## Acre

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# Renting Machine Online Energy Monitoring Solution

IoT based, Online APP/WEB Energy Monitoring, 4G Network, 1-phase 2-wire



Author: Aaron Shi

E-mail: aaron@acrel.cn

https://www.acrel-electric.ke/



#### 0. Scenario Preset

- (1) There are 10 renting machines which are far from each other or are impossible for RS485 wiring.
- (2) Each machine was powered by 1 main circuit 1-phase 2-wire that needed to be monitored online.

(3) Each circuit are with rated voltage of 230Vac L-N, and with rated current below 100A AC. All machines are using the typical 1P2W [1-phase 2-wire] power system.

(4) Circuits' current are carried by cable, of which the size was suitable for 16mm aperture. (diameter).

(5) For each machine's 3-phase monitoring circuit, we will install 1\* ADW310-D16-4GHW/C 1-phase 4G Energy Meter.

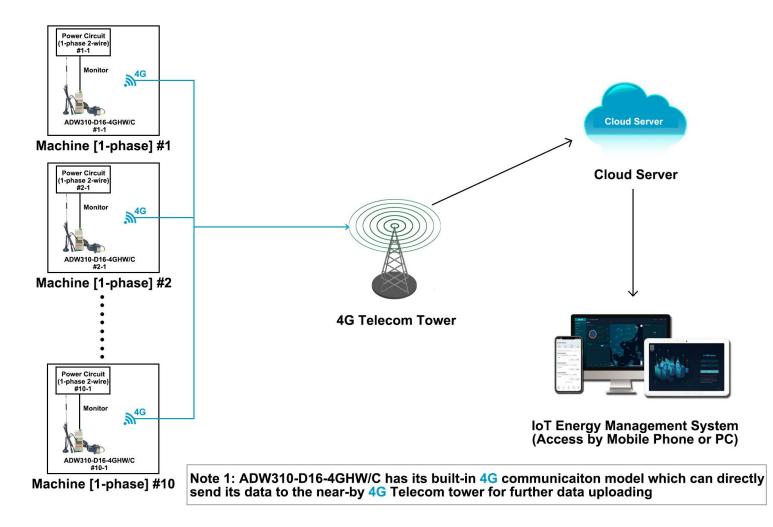
#### 1. Devices Deployment Plan

#### Machine #1 - Power Circuit #1-1:

- 1\* ADW310-D16-4GHW/C 1-phase 4G Energy Meter [For monitoring the power circuit of Machine #1]

#### Machine #10 - Power Circuit #10-1:

- 1\* ADW310-D16-4GHW/C 1-phase 4G Energy Meter [For monitoring the power circuit of Machine #10]





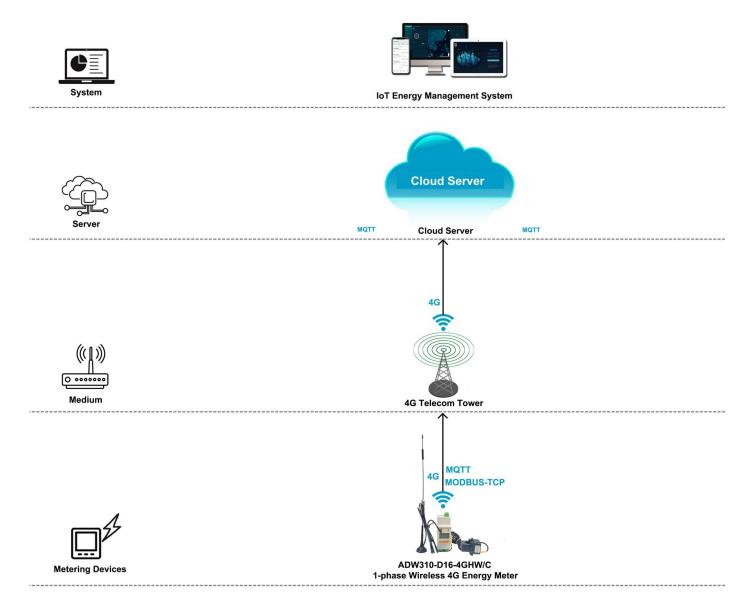
#### 3. Communication Structure&Logic

(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) ADW310-D16-4GHW/C Wireless 4G 1-phase Energy Meter has a built-in 4G communication module which allow it to directly send data to local 4G telecom tower through 4G signal based on MQTT and MODBUS-TCP protocol without using a extra 4G IoT Gateway.

(3) Each ADW310-D16-4GHW/C has a 4G card tray for installing the 4G sim card which could be bought from your local 4G service provider.

(4) ADW310-D16-4GHW/C also have a RS485 communication normally used for devices adjustment with Acrel ADW310 adjustment softare.





Renting Machine Online Energy Monitoring Solution (Cloud, 1P2W, 4G, Seperate)

Author: Aaron E-mail: aaron@acrel.cn Web: www.acrel-electric.ke

#### 4. Hardware Devices Overview

#### Model 1: ADW310-Dxx-4GHW/C 4G 1-phase IoT Energy Meter

- Monitoring: Up to 1 circuits 3-phase [AC Metering]
- Wireless Comms.: 4G LTE [MQTT, MODBUS Protocol]
- Wired Comms.: RS485 [MODBUS-RTU Protocol]
- Rated Current: 3x1(6)A AC [via -/5A CTs.]
- Rated Voltage: Up to 220~264Vac L-N
- Certificate&Standard: CE





#### 5. 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 ice or Buy-out Service after 3 ial of <b>Cloud IoT System</b> )
	·	been sent to cloud s	Il the meters across the country whose data has server through <b>4G,WiFi or Ethernet</b> . ading and data collection.	\$0 (recommended in pilot p	orojtect)		onth Free Trail ed to rent a cloud server))
		3.Provide <b>IoT APP</b> 4.Generate energy period with year-on-	for <b>mobile phone</b> side and <b>IoT WEB</b> for <b>PC</b> side. data report of daily, monthly and annually -yeay and period-on-period energy analysis.	\$xxx/Year (For 10 Po (Price for Host Service recommended in pilot p	Only,	connected	Service for 1 monitoring poin I to the system 1 year eed to rent a cloud server)
Acrel Cloud IoT Energy Manager	ment System	of the system and p	larm function to ensure a stable operation rotect your property. e trial of system with full technical support or pilot project.	\$xxxxPermanent (Limitles: (Price for Buy-out Sei Only,recommended in late	rvice	permanent use (Lin	\$xxxx for Buy-out Service of nitless monitoring points and need to be rent by users)
			Cloud Server				
Name			Description	Server Renting Price (For Reference On			Remark
Cloud Server Cloud Server		Cloud. 2.Users of <b>Cloud Id</b> cloud server when t <b>System</b> . And if they our Cloud IoT Syste rent on Amazon so	Id be rent on the cloud server provider like Amazon <b>DT Energy Management System</b> only need to rent hey choose <b>buy-out</b> service of <b>3-month free trial</b> o <b>are</b> using <b>hosting service</b> or <b>3-month free trial</b> o <b>are</b> , we will use our own cloud server which has bee that users don't need to rent a cloud server. Cloud Server is only a reference price that we have ud.	f According to Specs of Ren n Server	nted Cloud	1000~2000 monit	erver specs could support bings points connected to the system ver: 8 core 16G em: windows server 2016)
			4G Wireless Energy Me	ter			
Overview Picture	USAGE&MC	DULE NAME	DESCRIPTION & SPECIFICATION	QUANTITY	FOB L	INIT PRICE (USD)	AMOUNT (USD)
		eless Energy Meter 016-4GHW/C	Communication: 4G (MODBUS-TCP, MQTT) & RS485 (MODBUS-RTU) Rated Voltage: 220~264Vac L-N Rated Current: 20(100)A AC (via paired external CTs)	10 pcs		\$	
		al Split-core Current Iformer	Current Ratio: 100A/25mA AC Aperture: o16mm Appliaction: Paired with ADW310-D16-WF/C for current input	10 pcs		g both Energy meter d External CTs)	



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: acrelTest 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



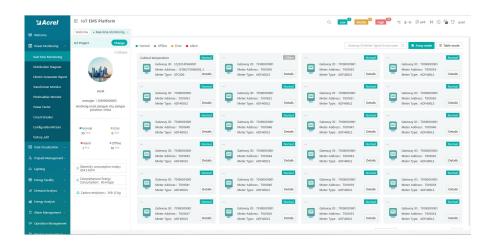
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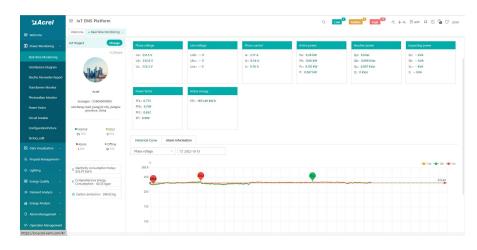
Main Function of WEB side System:

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

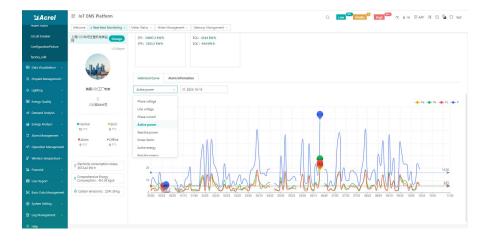
(1) Devices List: Showing the overall devices connected to Acrel System and were bond to certain project. SN code, Online-Offline status, devices model and other necessary information will be shown here.



(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.





Main Function of WEB side System:

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

(3) Electricity Parameters Report:Select the "electricity parameters"that you want to show in this report

MS Project	ange Ste B						> Ph	ane voltag		O Search	0 tipo									
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	on Ein		t Parameter	5							×	Policiw)	Pc(kW)	P(kW)	Qu(kViar)	Qb(kVar)	Qc(kWar)	Q(Mirr)	Pfa	N
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(3) Electricity Parameters Report: All the electricity parameters that could be collected by certain energy meter will showed as a report here.

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	* G/F	4	11.04	9	8.82	28.86	-9.54	-6.12	-7.2	22.86	14.58	10.92	11,46	36.96					139425
	ROOM001	08	10.02	8.82	8.64	27,48	-7.8	-6.18	-7.02	21	13.26	10.8	11.16	35.22					139427
Transformer Monitor	R00M002	24	9.84	8.46	8.46	26.76	-8.34	-5.82	-6.84	21	12.9	10.26	10.85	34.02			~		139429
Photovaltaic Monitor	> 1/F	98	10.14	8.76	8.76	27.66	-7.74	-6.06	-7.02	20.82	13.2	10.68	11.28	35.16			-		139432
Power Factor	> 3/F	76	9.54	8.64	8.34	26.52	-8.28	-6.06	-6.6	20.94	12.6	10.56	10.85	34.02			-		139434.5
	+ 4/F	14	10.38	9.18	8.64	28.2	-7,44	-6.42	-6.9	20.76	13.5	11.22	133	35.82					139436
Circuit breaker	5/F	58	9.9	8.82	8.34	27.06	-8.46	-6.12	-6.84	21.42	13.08	10.74	10.8	34.62					139439
	12203162030001_12203162030001_1	36	10.38	8.76	8.58	27.72	-8.04	-6.12	-6.9	21.06	13.32	10.68	11.04	35.04					139441
	11	48	9.78	8.94	8.52	27.24	-7.5	-6.18	-6.9	20.58	12.9	10.92	10.98	34.8					130443
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	70100001001 T001003	45	9.78	8.58	8.4	26.76	-8.46	-6.05	-6.9	21.42	12.96	10.5	10.92	34.38					139448
	70100001001 T001004	56	13.56	11.4	11.82	36.78	3.36	-4.8	-6.35	14.52	15.48	12.36	13.44	41.28					139450
	70100001001_T001005	24	9.66	8.4	8.52	26.58	-8.52	-5.94	-7.02	21.48	12.9	10.32	11.04	34.26					139453
🖇 Energy Quality 🗸 🗸	70100001001_T001005	64	9.42	8.28	8.34	26.04	-6.28	-5.88	-6.95	21.12	12.54	10.14	10.85	33.54					139455
Demand Analysis	70100001001_T001007	85	9.36	8.16	8.28	25.8	-8.28	-5.82	-6.95	21.06	12.34	10.02	10.8	33.3					139457
- oenano ionarysis	70100001001_T001008																		
	70100001001_T001009	54	10.02	8.22	8.22	26.46	-8.28	-5.88	-6.84	21	12.96	10.08	10.68	33.72					139460
	70100001001_T001010	08	9.66	8.28	8.16	26.1	-8.34	-5.94	-6.95	21.24	12.78	10.2	10.68	33.66	**				139462
	70100001001_T001011	22	10.92	8.28	0.34	27.54	-4.44	-5.94	-7.03	17.46	13.8	10.26	10.98	35.04					139464
A Operation Management	70100001001_T001012 70100001001 T001013													Tota	291 15	ó/page	< 1	2 >	Go to 1

(3) Electricity Parameters Report: Report on platform could be exported in "Excel" format to your computer for a brief storage when accessing the IoT EMS WEB platform.

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00:10		224.2					57.72	45.96	48.24	9.84	8.46	8.46	26.76	-8.34	-5.82	-6.84	21	12.9	10.26	10.86				
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00:35	226.2		228.6				59.04	47.16	48.36	10.38	8.76	8.58	27.72	-8.04	-6.12	-6.9	21.06	13.32	10.68	11.04				
00:40		226.2					57.18	48.3	48.48	9.78	8.94	8.52	27.24	-7.5	-6.18	-6.9	20.58	12.9	10.92	10.98	34.8			
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3 00:55		228.8					67.98	54.24	58.56	13.56	11.4	11.82	36.78	3.36	-4.8	-6.36	14.52	15.48	12.36	13.44	41.28			
4 01:00	228.5	228.8					56.52	45.12	48.24	9.66	8.4	8.52	26.58	-8.52	-5.94	-7.02	21.48	12.9	10.32	11.04	34.26			
5 01:05	227.7	228	229.2				55.32	44.7	47.66	9.42	8.28	8.34	26.04	-8.28	-5.88	-6.96	21.12	12.54	10.14	10.86	33.54			
5 01:10	230		231.8				54.54	43.68	46.86	9.36	8.16	8.28	25.8	-8.28	-5.82	-6.96	21.06	12.48	10.02	10.8	33.3			
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9 01:25	230.8	231.2	232.7				60	44.4	47.22	10.92	8.28	8.34	27.54	-4.44	-5.94	-7.08	17.46	13.8	10.26	10.98	35.04			
0 01:30	231.4	231.2	233.1				53.28	43.14	46.32	9.24	8.16	8.34	25.74	-8.1	-5.64	-6.78	20.52	12.3	9.96	10.74	33			
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3 01:45	229.8	229.5	231.1				51.36	42.6	45.06	8.7	7.92	7.92	24.54	-7.92	-5.64	-6.72	20.28	11.76	9.72	10.38	31.86			
4 01:50	230.1	229.6	231.9				58.32	50.88	51.6	12.24	10.56	10.32	33.12	5.4	3.54	-6	14.94	13.38	11.64	11.94	36.96			
5 01:55		230.2					52.86	49.8	49.26	10.38	10.08	9.12	29.58	6.3	-5.34	6.9	18.54	12.12	11.46	11.4	34.98			
6 02:00	229. 2	228.8					53. 58	48.12	46.86	10.44	9.24	8.28	27.96	6.36	5.88	6.84	19.08	12.24	10.98	10.8	34.02			
7 02:05	231	230.7	232.8				53.16	47.58	44.7	10.38	9.18	7.98	27.54	6.54	6	6.6	19.14	12.24	10.98	10.38	33.6			
8 02:10	230.7	230.4	232.6				52.32	46.68	43.65	10.26	8.94	7.8	27	6.3	5.88	6.42	18.6	12.06	10.74	10.14	32.94			*
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Main Function of WEB side System:

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

(4) Energy Report (Daily): ThisInterface show the daily energyconsumtion report (calculated byforward active energy)

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	Welcome Real-time Monitoring - Energy Report	*										
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Energy Trend			0.00	32.80	0.00	32.80 29.60	0.00	33.60	0.00	32.00	00.0	12.80
			0.00	17.60	0.00	23.60	0.00	20.00	0.00	21.60	0.00	20.80
Collecting Report	<b>2</b> , 10		0.00	30.40	0.00	30.40	0.00	30.40	0.00	30.40	0.00	30.40
Multiple Rate Report	2 00	0	0.00	24.80	0.00	21.60	0.00	20.80	0.00	21.60	0.00	20.80
Energy Rank		0	0.00	40.00	0.00	40.80	0.00	40.80	0.00	40.80	0.00	40.80
Loss Analysis			0.00	0.00	0.00	0.80	0.00	0.80	0.00	0.80	0.00	0.00
			0.00	42,40	0.00	26.40	0.00	47.20	0.00	47.20	0.00	46.40
Energy Flow				10.00		51.15		24.92		11.45		
https://iot.acrel-eem.com/	(#)											

(4) Energy Report (Daily): This dailyenergy report could be also exportto computer in "Excel" format

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		-8.80	0.00	9.60	0.00	9.60	0.00	9.60	0.00	9.60	0.00	9.60	0.00	9.60	
y		- 12.00	0.00	11.20	0.00	12.00	0.00	11.20	0.00	11.20	0.00	12.00	0.00	12.00	
3		- 39. 20	0.00	39.20	0.00	40.80	0.00	32.80	0.00	47.20	0.00	40.00	0.00	39.20	
М		32.80	0.00	32.80	0.00	33.60	0.00	32.80	0.00	12.80	0.00	32.80	0.00	32.80	
М	_	- 29.60	0.00	29.60	0.00	29.60	0.00	29.60	0.00	29.60	0.00	29.60	0.00	28.80	
И	C	- 17.60	0.00	21.60	0.00	20.80	0.00	21.60	0.00	20.80	0.00	21.60	0.00	20.80	
М	( ·	- 30. 40	0.00	30.40	0.00	30.40	0.00	30.40	0.00	30.40	0.00	30.40	0.00	29.60	
М	(	24.80	0.00	21.60	0.00	20.80	0.00	21.60	0.00	20.80	0.00	20.80	0.00	20.80	
У		- 40.00	0.00	40.80	0.00	40.80	0.00	40.80	0.00	40.80	0.00	40.00	0.00	40.80	
1		-0.00	0.00	0.80	0.00	0.80	0.00	0.80	0.00	0.00	0.00	0.80	0.00	0.80	
		0 42. 40	0.00	26.40	0.00	47.20	0.00	47.20	0.00	46.40	0.00	45.60	0.00	47.20	
		32.00	0.00	34.40	0.00	34.40	0.00	34.40	0.00	34.40	0.00	34.40	0.00	33.60	
1	otal	387.52	0.00	348.32	0.00	401.92	0.00	356.32	0.00	365.92	0.00	389.92	0.00	387.50	
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	平均值=0 计数=2							1.1			资中- 日	■□□□ 100%・			+

(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.

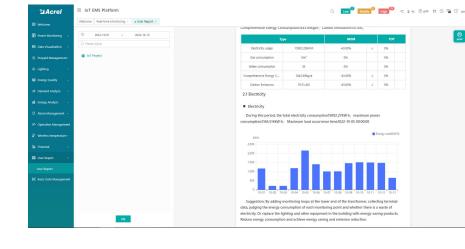
≌Acrel	IoT EMS Platform							Q	Low Niddl	e High	-1C & -16 SP	APP 11 (1) (1	a 🗘 acrel
Welcome	Welcome Real-time Monitoring × User Report ×	Electric I	Perameter Report ×	Energy Report ×									
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🖽 Data Visualization 🖂	Enter search content here	Energy	Consumption: Elec	tric	U Date:	Month 🗠 🖽 2	022-10	Q Sea	ch < Chart	# Export			
℅ Prepaid Management ~	All 🖸 Cascading			01		Day		03		04		05	
⇔ tighting ~	RCOM001			Cost(\$)	Consumption	Month	Consumption(k	Cost(\$)	Consumption(k W-b)	Cost(\$)	Consumption(k	Cost(\$)	Consumptio
📾 Energy Quality 🔍	RCOM002				and the second second	Year	W46)			0.00	Web)	0.00	Web)
55 Demand Analysis ~	<ul> <li>□ 1/F</li> <li>&gt; □ 2/F</li> </ul>		G/F RDOM001	0.00	2.76	0.00	2.92	0.00	2.81		2.17		1.72
	* _ 2/* * _ 3/F		RDOM001										
🗎 Energy Analysis 🗠	· _ 4/F		Total	0.00	2.76	0.00	2.92	0.00	2.81	0.00	2.17	0.00	1.72
YoY Analysis	5/F		IDGA	0.00	2/0	0.00	2.92	0.00	2.01	0.00	2.17	0.00	1.72
MoM Analysis	2203162030001_12203162030001_1												
Energy Trend	. 11												
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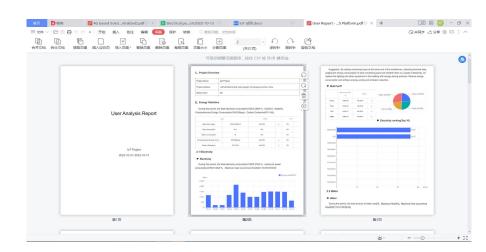
Main Function of WEB side System:

(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.

Sacrel	IoT EMS Platform	Q. Low 200 MASHE 9 High 200 - K & -K & APP 🛍 🛈 best
	Welcome Real-time Monitoring ×	
	Project Name	Report Template
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	In The Project sincheng read, Jangvin dty, Jangsu province, china	All projectOverview
		<ul> <li>unergy/statistics</li> </ul>
	173	invergefticknop     intersections
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	338	
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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.

13:23 🛙 🖬 🛸	🖽 🖏 🖏 77% 🔲
Q Gateway ID/Meter Type	
📮 Cabinet temperature 🛛 💷	
Gateway ID:12202141960001	>
Meter address:12108275060005_1	/
Meter Type:ATC600	
Coline	
Gateway ID:70100001001	
Meter address:T001055	>
Meter Type:ADF400LS	
Conine)	
Gateway ID:70100001001	
Meter address:T001054	>
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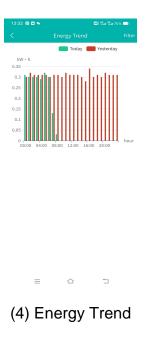
(1) Device List

13:32 😰 🖼 💊		<b>B</b> i %a %a	75% 🔜
<	Electrical p	ara…	Filter
Acquisition time	Ua(V)	Ub(V)	Uc(V)
00:00	220.9	220.6	221.4
00:05	221.4	220.8	221.5
00:10	221.9	221.7	222.1
00:15	221.6	221.2	222
00:20	222	221.5	221.9
00:25	221.5	221.2	221.8
00:30	221.9	221.3	221.6
00:35	220.6	220.4	220.9
00:40	221.6	220.7	221.7
00:45	222.3	221.4	222.2
00:50	221.5	221	221.7
00:55	221.9	221.7	221.7
01:00	221.4	220.8	221.6

(3) Parameter Report

13:28 🛙 🖼 💊		🕮 🖓 a 🖓 a 76% 🔲
Device Status:Online		2022-10-13 13:25:00
Ua	Ub	Uc
218.8V	217.5V	218.6V
Uab	Ubc	Uca
V	V	V
la	1b	Ic
0.8A	0.8A	0.8A
Pa	Pb	Pc
0.08kW	0.16kW	0.16kW
P	Qa	Qb
0.48kW	-0.08kVar	0kVar
Qc	Q	PFa
0kVar	-0.16kVar	0.666
EPI	EPE	EQL
15258.4kW • h	5790.4kW • h	16692kW • h
EQC 7143.2kW • h		
Phase voltage		2022-10-13 🔹
v	- <b>O-</b> Ua - <b>O</b> -	Ub -O- Uc

(2) History Curve





(2) History Curve

13:34 🗊 🖬 🛸		🖽 Xa Xa 74% 📥
energy	comEnergy	CO2
Circuit name	17:00	
	Cost(¥)	Consumpti on(kW · h)
z	- 0.00	0.80
)-	- 0.00	22.40
	0.00	38.40
	0.00	17.60
	0.00	18.40
Total	0.00	97.60
=		1

(5) Energy Report