Residential Houses Online Prepaid Solution

Online Prepaid Solution, 1-phase Apartment, Hotel & any other Residential Houses.

Ver. Date: July,6th 2023

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2023/06/07 Ver.

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1. What can Acrel Online Payment Solution do?

A complete electricity online prepaid solution could realize the function below

(1) Online Mobile APP Topping Up

End power user could do online topping up their prepaid energy meter remotely by using Acrel Prepaid APP. (This Acrel Prepaid App designed for end power user)

(2) Auto-generated Energy Report and Electricity Bill

End power user could check their daily, monthly energy consumption and their electricity balance credit by using Acrel Prepaid APP.

(3) Manage End Power Users Account and or other ADMIN System Function for Utility Side

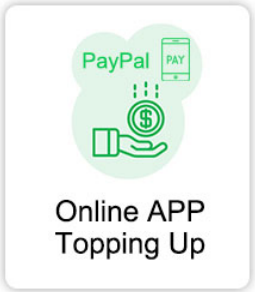
Utility or power selling company could create, manage the all the "user account" for their end power user to realize remote account management, remote load on-off control, remote metering reading function and etc. All the operation will be done on Acrel Cloud Prepaid Platform (this platform designed and opened to utility or power selling company only)

(4) Set Multi-rate/TOU Electricity Price according to your country's billing Policy

Utility or power selling company could set electricity price for each kwh used by end power user, different electricity price rate setting like flat rate, step rate or multi-tariff will be all avaible.

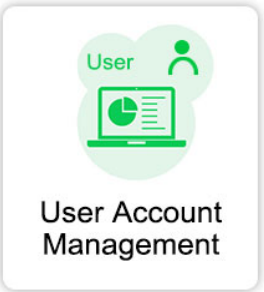
(5) Low Balance Credit Alarm Setting for reminding of Topping Up the Electricity in time

A low balance alarm will be sent to end power user when their remain balance was lower that a certain threshold, form like by sending SMS or APP warning. This threshold could be set on Acrel Cloud Prepaid Platfor by utility or power selling company.

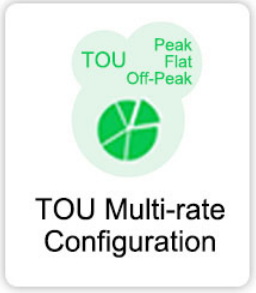


(1) Online Top up

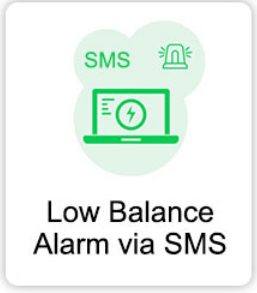
(2) Energy Report



(3) User Mangement



(4) Multi-rate Settting



(5) Alarm Setting

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2. How should we cooperate for realizing a complete Online Prepaid Solution

Stage by stage cooperation move:

Stage 1 - Testing Sample:

Software System: Acrel Prepaid System (3-month Free trial), deployed on Acrel rented cloud server .

Cloud Server: Using Acrel rented Cloud Server

Hardware: Several pcs of ADL100-EYNK 1-phase Prepaid Energy Meter + AWT100-4GHW IoT 4G Gateway.

Payment Methods: Off-line payment.

Stage 2 - Buy-out Service (Off-line Payment - Server Transportation):

Software System: Acrel Prepaid System (Buy-out Service), deployed on customer rented cloud server.

Cloud Server: Using Customer rented Cloud Server.

Hardware: Batch order of ADL100-EYNK 1-phase Prepaid Energy Meter + AWT100-4GHW IoT 4G Gateway. (Special manufacturing order for server configuration)

Payment Methods: Off-line payment. Set administration site for charge the electricity.

Stage 3 - Buy-out Service (On-line Payment - 3rd Party Payment API Integration):

Software System: Acrel Prepaid System (Buy-out Service), deployed on customer rented cloud server, also provide Acrel Prepaid APP (for end power user), cutomer side integrate this Acrel Prepaid APP with their local 3rd party payment methods.

Cloud Server: Using Customer rented Cloud Server.

Hardware: Batch order of ADL100-EYNK 1-phase Prepaid Energy Meter + AWT100-4GHW IoT 4G Gateway. (Special manufacturing order for server configuration)

Payment Methods: On-line payment. End power use Acrel Prepaid App to charge the electricity online by themselves.

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3. Actual Scenario Example

(1) There are 10 areas with 1-phase Power System needed to be monitored

(2) Each area has 20 rooms with 1-phase power system needed to be monitored and billed by online Acrel Cloud Electricity Prepaid System. System could be accessed by PC or Mobile Phone.

(3) All 1-phase prepaid energy meters will be of partial centralized installation in each area's DB room or cabinet, which make it possbile for 1 AWT100-4GHW 4G IoT gateway to support 20 ADL100-EYNK/F 1-phase Energy Meters using RS485 wired communication in a close range.

(4) Prepaid energy meter and system must support multi-tariff TOU function to meet country's multi-tariff request. And needed to be API to 3rd party payment system to realize online payment.

4. Devices Deployment Plan

Area #1 [For Room #1-1 to Room #1-20]:
- 1* AWT100-4GHW IoT 4G Gateway [to support ADL100-EYNK/F #1-1 to #1-20]
- 20* ADL100-EYNK/F 1 -phase Prepaid Energy Meter [to monitoring Room #1-1 to Room #1-20]

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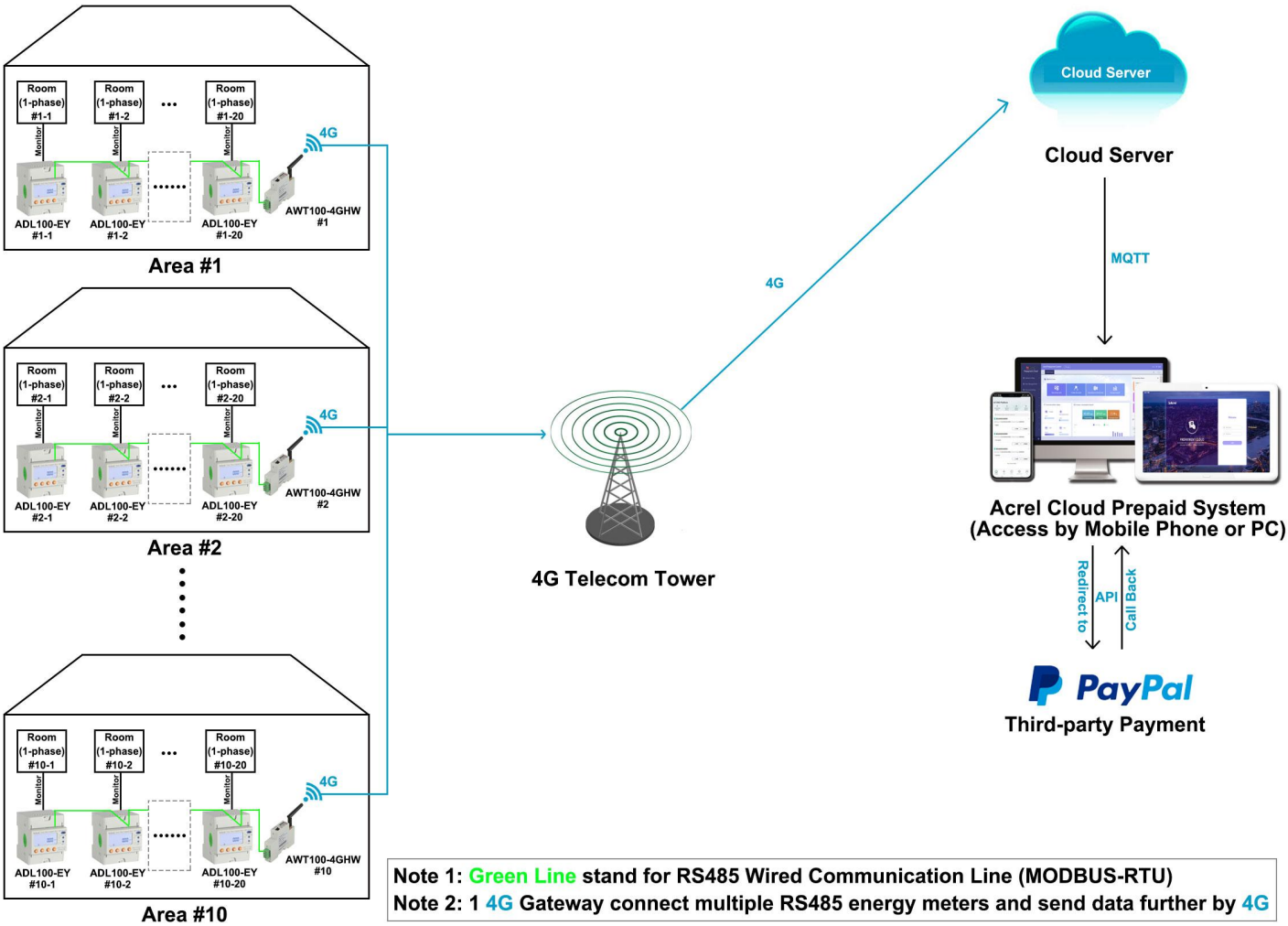
Area #10 [For Room #10-1 to Room #10-20]:
- 1* AWT100-4GHW IoT 4G Gateway [to support ADL100-EYNK/F #10-1 to #10-20]
- 20* ADL100-EYNK/F 1-phase Prepaid Energy Meter [to monitoring Room #10-1 to Room #10-20]



Note 1: Green Line stand for RS485 Wired Communication Line (MODBUS-RTU)
Note 2: 1 4G Gateway connect multiple RS485 energy meters and send data further by 4G

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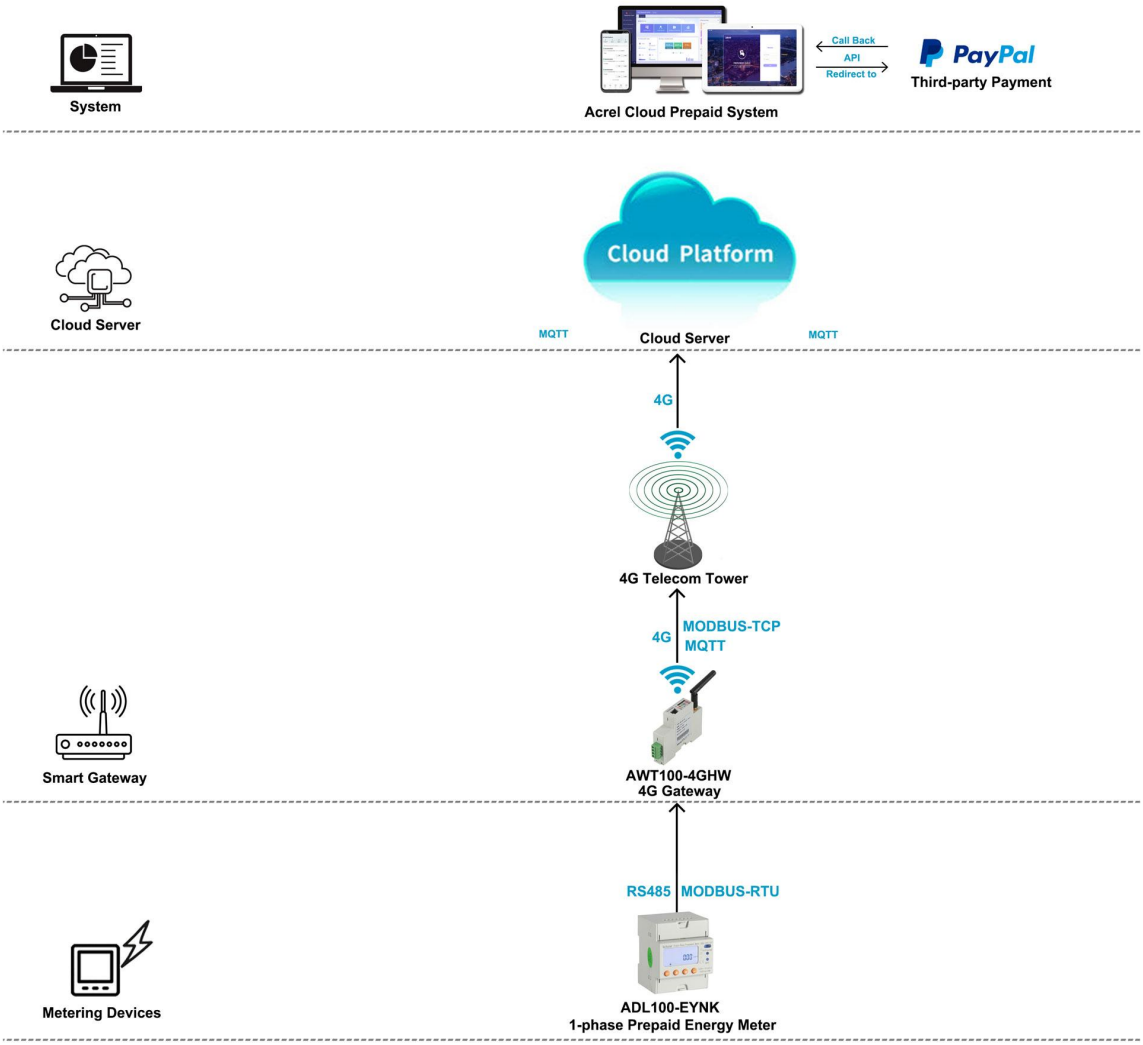
5. Communication Structure&Logic

(1) 4G Communication could be served as one of the final data upstream methods by sending the data to cloud server deployed in Internet so that Acrel IoT System could be interact with these data collected by bottom metering devices like Energy Meter

(2) AWT100-4GHW gateway support upstream of 4G communication with MQTT and MODBUS-protocol and downstream of RS485 communication based on MODBUS-RTU protocol. ADL100-EYNK/F support upstream communication of RS485 communication based on MODBUS-RTU protocol.

(3) Based on the communication described in item (2), Acrel AWT100-4GHW gateway could receive the data from ADL100-EYNK/F energy meter using RS485 communication while sending the data further to cloud server using WiFi upstream communication. Thus accomplish a complete communication from bottom metering devices to top Acrel prepaid system software for realizing remote manual Off-line Payment first.

(4) By API between Acrel Prepaid System and 3rd party Payment Software, we could realize also remote automatical On-line Payment.



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6. Remote Control Logic

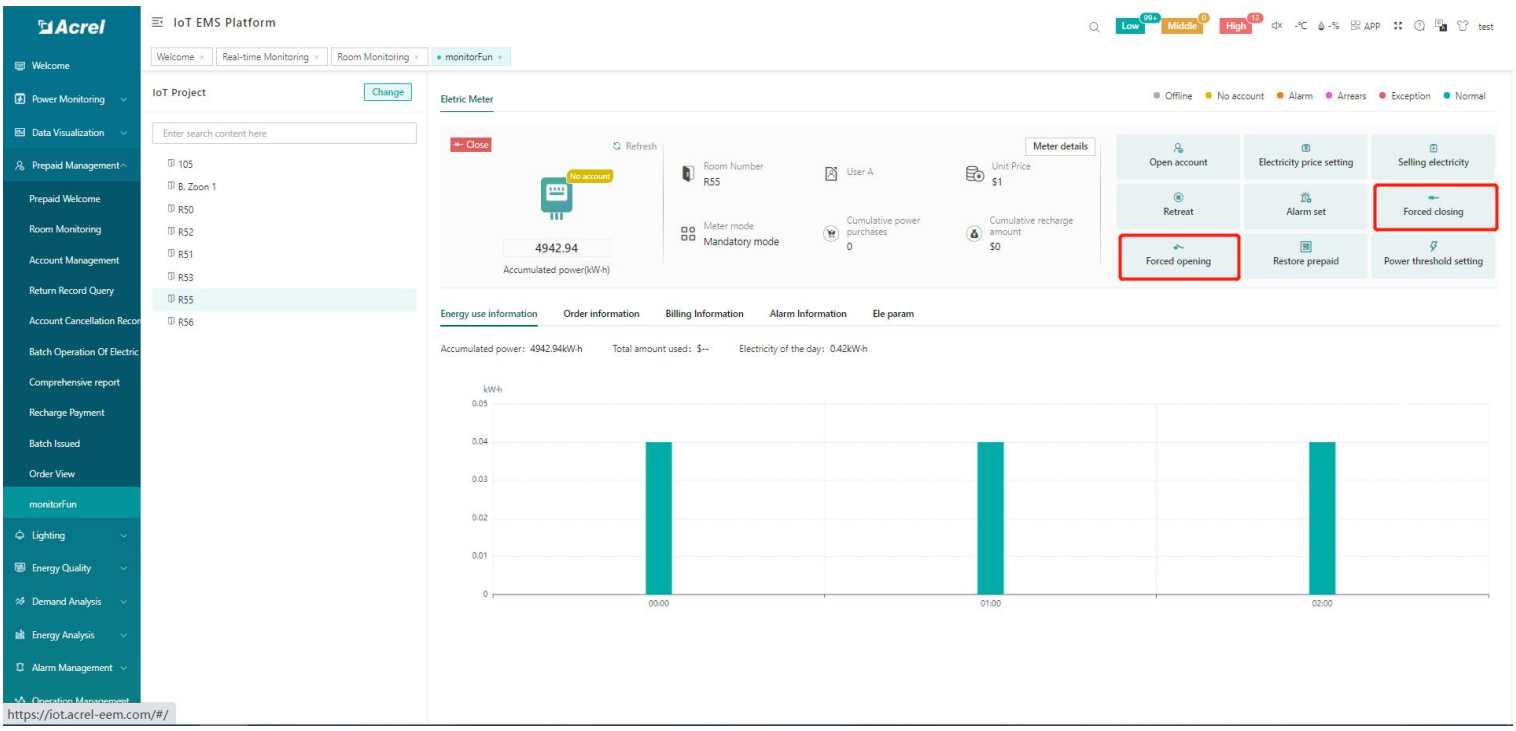
For remote switch on/off control of circuit's CB (circuit breaker), basic control logic was as below [pic 6.1]:

(1) Administrator use Acrel Cloud Prepaid System, enter the "room mangement" interface, and issue " force closing/switch on" or "force opening/switch off" command to control the on or off status of circuit's Circuit. [pic 6.2]

(2) AWT100-4GHW gateway receive the control command via 4G communication. And further issue this control command to downstream ADL100-EYNK energy meter.

(3) ADL100-EYNK energy meter has built-in magnetic holding relay. Once the energy meter receive the " switch on" or "switch off" control command, this will trigger its magnetic holding relay to switch on or switch off the circuit's CB respectively.

(6.1) Illustration of Remote Control Logic



(6.2) Administrator use Acrel Cloud Prepaid System to issue "Control Command"

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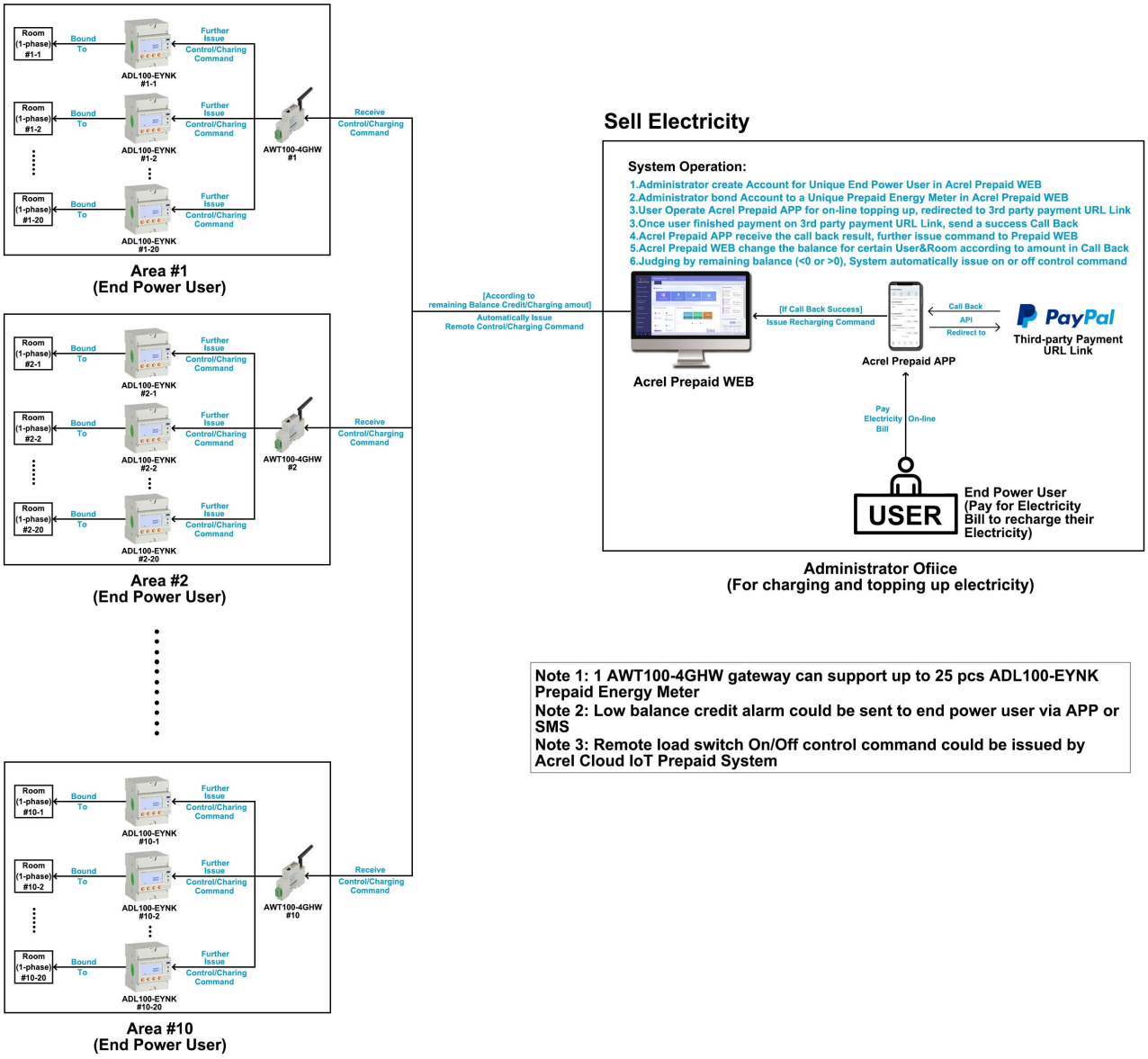
7. Topping Up Logic

(1) The basic binding logic is Prepaid Energy Meter (with unique SN Code) bind to a certain "Room" then this certain room bind to a certain "User". All these binding operation could be done on Acrel Cloud Prepaid WEB System by utility company.

(2) End Power User use the "User Account" created by Acrel Prepaid WEB to login in Prepaid APP. They could do the online payment using this APP.

(3) Once End Power User submit topping up request, will rediect to a 3rd party payment URL (done by API), they will finish the payment in 3rd party payment methods and once finished, will send a call back to Acrel Prepaid APP.

(4) Acrel Prepaid APP [End Power User Ver.] will further issue recharge command to Acrel Prepaid WEB [Administrator Ver.] according to this call back (including recharging result, user account info, topping up amount and etc.) So that Acrel Prepaid WEB will automatically topping up for certain " User Account" and "Room bound with unique prepaid energy meter"



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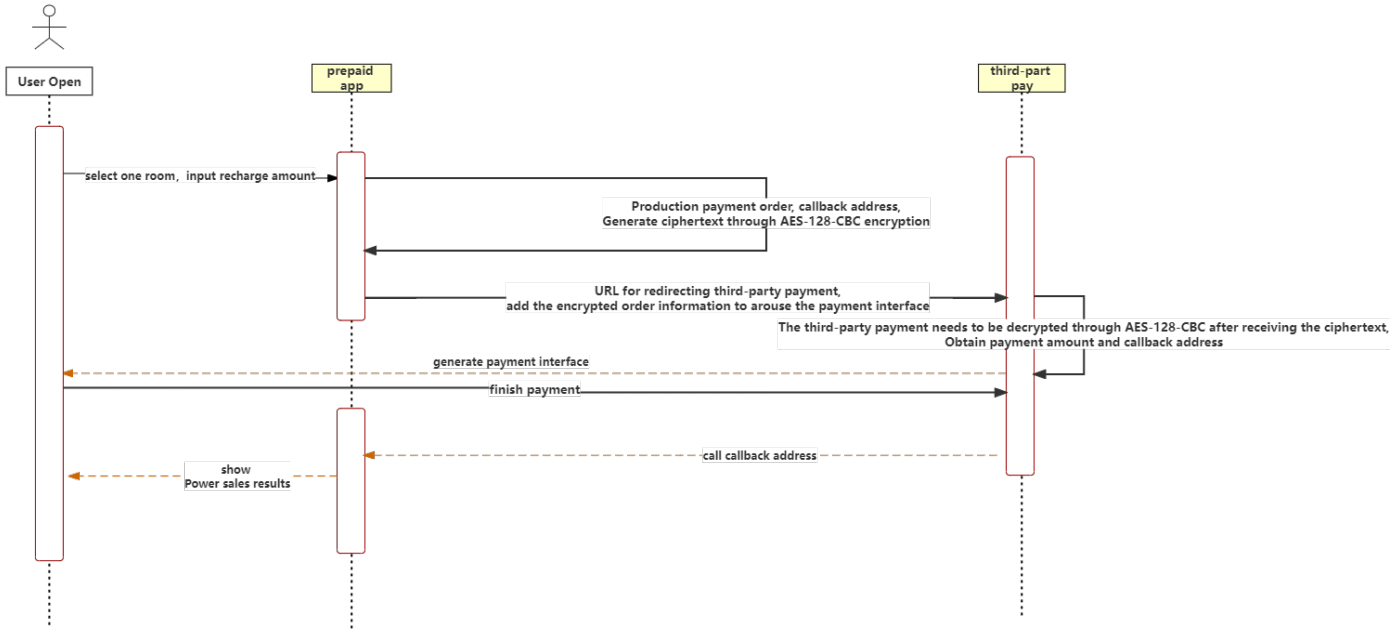
8. Overall Schedule to Realize Online Payment

(1) Buy sample devices from Acrel to test the devices on Acrel Platform and Acrel rented cloud server first for testing some basic Acrel Prepaid System Function and Off-line payment. [In this stage, Acrel System provide 3-month free trail, and will use Acrel rented cloud server]

(2) After the testing stage, customer need to buy-out Acrel Prepaid System for permanent usage and rent their our cloud server under the instruction of Acrel Technical Group. Once bought both the buy-out service and rent a own cloud service, Acrel software team will deploy Acrel Prepaid System on customer's rented cloud server. [Some OEM and customization of Buy-out service of Acrel Prepaid System was available like changing the Logo of system and access address of system]

(3) Once software deployed successfully, Acrel technical group assist the customer to first move already bought Acrel hardware devices like prepaid energy meter and IoT gateway from Acrel platform&server to cusomter's platform&server by changing the configuration of IoT gateway like Server address, server port changing.

(4) Once Platform&Server movement success, will proceed for API between Prepaid System and customer's own 3rd party payment software. To realize a actual Online payment. Will set a API discussion group for this and customer side need to have people who know about API integration. (Acrel Side could provide API protocol in advance for a preview)



Overall API Flow Chart

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9. Overall Model Selection&Quoation

(1) This Quotation doesn't include freight charge. To gain a complete quotation, please refer the actual quantity that you want to request for the actual order, once we receiving it. We will issue a Official Proforma Invoice with Acrel Stamps on it for later procedure.

System Software

Name	Description	System Price	Remark (Choose Host Service or Buy-out Service after 3-month Free Trial of **Cloud IoT System**)
 Acrel Cloud Prepaid System	1.System support all the meters over-cross the country connected to the cloud server through smart gateway. 2.Remote meter reading and data collection. (Energy consumption, Credit Balance Amount and etc) 3.Off-line topping up by Cloud Prepaid System. 4.Remote Switch on-off Power Control by Cloud Prepaid System 5.Low balance credits alarm by SMS. 6.Offer 3-month free trial of system with full technical support as for a test phase or pilot project	$0 (recommended in pilot projtect)	3-month Free Trail (Users don't need to rent a cloud server))
		$xx/Year (For 200 Points) (Price for Host Service Only, recommended in pilot projtect)	$xx to buy Hosting Service for 1 monitoring points connected to the system 1 year (Users don't need to rent a cloud server)
		$xxxx/Permanent (Limitless Points) (Price for Buy-out Service Only,recommended in late projtect)	1-time charging of $xxxx for Buy-out Service of permanent use (A cloud server need to be rent by users)

Cloud Server

Name	Description	Server Renting Price (For Reference Only)	Remark
 Cloud Server	1.Cloud Server could be rent on the cloud server provider like Amazon Cloud. 2.Users of **Cloud Prepaid&Postpaid System** only need to rent cloud server when they choose **buy-out** service of our **Cloud Prepaid&Postpaid System**. And if they are using **hosting service** or **3-month free trial** of our Cloud IoT System, we will use our own cloud server which has been rent on Amazon so that users don't need to rent a cloud server. 3.The quotation of Cloud Server is only a reference price that Acrel has rent on Amazon Cloud.	According to Specs of Rented Cloud Server	Below cloud server specs could support 1000~2000 monitoings points connected to the system (Server：8 core 16G Operation System：windows server 2016)

4G Smart Gateway

Overview Picture	USAGE&MODULE NAME	DESCRIPTION & SPECIFICATION	QUANTITY	FOB UNIT PRICE (USD)	AMOUNT (USD)
	4G Smart Gateway **AWT100-4GHW**	**Upstream:** 4G (MQTT&MODBUS-TCP) **Downstream:** RS485 (MODBUS-RTU) **Support:** up to **20~25** Prepaid Energy Meters within 400m using RS485 Wired Communication **Power Supply:** 85~265Vac/Vdc (via AWT100-POW Module); 24Vdc (Default)	10 pcs		
	Power Supply Module **AWT100-POW**	**Input:** 85~265Vac/Vdc **Output:** 24Vdc **Application:** paired with AWT100 Series gateway for 85~265Vac/Vdc power supply input	10 pcs		

1-phase Prepaid Energy Meter

Overview Picture	USAGE&MODULE NAME	DESCRIPTION & SPECIFICATION	QUANTITY	FOB UNIT PRICE (USD)	AMOUNT (USD)
	1-phase Prepaid Energy Meter **ADL100-EYNK/F**	**Communication:** RS485 (MODBUS-RTU) **Multi-rates**: 4 Tariff Rates and etc. **Control Mode:** Remote Prepaid&Postpaid Control **TOU/Multi-rate Function:** 4 Tariff rates and etc. **Rated Voltage:** 220~264Vac L-N (via direct connect) **Rated Current:** 10(60)A AC (via direct connect)	200 pcs	/	/

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10. Acrel IoT Cloud Prepaid System (Partail Introduction)

Acrel IoT Energy Monitoring System could be access in 2 different ways:

(1) Access through WEB on your computer.

Access port: https://iot.acrel-eem.com/

(2) Access through APP on your mobile phone

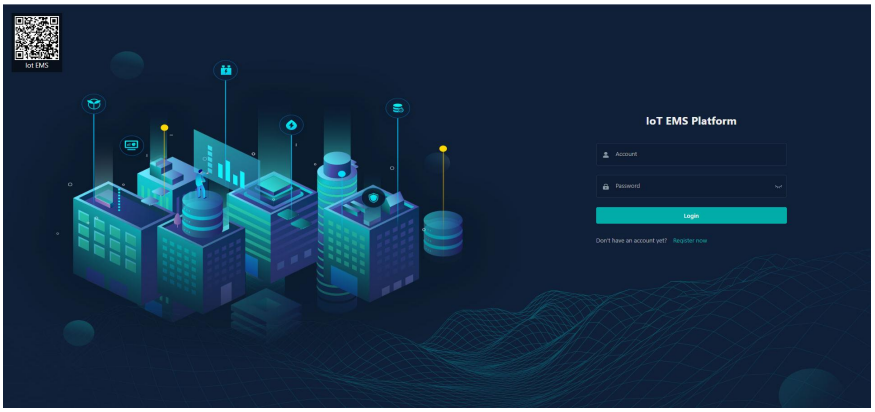
Download Link: https://play.google.com/store/apps/details?id=com.acrel.iotems

(1) WEB Accesss (Computer):

Access Port: https://iot.acrel-eem.com/

Test Account Name: acrel

Test Account Password: 123456

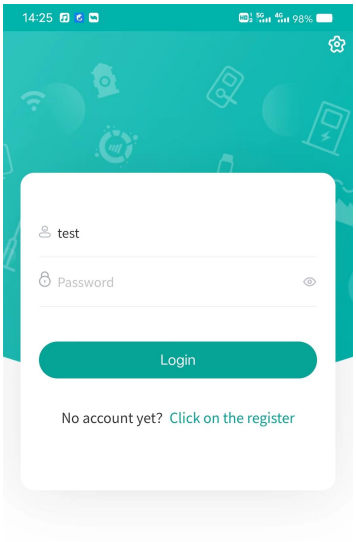


(2) APP Accesss (Mobile):

Download Link: https://play.google.com/store/apps/details?id=com.acrel.iotems

Test Account Name: acrel

Test Account Password: 123456



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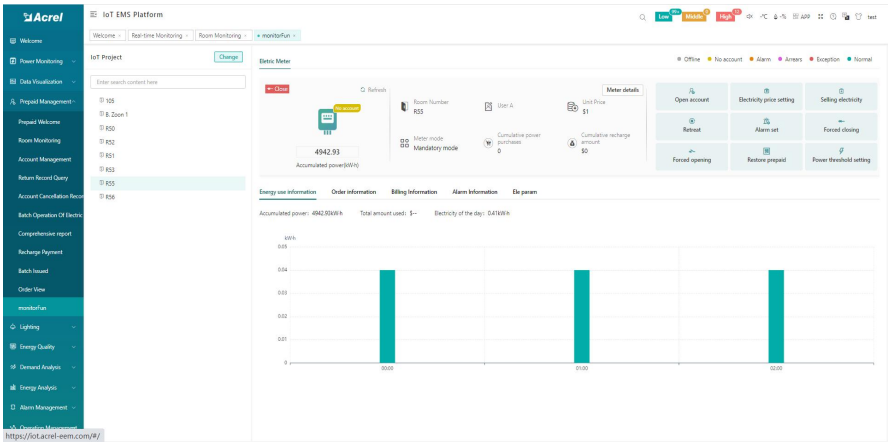
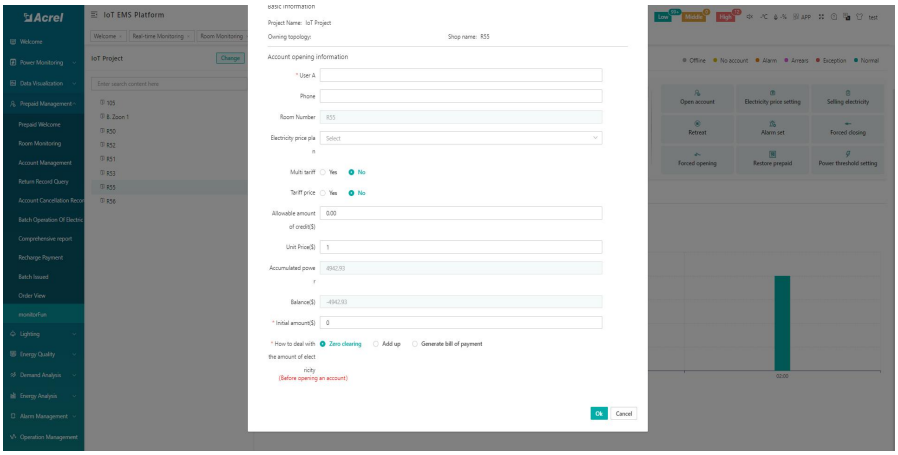
Main Function of WEB side System:

(0) Prepaid Interface (1) Devices List (2) History Curve (3) Electricity Parameters Report (4) Energy Consumption Report (Daily, Monthly, Yearly) (5) User Report

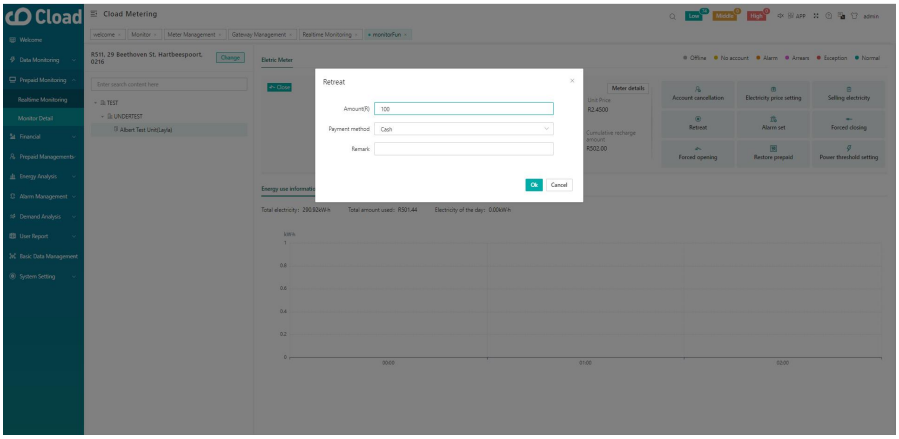
(0) Prepaid Interface-Overview: All basic function of prepaid operation could be seen here.Also, a overview of room balance credit and power consumption was available



(0) Prepaid Interface-Open Account: A prepaid energy meter will formally serve its prepaid billing and control function only after binding a "room" and "user" with it and open account for this certain "room".



(0) Prepaid Interface-Topping Up: Enter amount to issue topping up command to certain "prepaid energy meter" bound with certain " room/user".



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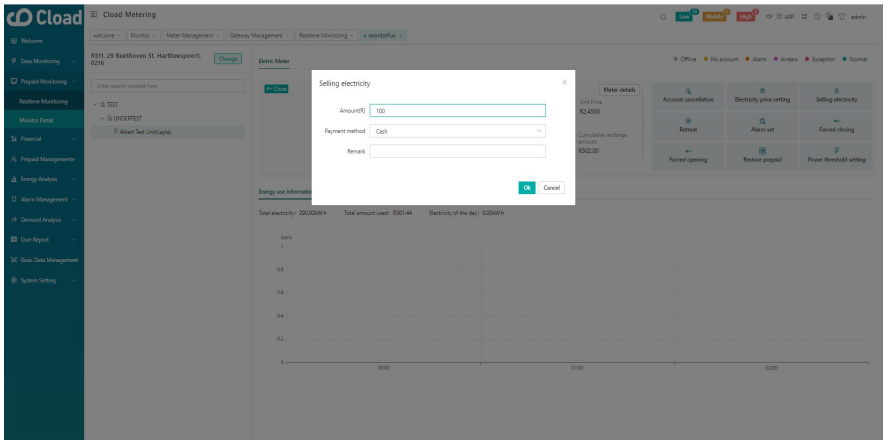
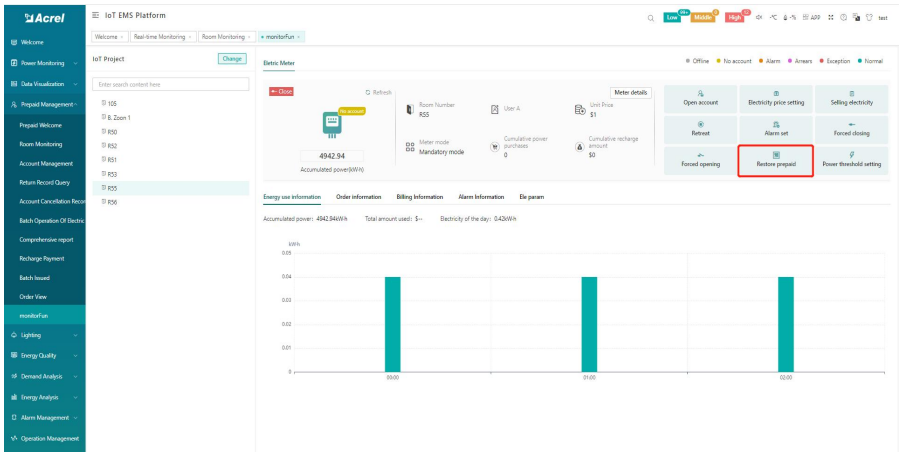
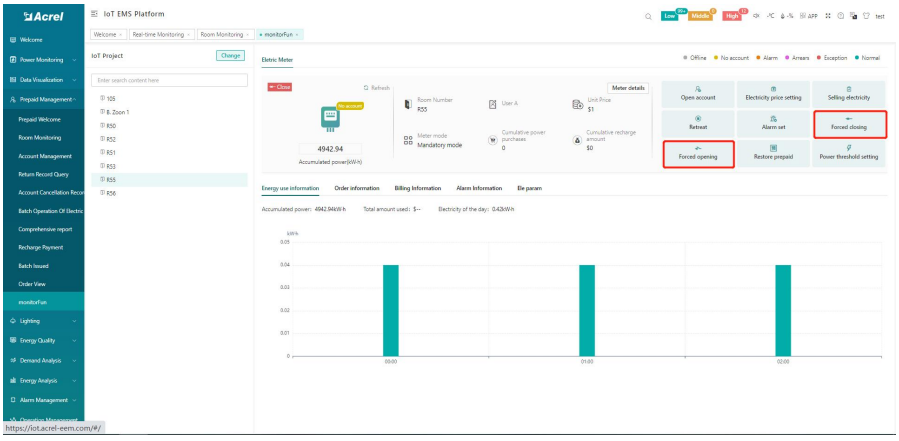
(0) Prepaid Interface-Retreat: Retreat certain amount from credit balance. Designed for revising the possible false operation



(0) Prepaid Interface - Control - Prepaid Mode: In Prepaid Mode, when the credit balance below 0, prepaid energy meter will automatically shut down loads power. and when balance above 0, will immediate resume loads power



(0) Prepaid Interface - Control - Postpaid Mode: In postpaid mode, load's off-on switch control will be fully manually control by platform. Balance credite whether below or above 0 won't influence the load's switch on/off status automatically



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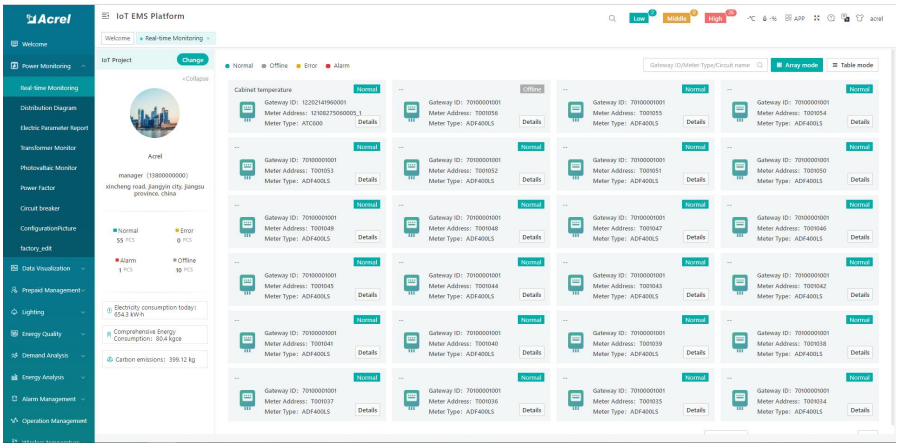
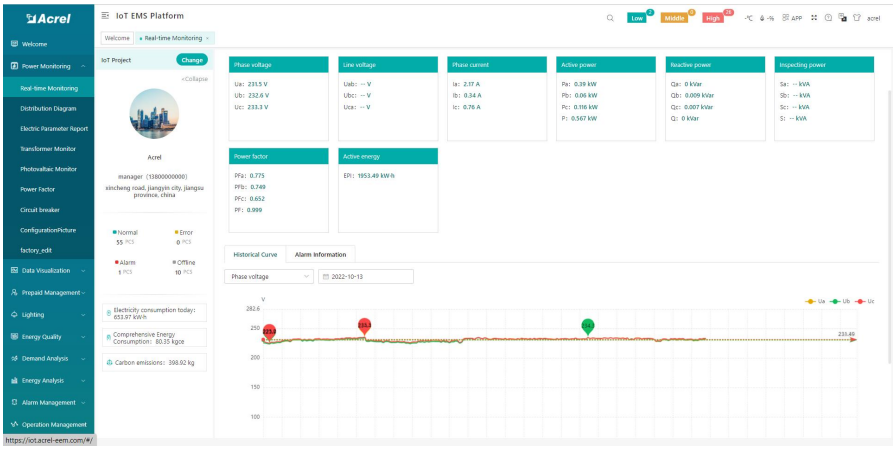
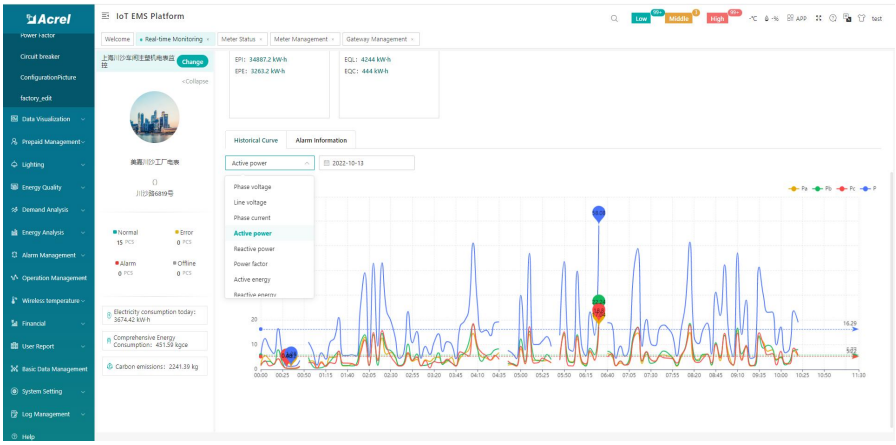
(1) Devices List: Showing the overall devices connected to Acrel System and were bond to certain project. SN code, Online-Offline status, devices model and other necessary information will be shown here.



(2) History Curve: Showing the daily history data curve of all the data that could be collected and upload by energy meter or other basic metering devices.



(2) History Curve: By selecting the items of "data" and "electricity parameter", platform can show the history curve of different data and date.



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Main Function of WEB side System:

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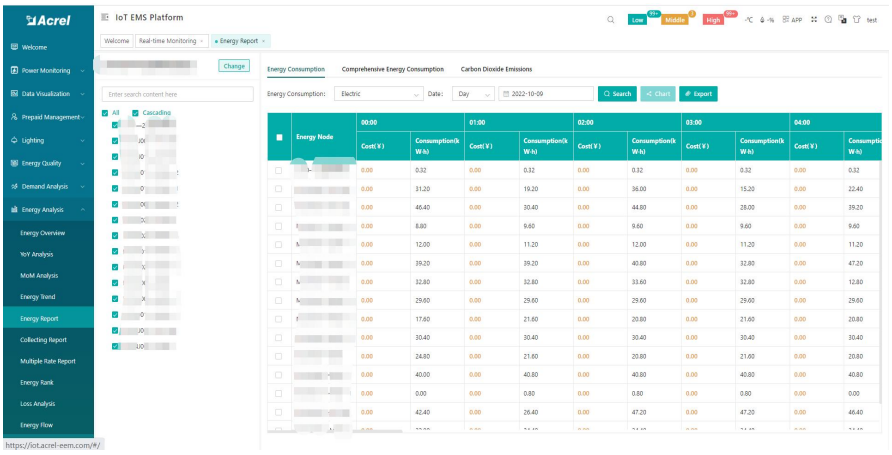
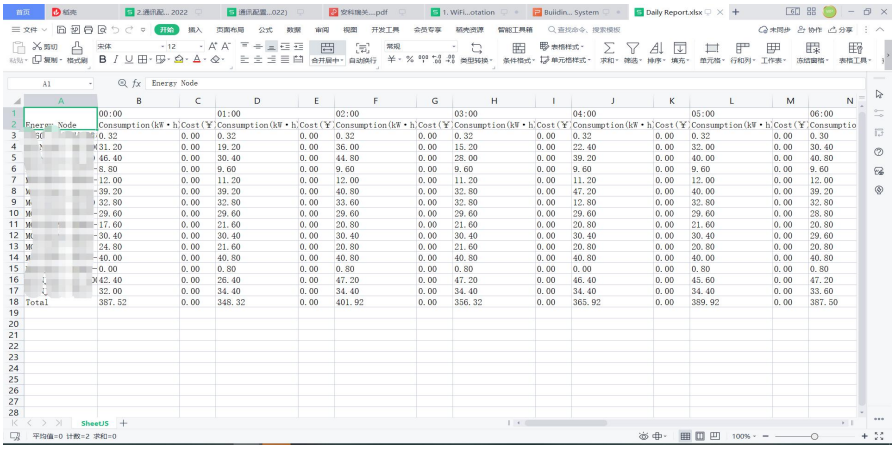
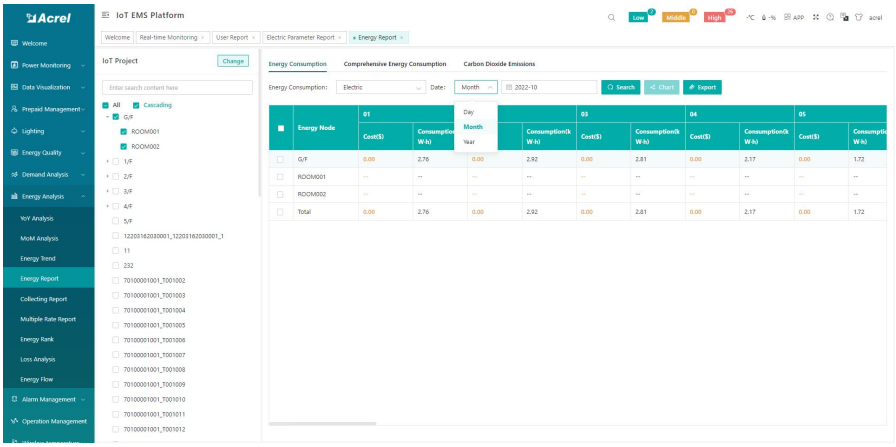
(4) Energy Report (Daily): This Interface show the daily energy consumtion report (calculated by forward active energy)



(4) Energy Report (Daily): This daily energy report could be also export to computer in "Excel" format



(4) Energy Report (Monthly& Yearly): Same as daily energy report, monthly and yearly energy report could be also checked on platform and exported in "Excel" format.



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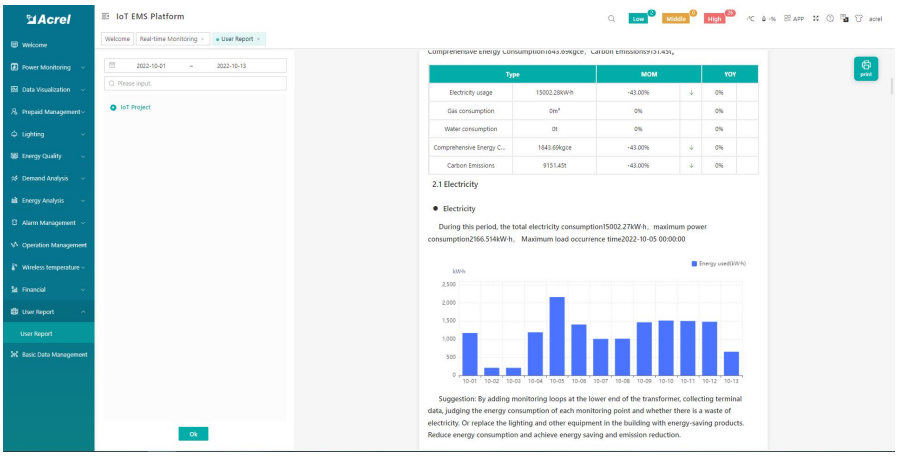
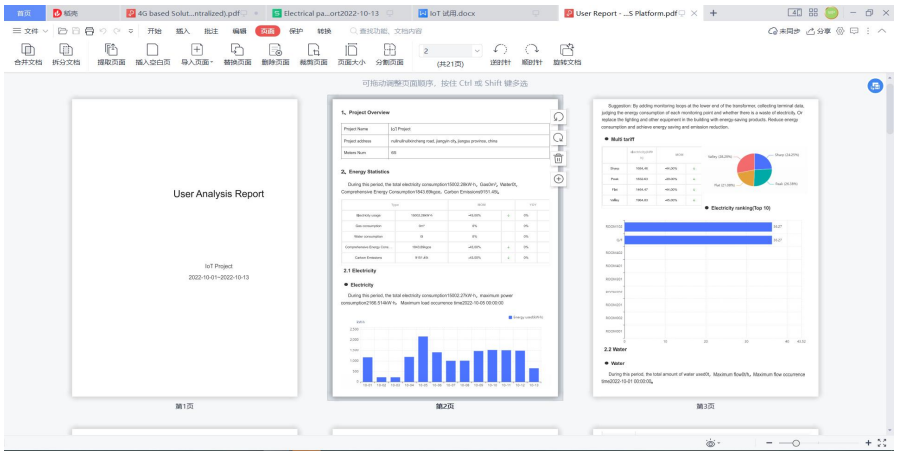
(0) Prepaid Interface (1) Devices List (2) History Curve (3) Electricity Parameters Report (4) Energy Consumption Report (Daily, Monthly, Yearly) (5) User Report

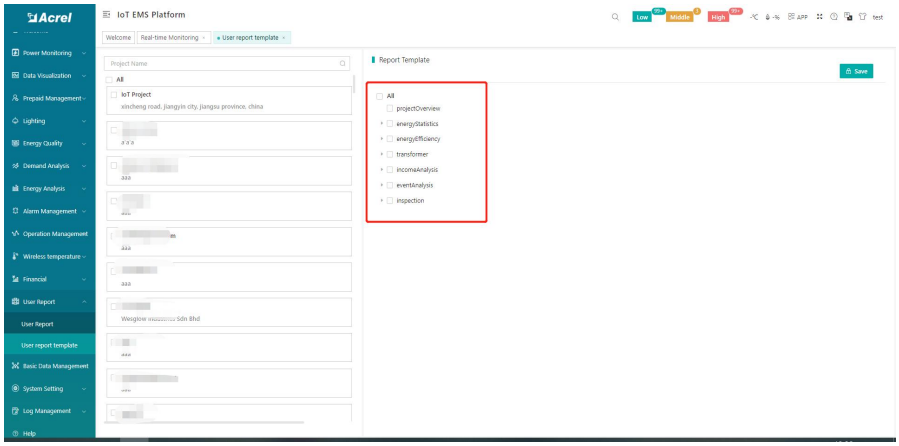
(5) User Report: A comprehensive user report including project overview, energy report, energy analysis and etc could be check on platform



(5) User Report: User report could be exported in "PDF" format into your PC for convenient check and storage.



(5) User Report: User report support template customization in buy-out service of Acrel IoT Energy Monitoirng System.



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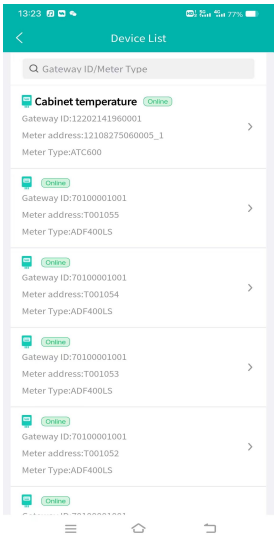
10. Acrel IoT Cloud Prepaid System (Partail Introduction)

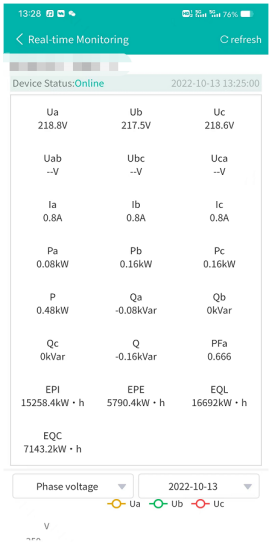
Main Function of APP side System:

(1) Devices List (2) History Curve (3) Electricity Parameters Report (4) Energy Trend (5) Energy Consumption Report (Daily, Monthly, Yearly)

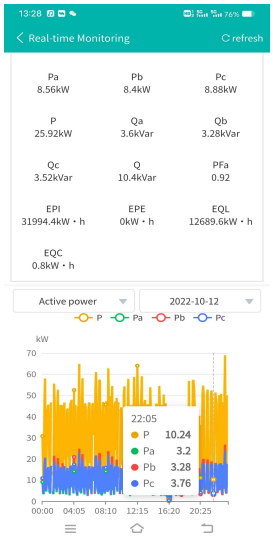
Noted: Since APP side and WEB side of Acrel IoT Energy Monitoring System share the same data, normally recommend our user to add the devices to their account using APP and check the data using WEB platform.



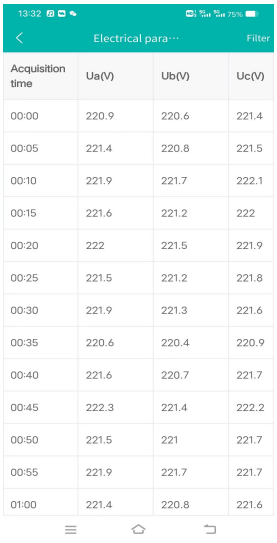
(1) Device List



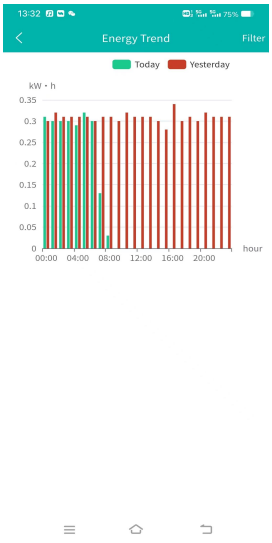
(2) History Curve



(2) History Curve



(3) Parameter Report



(4) Energy Trend

(5) Energy Report