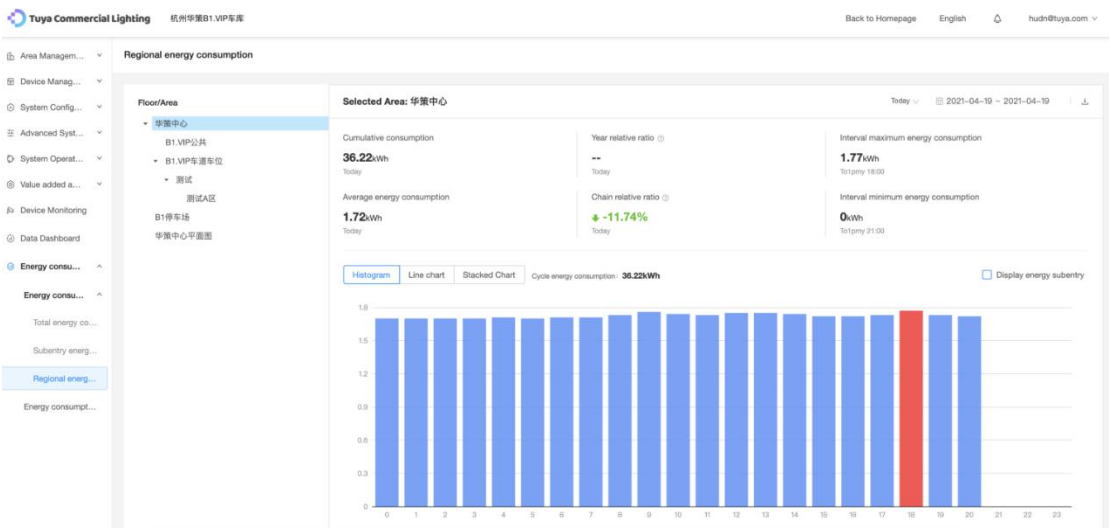


- The general energy consumption section, numbered as 3 in the preceding figure, supports three types of graphic displays: histogram, line chart, and stacked chart. Data of energy consumption are displayed based on the selected time dimension. Supported time dimensions include today (24 hours), this week (seven days), this month (30 or 31 days), and this year (12 months).
- On the stacked chart, you can move the pointer over a column to view the data of each energy consumption subentry.
- On the histogram or line chart, the column or the point that represents the highest energy consumption is displayed in red, and that represents the lowest energy consumption is in blue.



- The section numbered as 4 in the preceding figure uses a chart to display the data of each energy consumption subentry and the proportion of data in the current project. You can deselect or select **Display energy subentry** in the top right corner to hide or show the chart. The size of the section numbered as 3 is adjusted accordingly.


Display energy subentry
Total energy consumption
36.22kWh
Lighting and ...
100%
36.22kWh


Tuya Commercial Lighting
杭州华策B1.VIP车库
Back to Homepage
English
hudn@tuya.com
Area Managem...
Device Manag...
System Config...
Advanced Syst...
System Operat...
Value added a...
Device Monitoring
Data Dashboard
Energy consu...
Energy consu...
Total energy co...
Subentry energ...
Regional energ...
Energy consumpt...
Regional energy consumption
Floor/Area
华策中心
B1.VIP公共
B1.VIP车道车位
测试
测试A区
B1停车场
华策中心平面图
Selected Area: 华策中心
Today
2021-04-19 ~ 2021-04-19
Cumulative consumption
36.22kWh
Today
Year relative ratio
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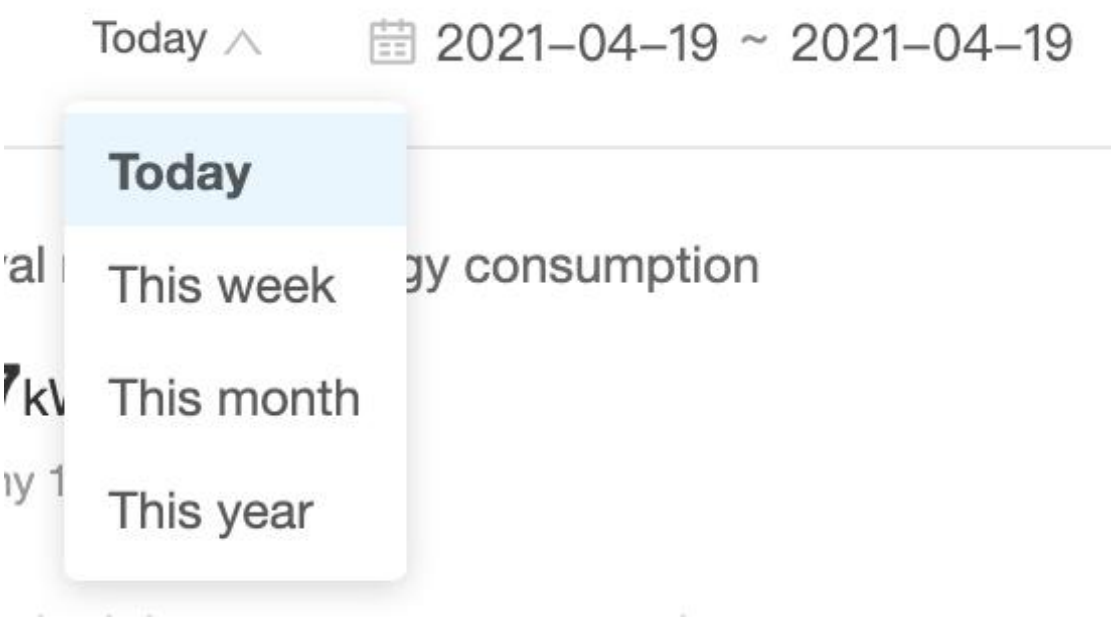
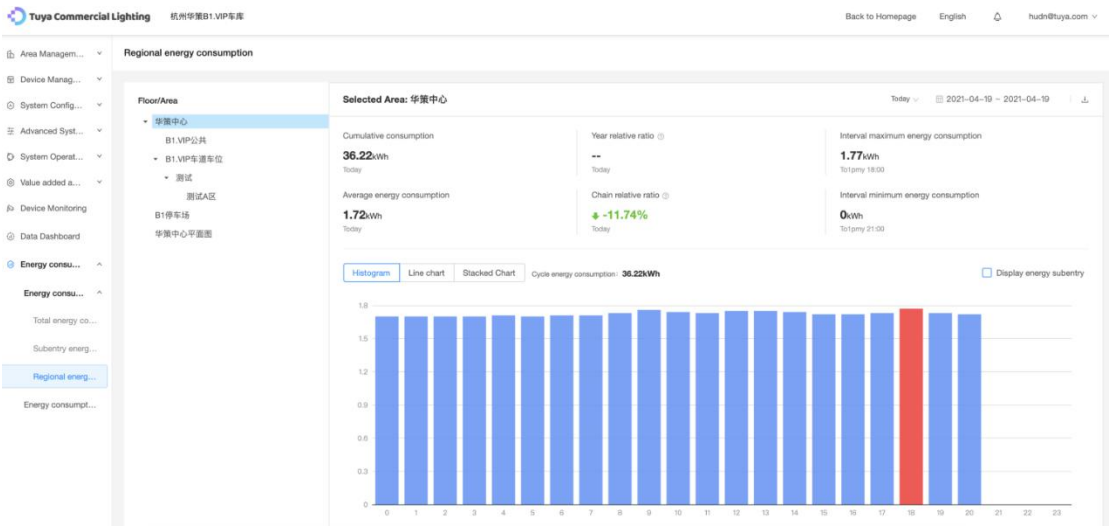
Today
Interval maximum energy consumption
1.77kWh
To1pmy 18:00
Average energy consumption
1.72kWh
Today
Chain relative ratio
-11.74%
Today
Interval minimum energy consumption
0kWh
To1pmy 21:00
Histogram
Line chart
Stacked Chart
Cycle energy consumption: 36.22kWh
Display energy subentry
1.8
1.5
1.2
0.9
0.6
0.3
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

- In the section numbered as 5 in the preceding figure, you can select a time dimension to query and view the data. The time dimension includes **Today**, **This week**, **This month**, and **This year**.



- Report download: Click the **Report download** icon numbered as 6 in the preceding figure to take a screenshot of the current page and save it to the local computer in PDF format.

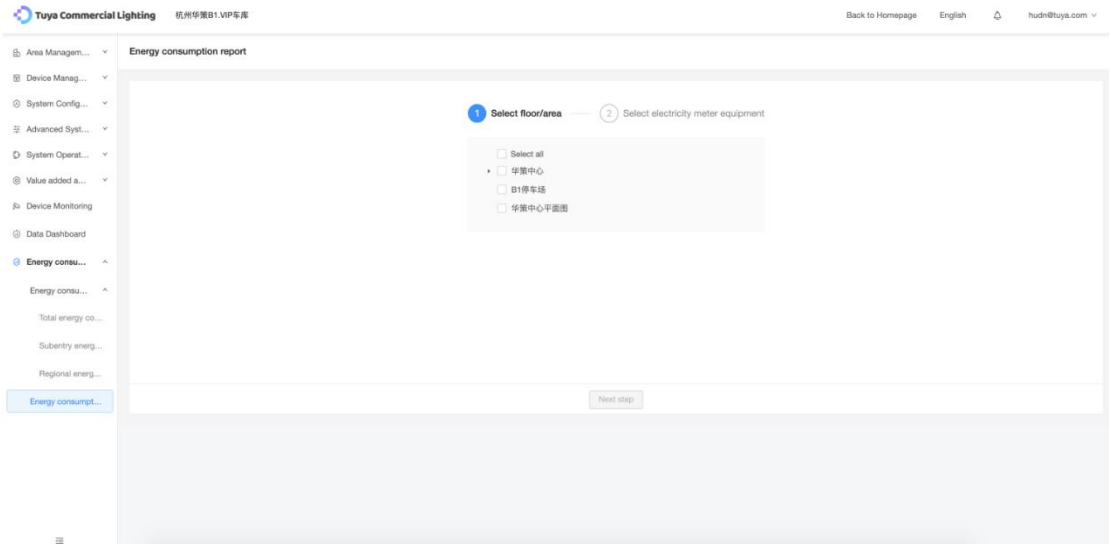


3.4 Energy consumption report

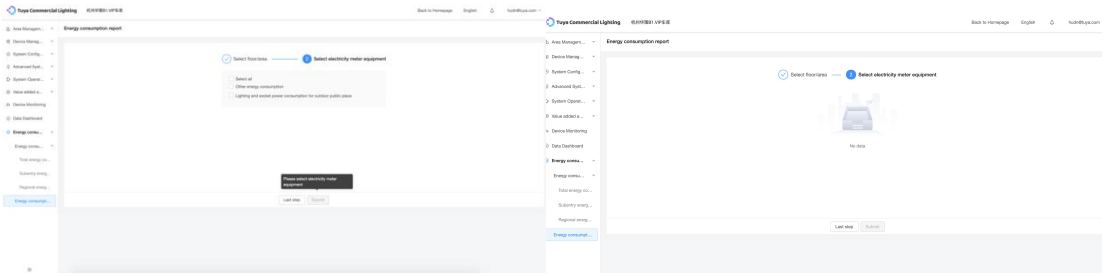
Go to **Energy consumption management** > **Energy consumption data list**. Select an area and the device usage to view the historical energy consumption. The following table describes the functions on this page.

Page	**Function**	**Description**
Energy consumption report	Area and device usage selection	Allows you to select an area and the usage of metering devices in the area to view the energy consumption data.
	Data display	Displays the names of metering devices, energy consumption classification (based on the device usage), and cumulative power consumption (based on the selected time dimension).
	Time-based data display	Allows you to query data generated today, in this week, in this month, or in this year. Data is displayed based on the time dimension you select.
	Report download	Takes a screenshot of the current page and saves it to the local computer in PDF format.

- **Select floor/area**: Select the area to query the data. You can select one or more areas. Then, click **Next step** to select the usage of metering devices.



- **Select electricity meter equipment**: Select the usage of metering devices allocated to the areas you select, as shown in the following left figure. Then, click **Submit** to go to the **Energy consumption report** page. If no metering device usage is available in the selected area, **No data** is displayed, as shown in the following right figure.
- The device usage displayed in this step includes the current usage of metering devices and historical usage in the scenario where metering devices are deleted or usage is changed.



The **Energy consumption report** page displays data based on the area and usage you select. By default, the energy consumption data generated today is displayed. The following functions are supported:

- **Floor/Area**: This section, numbered as 1 in the following figure, displays the area you select. You can click **Select floor/area** to change the area.

- **Electricity meter equipment**: This section, numbered as 2 in the following figure, displays the selected usage of metering devices. You can click **Select device** to change the usage.
- The section numbered as 3 in the following figure displays the names of the metering devices, energy consumption classification (based on the device usage), and cumulative electricity consumption (based on the selected time dimension). It displays 10 records per page.
- In the section numbered as 4 in the following figure, you can select a time dimension to query and view the data. The time dimension includes **Today**, **This week**, **This month**, and **This year**.
- Report download: Click the **Report download** icon in the top right corner as shown in the following figure to take a screenshot of the current page and save it to the local computer in PDF format.