## Acre

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# Renting Machine Online Energy Monitoring Solution

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



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



#### 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.

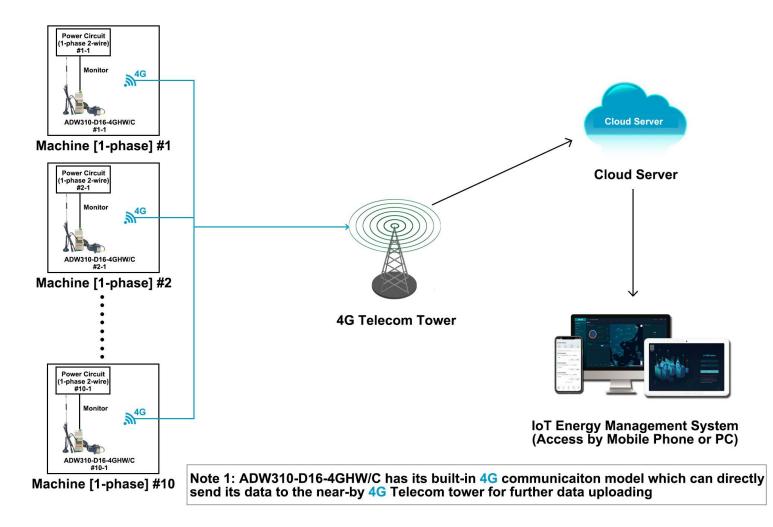
#### 1. Devices Deployment Plan

#### 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]





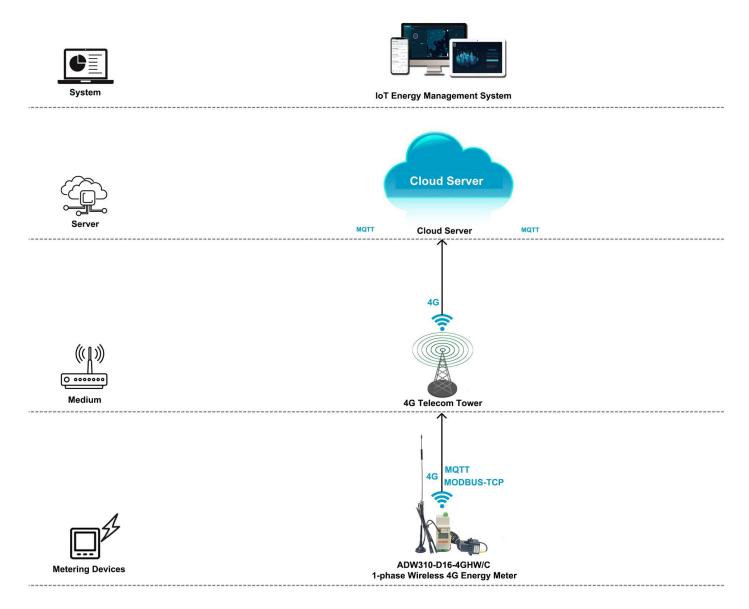
## 3. Communication Structure&Logic

(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)

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#### 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
- More Introduction: https://www.acrel-electric.fr/product/adw310-

iot1-phase-wireless-smart-energy-meter





### 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 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	rojtect)		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 poir to the system 1 year eed to rent a cloud server)
Acrel Cloud IoT Energy Manage	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 Se Only,recommended in late	rvice	permanent use (Lin	\$xxxx for Buy-out Service o nitless monitoring points and need to be rent by users)
			Cloud Server				
Name			Description	Server Renting Pri (For Reference On			Remark
Cloud Server Cloud Server		Cloud. 2.Users of Cloud Id cloud server when t System. 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 our <b>Cloud IoT</b> a re using <b>hosting service</b> or <b>3-month free trial</b> of m, we will use our own cloud server which has beer that users don't need to rent a cloud server. Cloud Server is only a reference price that we have rud.		ited Cloud	1000~2000 monit	erver specs could support bings points connected to th system ver: 8 core 16G mn: windows server 2016)
			4G Wireless Energy Met	er			
Overview Picture	USAGE&M0	ODULE NAME	DESCRIPTION & SPECIFICATION	QUANTITY	FOB U	INIT PRICE (USD)	AMOUNT (USD)
		eless Energy Meter D16-4GHW/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	(in the dia	\$	
		al Split-core Current nformer	Current Ratio: 100A/25mA AC Aperture: o16mm Appliaction: Paired with ADW310-D16-WF/C for current input	10 pcs		g both Energy meter I 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



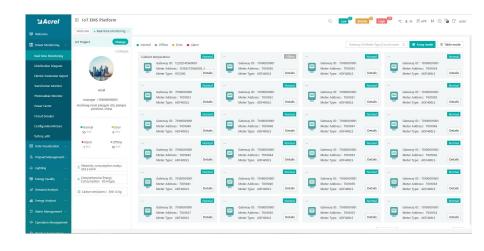
14:25 😰 🛯 🝽	80 <sup>1</sup> %	ı 🏭 98% 💻
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은 test Ô Password		۲
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No accour	nt yet? Click on the reg	ister



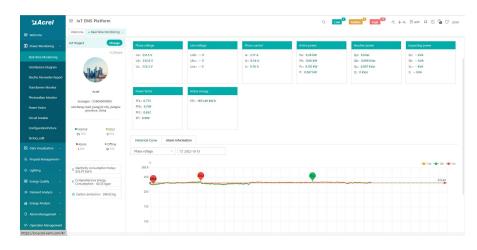
Main Function of WEB side System:

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

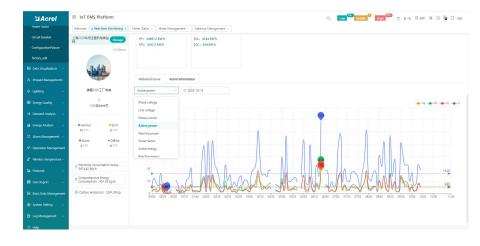
(1) Devices List: Showing the overall devices connected to Acrel System and were bond to certain project. SN code, Online-Offline status, devices model and other necessary information will be shown here.



(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

Salarel 22	E IoT EMS Platform													Q	LOW 1	Visite	High The G	x - C & - 3		: U	
	Welcome  Resi-time Monitoring  Betric Parameter R	eport +																			
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		Acquisit on time	Select	Parameter	5							×	Pis(aW)								
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	Site A	00.05		Phase voltage		ase current	Active p	ower 1	Reactive p	ower 1	Active energy	o'	-								
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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.

Acrel	E IoT EMS Platform											Q L	× <sup>60</sup> M	ddle 0	High (35)	-C 4-	6 82 APP	<b>#</b> ①	<b>≌</b> ℃ ×
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Sectric Parameter Report	RDOM001	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
tarsformer Monitor	RDOM002	24	9.84	8.46	8.46	26.76	-8.34	-5.82	-6.84	21	12.9	10.26	10.86	34.02					139429.
hotovalteic Monitor	> 1/F > 2/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
	> 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
	* 4/F	14	10.38	9.18	8.64	28.2	-7,44	-6.42	-6.9	20.76	13.5	11.22	11.1	35.82				~	139436
	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					139443
ata Visualization 🗸	232	24	9.6	9.54	9.3	28.44	-8.34	-6.12	-6.12	20.58	12.72	11.4	11.64	35.76					139449
	70100001001_T001002	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_T001003 70100001001 T001004																		
	70100001001_001005	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			~	~	139450
nerov Cuality 🗸 🗸	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
	70100001001_T001007	64	9.42	8.28	8.34	26.04	-8.28	-5.88	-6.95	21.12	12.54	10.14	10.85	33.54					139455
	70100001001_7001008	86	9.36	8.16	8.28	25.8	-8.28	-5.82	-6.95	21.06	12:48	10.02	10.8	33.3	~		**	**	139457
	70100001001_T001009	14	10.02	8.22	8.22	26.46	-8.28	-5.88	-6.84	21	12.96	10.08	10.68	33.72			**	**	139460
arm Management 🖂	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					139463
and a second second	70100001001_T001011	22	10.92	8.28	0.34	27.54	-4.44	-5.94	-7.03	17.46	12.8	10.26	10.98	35.04					139464
	70100001001_T001012															ió/page -			

(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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0	0:15	223.9	224.2	225.9				59, 16	47.82	49,98	10, 14	8,76	8,76	27.66	-7.74	-6.06	-7.02	20,82	13.2	10,68	11.28	35, 16			
	0:20			227.1					47.04			8,64	8.34	26, 52		-6,06	-6.6	20, 94	12.6	10, 56	10.86	34.02			
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(	0:30	225.3	225.7	227.5				58.08	47.7	47.58	9.9	8,82	8.34	27.06	-8,46	-6.12	-6.84	21.42	13.08	10.74	10.8	34.62			
0	0:35	226.2	227	228.6				59.0	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	35.04			
0	0:40	225.8	226.2	227.7				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			
(	0:45	226.7	226.9	228.6				56. 52	50.28	51.24	9.6	9.54	9.3	28.44	-8.34	-6.12	-6.12	20.58	12.72	11.4	11.64	35.76			
: 0	0:50	228.1	228.5	229.9				57	46.2	47.46	9.78	8.58	8.4	26.76	-8.46	-6.06	-6.9	21.42	12.96	10.5	10.92	34.38			
1 (	0:55	228.3	228.8	230.4				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			
F (	1:00	228.5	228.8	230				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			
6	1:05	227.7	228	229.2				55. 33	44.7	47.64	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 (	1:10	230	230.2	231.8				54.5	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			
1	1:15	230.3	231.1	232.5				56.52	43.86	46.14	10.02	8.22	8.22	26.46	-8.28	-5.88	-6.84	21	12.96	10.08	10.68	33.72			
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F (	1:25	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			
) (	1:30	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			
0	1:35	229.9	229.8	231.3				53.10	43.5	46.8	9.06	8.16	8.28	25.5	-8.16	-5.7	-6.9	20.76	12.18	9.96	10.8	32.94			
! (	1:40	230.6	230.5	232.3				51.9	42.9	45.96	9.18	8.16	8.46	25.8	-7.56	-5.52	-6.48	19.56	11.94	9.9	10.68	32.52			
1 (	1:45	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			
F (	1:50	230.1	229.6	231.9				58.33	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			
. (	1:55	230.1	230.2	232				52.8	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			
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1	2:05	231	230.7	232.8				53.10	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			
1 (	2:10	230.7	230.4	232.6				52. 33	46.68	43.68	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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## 6. Acrel IoT Energy Monitoring System (Partail Introduction)

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

E IoT EMS Platform

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

Welcome		e Real-time Monitoring	Energy Report												
Power Monitoring ~			Change	Energy	Consumption Con	prehensive Ener	gy Consumption	Carbon Dioxide E	missions						
Data Visualization 🖂	Enter	search content here		Energy	lorsumption: Elect	ric	Date: D	ay 🖉 🖂	2022-10-09	Q Se	arch < Chart	@ Export			
Prepaid Management ~		Cascadino				00:00		01:00		02:00		03:00		94:00	
Lighting ~		101		•			Consumption(k W/b)		Consumption(k W-h)		Consumption(k		Consumption(k W-h)		Consump W/b)
Energy Quality 🗸 🗸		10 0 1				0.00	0.32	0.00	0.32	0.00	0.32	0.00	0.32	0.00	0.32
Demand Analysis 🛛 🗸		0				0.00	31.20	0.00	19.20	0.00	36.00	0.00	15.20	0.00	22.40
Energy Analysis 🔷		0C 1				0.00	46.40	0.00	30.40	0.00	44.80	0.00	28.00	0.00	39.20
Energy Overview		x			1	000	8.00	0.00	9.60	0.00	9.60	0.00	9.60	0.00	9.60
NoY Analysis		y			7	0.00	12.00	0.00	11.20	0.00	12.00	0.00	11,20	0.00	11.20
MoM Analysis		x				0.00	39.20	0.00	39.20	0.00	40.80	0.00	32.90	0.00	47.20
Energy Trend		×				0.00	29.60	0.00	29.60	0.00	29.60	0.00	32.00	0.00	12.80
Energy Report		0			1	0.00	17.60	0.00	21.60	0.00	20.80	0.00	21.60	0.00	20.80
Collecting Report		30				0.00	30.40	0.00	30.40	0.00	30.40	0.00	30.40	0.00	30.40
Multiple Rate Report		00				0.00	24.90	0.00	21.60	0.00	20.80	0.00	21.00	0.00	20.80
Energy Rank						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
Energy Flow						0.00	42,40	0.00	26.40	0.00	47.20	0.00	47.20	0.00	46.40
ulogy now					. A.	A.85	22.00		5.1.10		54.10		11.45		11.10

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

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(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.

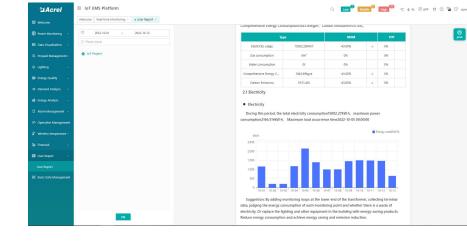
≌Acrel	E IoT EMS Platform							Q	Low Nidd	e <sup>O</sup> High <sup>OS</sup>	-1C & -96 BR	APP 22 1	acrel 😚
I Welcome	Welcome Real-time Monitoring × User Report ×	Electric	Parameter Report ×	Energy Report ×									
Rower Monitoring	IoT Project Change	Energy	Consumption Con	nprehensive Energ	y Consumption	Carbon Dicoide Em	nissions						
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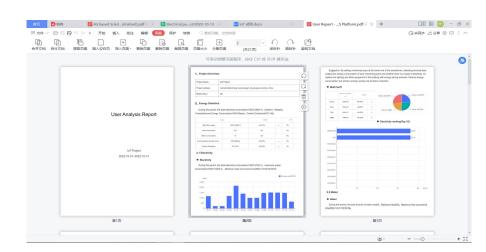
Main Function of WEB side System:

(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	E IoT EMS Platform	् 🗤 🥙 Indeke 📍 High 💯 🗶 ६-२६ 🕮 २२२ 🖬 🖸 test
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Power Monitoring ~	Project Name Q	Report Template
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Prepaid Management~	IoT Project     xincheng road, Jiangyin city, Jiangsu province, china	All project/overview
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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	
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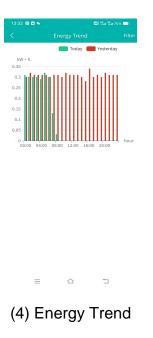
(1) Device List

13:32 😰 🖼 🗣			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	Ib	lc	
0.8A	0.8A	0.8A	
Pa	Pb	Pc	
0.08kW	0.16kW	0.16kW	
Р	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 🔍	
	- <b>O</b> - Ua - <b>O</b> -	Ub -O- Uc	
V			

(2) History Curve





(2) History Curve

13:34 🖬 🖼 💊		🖽 Sar Sar 74% 💶
energy	comEnergy	CO2
	17:00	
Circuit name	Cost(¥)	Consumpti on(kW · h)
z	0.00	0.80
)— 1	- 0.00	22.40
	0.00	38.40
-	0.00	17.60
	0.00	18.40
Total	0.00	97.60
=	$\bigcirc$	1

(5) Energy Report