Acre

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Renting Machine Online Energy Monitoring Solution

IoT based, Online APP/WEB Energy Monitoring, 4G Network, 1-phase&3-phase



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

2023/06/07 Ver.



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 3-phase that needed to be monitored online.
- (3) Each circuit are with rated voltage of 3x400Vac L-L&3x230Vac L-N, and with rated current of
- 150A AC. All machines are using the typical 3P4W [3-phase 4-wire] power system.

(4) Circuits' current are carried by cable, of which the size was suitable for 24mm aperture.

(diameter).

(5) For each machine's 3-phase monitoring circuit, we will install 1* ADW300-4GHW/C Wireless 4G 3

-phase Energy Meter paired with 3* AKH-0.66/K K- 24 150/5 for current input.

1. Devices Deployment Plan

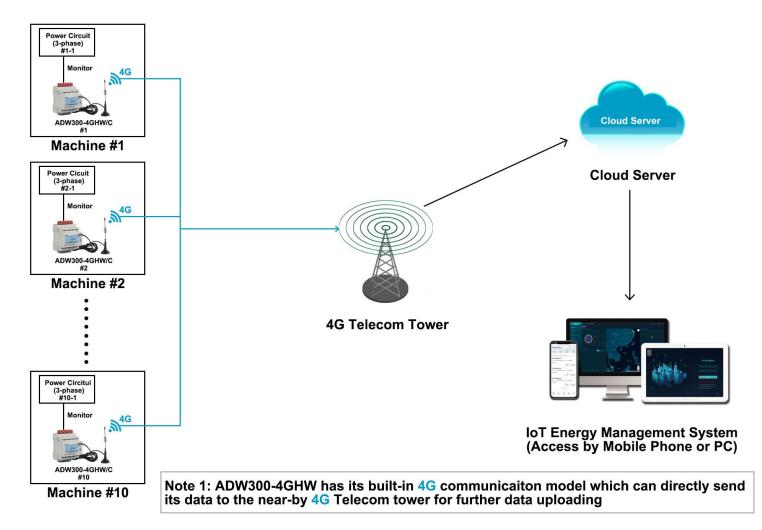
Machine #1 - Power Circuit #1-1:

- 1* ADW300-4GHW/C Wireless 4G Energy Meter [For monitoring the power circuit of Machine #1]

- 3* AKH-0.66/K K- 24 150/5 Split-core Current Transformer [paired with energy meter for current input]

Machine #10 - Power Circuit #10-1:

- 1* ADW300-4GHW/C Wireless 4G Energy Meter [For monitoring the power circuit of Machine #10]
- 3* AKH-0.66/K K- 24 150/5 Split-core Current Transformer [paired with energy meter for current input]





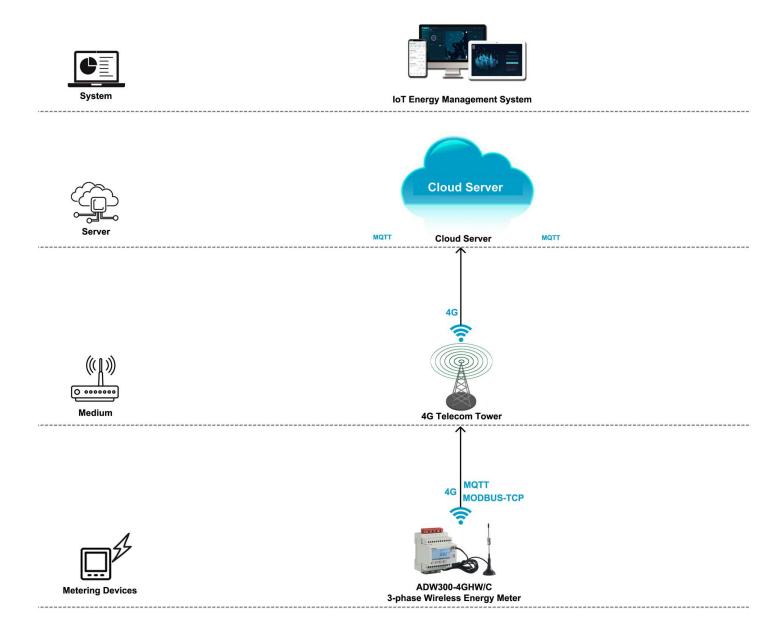
2. Communication Structure&Logic

(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) ADW300-4GHW/C Wireless 4G 3-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 ADW300-4GHW/C has a 4G card tray for installing the 4G sim card which could be bought from your local 4G service provider.

(4) ADW300-4GHW/C also have a RS485 communication normally used for devices adjustment with Acrel ADW300 adjustment softare.





3. Hardware Devices Overview [Energy Meter & Paired CTs]

Model 1: ADW300-4GHW/C 4G 3-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 3x660Vac L-L
- Certificate&Standard: CE, CE-RED



		AC	6
Model 2: AKH-0.66/K K-	24 150/5 Split-core Current Transformer	Split Core	CI
- Current Ratio: 150A/5A			

- Primary Current: 150A
- Secondary Current: 5A
- Accuracy: Class 0.5 or 1.0
- Certificate&Standard: CE





4. 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 vice or Buy-out Service after 3- rial of Cloud IoT System)
	been sent to c	ort all the meters across the country whose data has bud server through 4G,WiFi or Ethernet . r reading and data collection.	\$0 (recommended in pilot pr		nonth Free Trail eed to rent a cloud server))
	4.Generate en period with yea	APP for mobile phone side and IoT WEB for PC side. ergy data report of daily, monthly and annually r-on-yeay and period-on-period energy analysis.	\$140/Year (For 10 Poin (Price for Host Service (recommended in pilot pro	Only, connecte	Service for 1 monitoring points d to the system 1 year eed to rent a cloud server)
Acrel Cloud IoT Energy Manager	ment System of the system a 6.Offer 3-mont	us alarm function to ensure a stable operation nd protect your property. I free trial of system with full technical support ase or pilot project.	\$8000/Permanent (Limitless (Price for Buy-out Serv Only,recommended in late	vice permanent use (S	f \$8000 for Buy-out Service of upport OEM and a cloud server o be rent by users)
		Cloud Server			
Name		Description	Server Renting Price (For Reference Only		Remark
Cloud Server Cloud Server	Cloud. 2.Users of Clo rent cloud sen System. And of our Cloud b been rent on A	could be rent on the cloud server provider like Amazon ud IoT Energy Management System only need to er when they choose buy-out service of our Cloud IoT they are using hosting service or 3-month free trial T System, we will use our own cloud server which has mazon so that users don't need to rent a cloud server. n of Cloud Server is only a reference price that we have a Cloud.	According to Specs of Rente Server	ed Cloud 1000~2000 moni	erver specs could support toings points connected to the system ver: 8 core 16G em: windows server 2016)
		4G Wireless Energy Met	er		
Overview Picture	USAGE&MODULE NAME	DESCRIPTION & SPECIFICATION	QUANTITY	FOB UNIT PRICE (USD)	AMOUNT (USD)
	3-phase 4G Wireless Energy Me ADW300-4GHW/C	Communication: 4G Wireless Communication (with 4G SIM card)&RS485 (MODBUS-RTU) er Rated Voltage: 3x380~456Vac L-L or 3x660Vac L-L (45~65Hz) Rated Current: 3x1(6)A AC (via CTs) Auxiliary Power Supply: 85~265Vac	10pcs	1	1
		Paired Split-core CT	-	-	
Overview Picture	USAGE&MODULE NAME	DESCRIPTION & SPECIFICATION	QUANTITY	FOB UNIT PRICE (USD)	AMOUNT (USD)
	Split-core Current Trasnforme AKH-0.66/K K-φ24	Current Ratio: 150A/5A AC Aperture: φ24mm (diameter) Accuracy: Class 1.0	30pcs	I	1



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



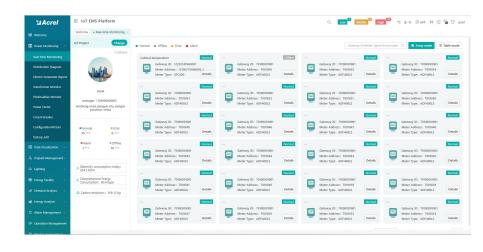
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Log	gin
No account yet? C	lick on the register



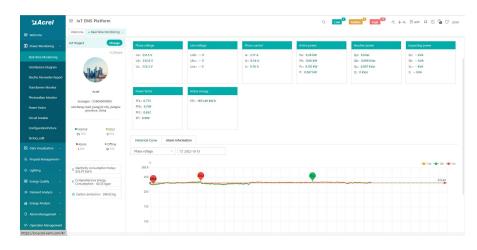
Main Function of WEB side System:

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

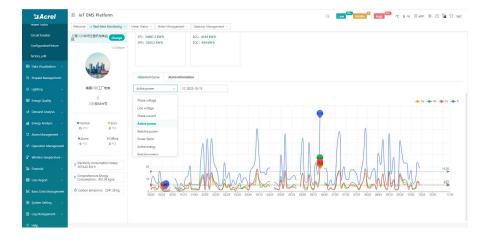
(1) Devices List: Showing the overall devices connected to Acrel System and were bond to certain project. SN code, Online-Offline status, devices model and other necessary information will be shown here.



(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									
	Acquir						-		_										EPION
	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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Distribution Diagram	* 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
	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
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
	 ≥ 2/F 	98	10.14	8.76	8.76	27.66	-7.74	-6.05	-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	10.86	34.02			-		139434.5
Circuit breaker	> 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					139435
	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
ConfigurationFicture	12203162050001_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
factory_edit	11 232	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
	70100001001_T001002	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		1.0			139445
	70100001001_T001003	46	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
⇒ Lighting ~	70100001001_T001004	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
	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	34.25					139453
🖥 Energy Quality 🗸 🗸	70100001001_T001005 70100001001 T001007	64	9.42	8.28	8.34	26.04	-8.28	-5.88	-6.95	21.12	12.54	10.14	10.86	33.54		-		-	139455
	70100001001_1001008	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
3 Alarm 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		-	-	-	139462
a saann waragement 🗸	70100001001_T001011	22	10.92	8.28	8.34	27.54	-4.44	-5.94	-7.08	17.46	13.8	10.25	10.98	35.04					139464
	70100001001_T001012																		
	70100001001_T001013													Tota	1291 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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00:15		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			
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00:35		226.2	227	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	35.04			
00:40		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			
1 00:45		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			
2 00:50		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			
3 00:55		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			
4 01:00		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			
5 01:05		227.7	228	229.2				55.32	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 01:10		230	230.2	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			
7 01:15		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			
8 01:20		230.5	231.2	232.8				55, 56	44.28	46.08	9,66	8,28	8, 16	26.1	-8.34	-5.94	-6,96	21.24	12,78	10.2	10.68	33,66			
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		-5.64	-6.78	20, 52	12.3	9,96	10,74	33			
1 01:35		229.9	229.8	231.3				53, 16	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			
2 01:40		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			
3 01:45			229.5						42.6				7.92	24.54		-5.64	-6.72	20, 28	11.76	9.72	10.38	31.86			
4 01:50			229.6									10.56				3.54	-6	14.94	13.38	11.64	11.94				
5 01:55			230.2									10.08		29.58		-5.34	6.9	18, 54	12, 12	11.46	11.4	34, 98			
5 02:00			228.8									9.24	8,28	27.96		5.88	6,84	19.08	12.24	10.98	10.8	34.02			
7 02:05		231	230.7										7.98	27.54		6	6.6	19.14	12.24	10.98	10.38				
8 02:10		230.7	230.4										7.8		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): This Interface show the daily energy consumtion report (calculated by forward active energy)

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	Welcome Real-time Monitoring - Energy Report	*										
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	0		0.00	31.20	0.00	19.20	0.00	36.00	0.00	15.20	0.00	22.40
			0.00	46.40	0.00	30.40	0.00	44.80	0.00	28.00	0.00	39.20
Energy Overview		0		8.00	0.00	9.60	0.00	9.60	0.00	9.60	0.00	9.60
		□ N		12.00	0.00	11.20	0.00	12.00	0.00	11.20	0.00	11.20
MoM Analysis	🖬 (🛛 🗙			39.20	0.00	39.20	0.00	40.80	0.00	32.90	0.00	47.20
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	2 , 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		24.10		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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ŵ.		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	
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и	100.00	- 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	
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		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	
	ê.	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	
Tot	al	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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(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.

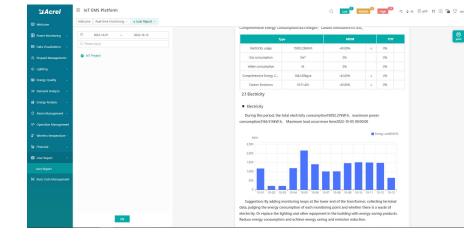
≌Acrel	IoT EMS Platform							Q	Low Niddl	e ⁽⁰ High ⁽²⁶	-c 6-6 89	APP 12 ()	🖥 😚 acral
B Welcome	Welcome Real-time Monitoring × User Report ×	Electric I	Parameter Report ×	Energy Report ×									
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& Prepaid Management ~	All Cascading			01		Day		03		04		05	
⇔ tighting ~	RCOM001			Cost(5)	Consumption W-h)	Month	Consumption(k W-h)	Cost(\$)	Consumption(k W-b)	Cost(\$)	Consumption(k	Cost(\$)	Consumptio W-b)
📾 Energy Quality 🖂	RCOM002		G/F	0.00	2.76	0.00	2.92	0.00	2,01	1.00	2.17	0.00	1.72
55 Demand Analysis ~	 □ 1/F > □ 2/F 		RDOM001				<i>L91</i>						
	•		RDOM002								w.		
🛍 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
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Energy Trend	232												
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Multiple Rate Report	70100001001_7001005												
Energy Rank	70100001001_T001008												
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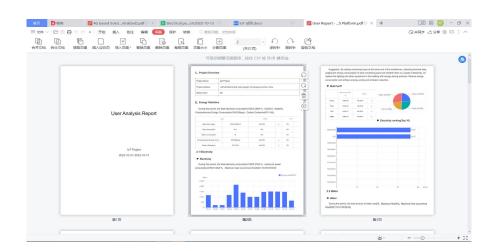
Main Function of WEB side System:

(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.

Sa Acrel	E IoT EMS Platform	Q. Low 200 MASHE 9 High 200 - K & -K & APP 🛍 🛈 best
	Welcome Real-time Monitoring + User report template +	
	Project Name	Report Template
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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	>
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Conine)	
Gateway ID:70100001001	
Meter address:T001054	>
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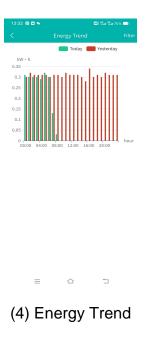
(1) Device List

13:32 😰 🖼 💊		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 🗊 🖬 🛸		🕮 Xa Xa 76% 🔲	
Device Status:Online		2022-10-13 13:25:00	
Ua 218.8V	Ub 217.5V	Uc 218.6V	
Uab V	Ubc V	Uca V	
la 0.8A	1b 0.8A	Ic 0.8A	
Pa 0.08kW	Pb 0.16kW	Pc 0.16kW	
р	Oa	Ob	
0.48kW	-0.08kVar	0kVar	
Qc	Q	PFa	
0kVar	-0.16kVar	0.666	
EPI 15258.4kW • h	EPE 5790.4kW • h	EQL 16692kW・h	
EQC 7143.2kW • h			
Phase voltage	•	2022-10-13 🔍	
V	- O- Ua - O -	Ub -O- Uc	

(2) History Curve





(2) History Curve

13:34 🕫 🖼 💊		Bi Sin Sin 74% 🛑
<	Data report	Filte
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
=		5

(5) Energy Report