



# APPLICATION OF LORA IN IOT SYSTEM ENSURING POWER QUALITY

GRIFFINS TEAM





33.000 \$



**EVN**

**Gia Lai Electricity Company  
Control Center Room**





- ## Causes
- Unable to detect abnormal status
  - Network signal loss at some locations among the 47 stations in Chuh Puh

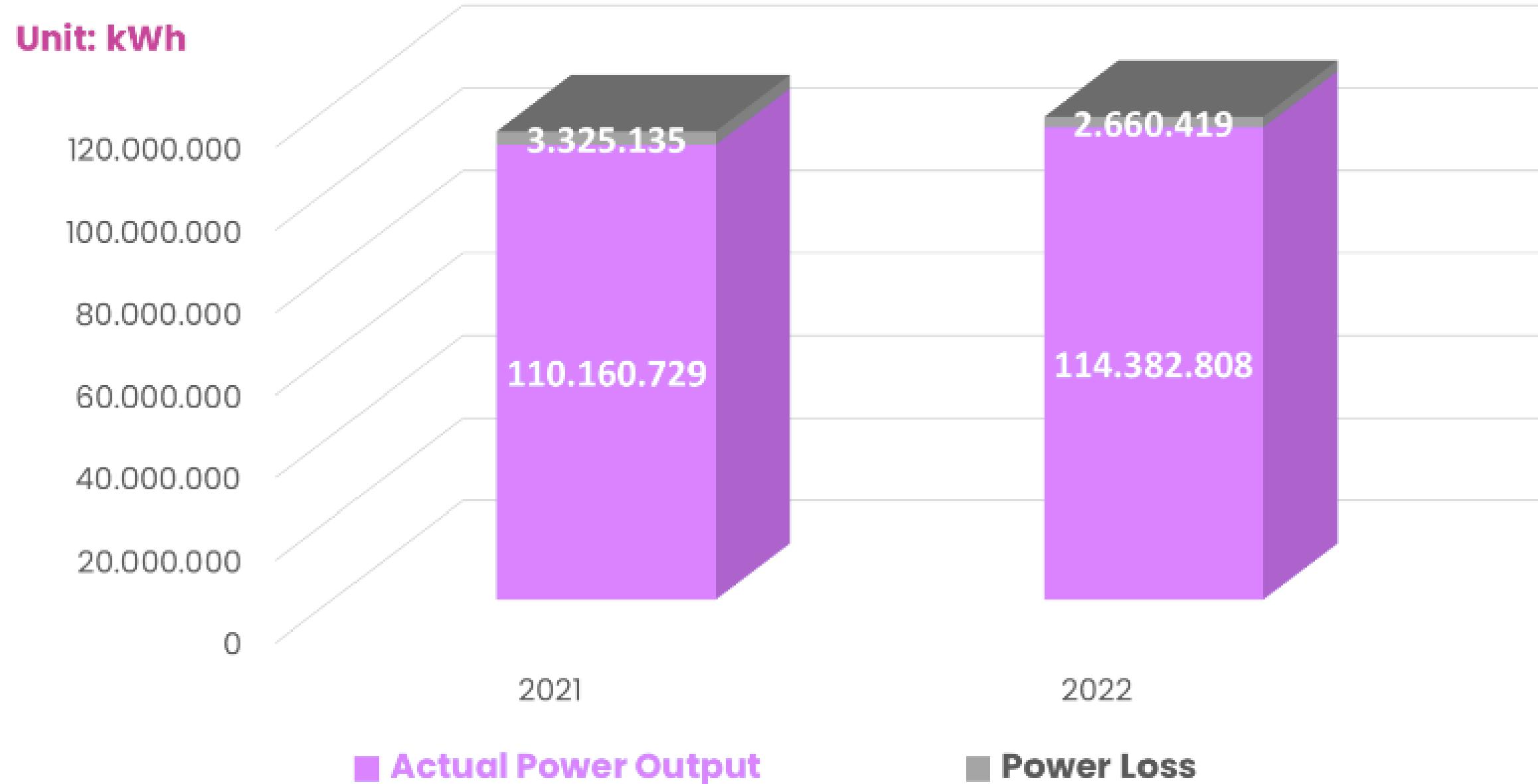


- ## Problems
- Electrical parameters are frequently unstable
  - The power factor correction capacitor contactor is damaged
  - High accident rate when examining

Leading to power loss



## Power loss in 2021 and 2022 of 47 stations in Chu Puh PC



## Current local way is being used in Chu Puh district



**Occupational accident**



**Labor cost**



**Collecting data manually**

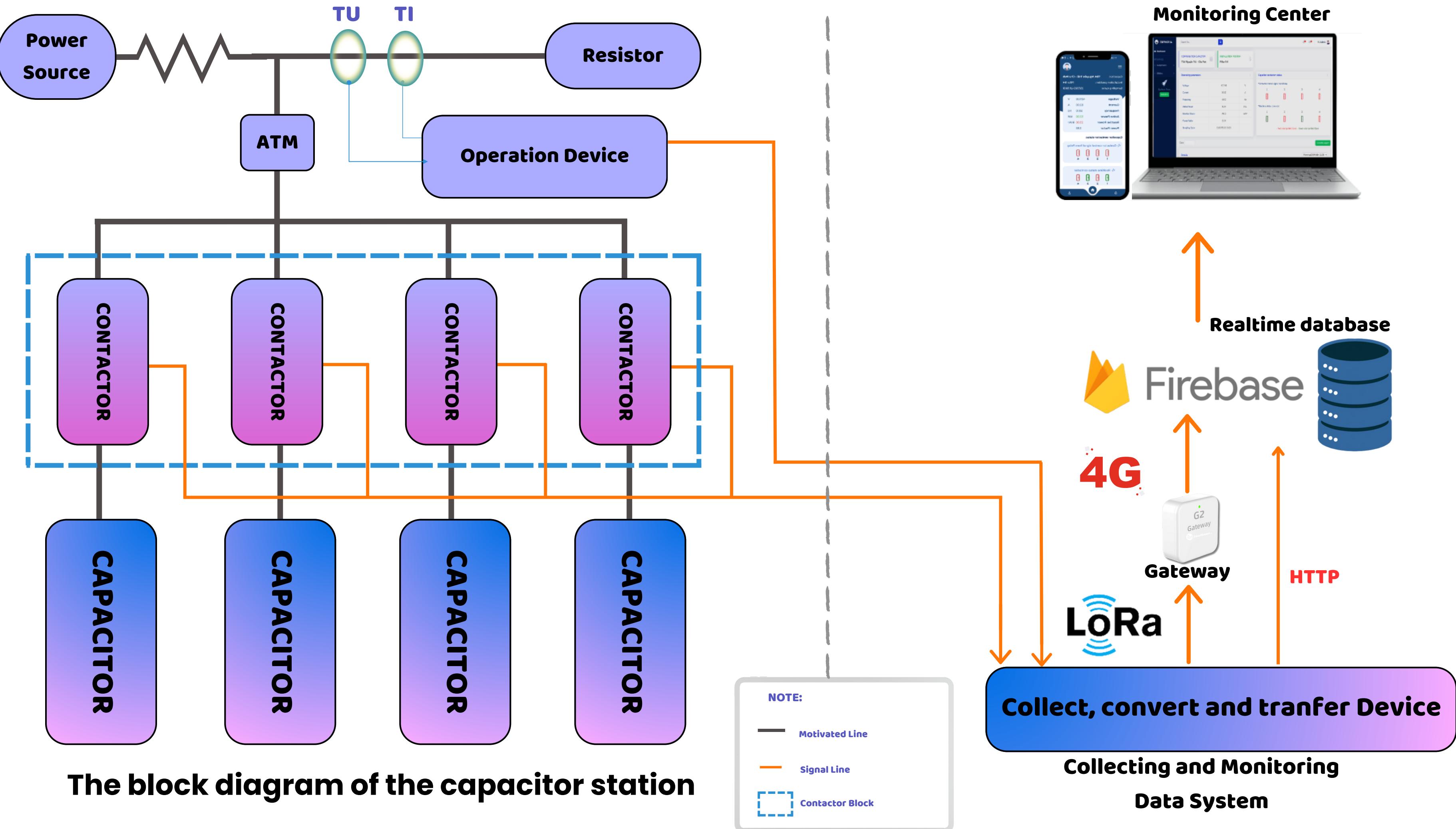


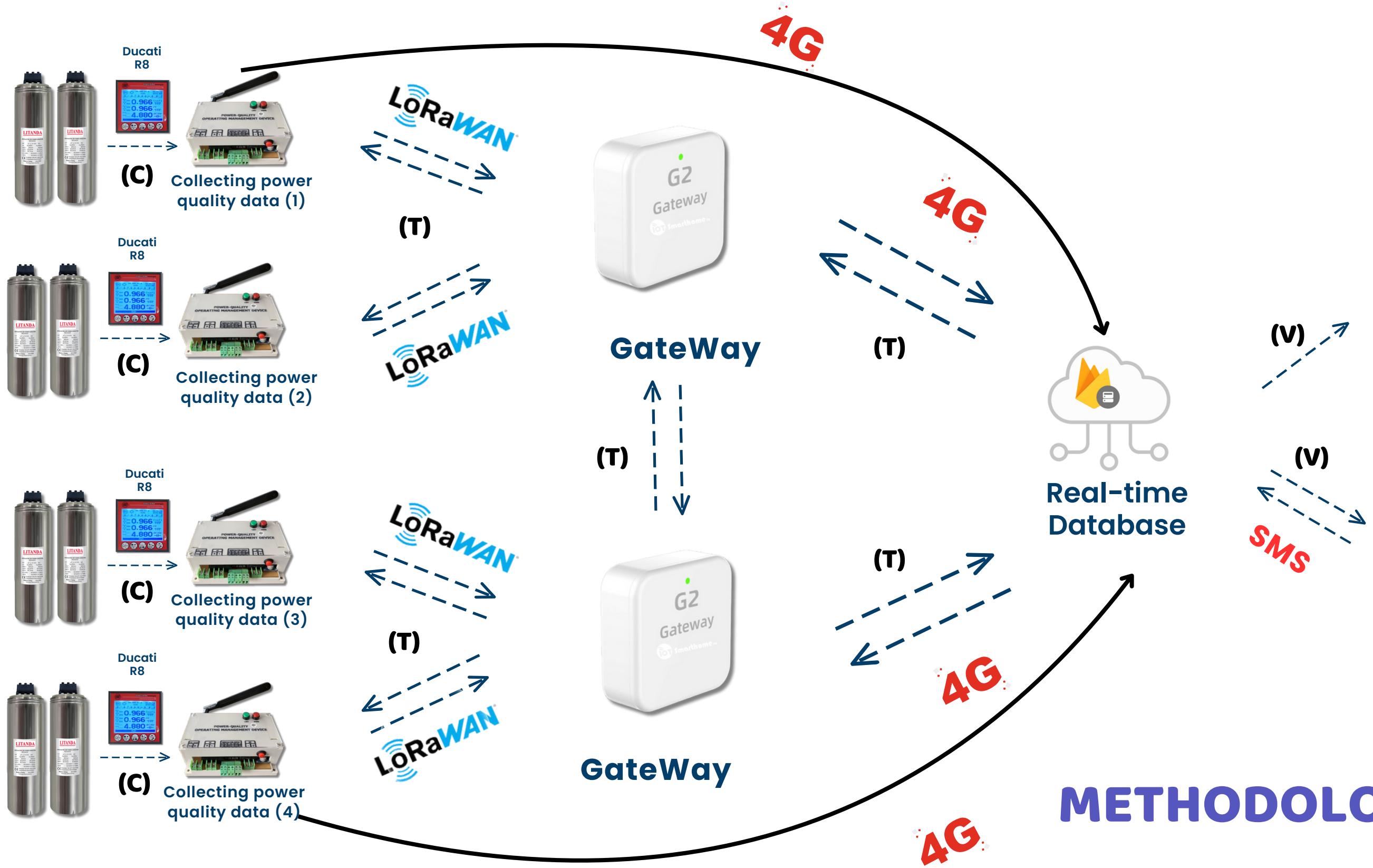
**Cumbersome  
Procedures**



**The current monitoring  
system can not detect  
abnormal status**

On-site examination



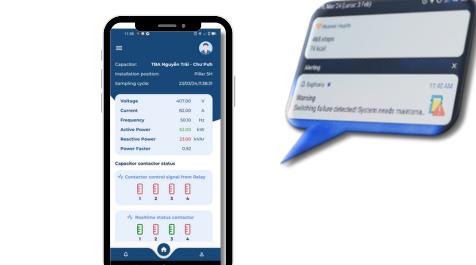


### Note:

- (C)**: Collection
- (T)**: Transmission
- (V)**: Visualization



Visualizing data



Warning notification

Introduce  
Web/App



## METHODOLOGY & SYSTEM DESIGN

## Interface monitoring program



**GATEWAY**

Date: 23/06/13

Details

Voltage	Frequency	Datetime	Current	CosFi	ActivePower	ReactivePower	StatusCap 1	StatusCap 2	StatusCap 3	StatusCap 4
23/06/13.00:00:04	225.00	50.20	0.00	20.00	0.00	0.00	null	null	null	null
23/06/13.00:10:05	223.00	49.90	0.00	20.00	0.00	0.00	null	null	null	null
23/06/13.00:20:05	224.00	50.00	0.00	20.00	0.00	0.00	null	null	null	null
23/06/13.00:30:04	224.00	50.00	0.00	20.00	0.00	0.00	null	null	null	null
23/06/13.00:40:06	225.00	50.10	0.00	20.00	0.00	0.00	null	null	null	null
23/06/13.00:50:06	225.00	50.20	0.00	20.00	0.00	0.00	null	null	null	null
23/06/13.01:00:06	225.00	50.20	0.00	20.00	0.00	0.00	null	null	null	null

Tabular data statistics

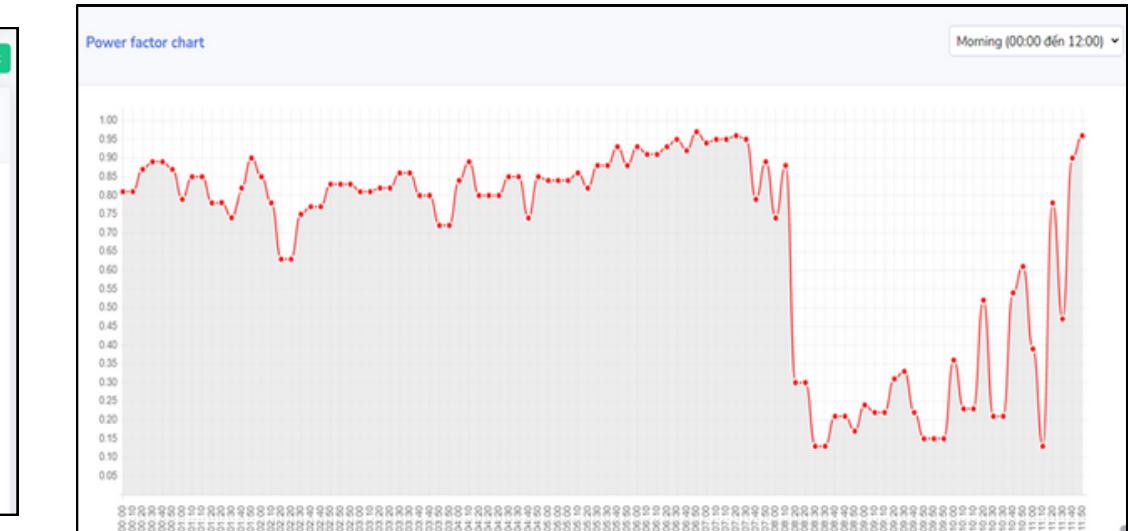
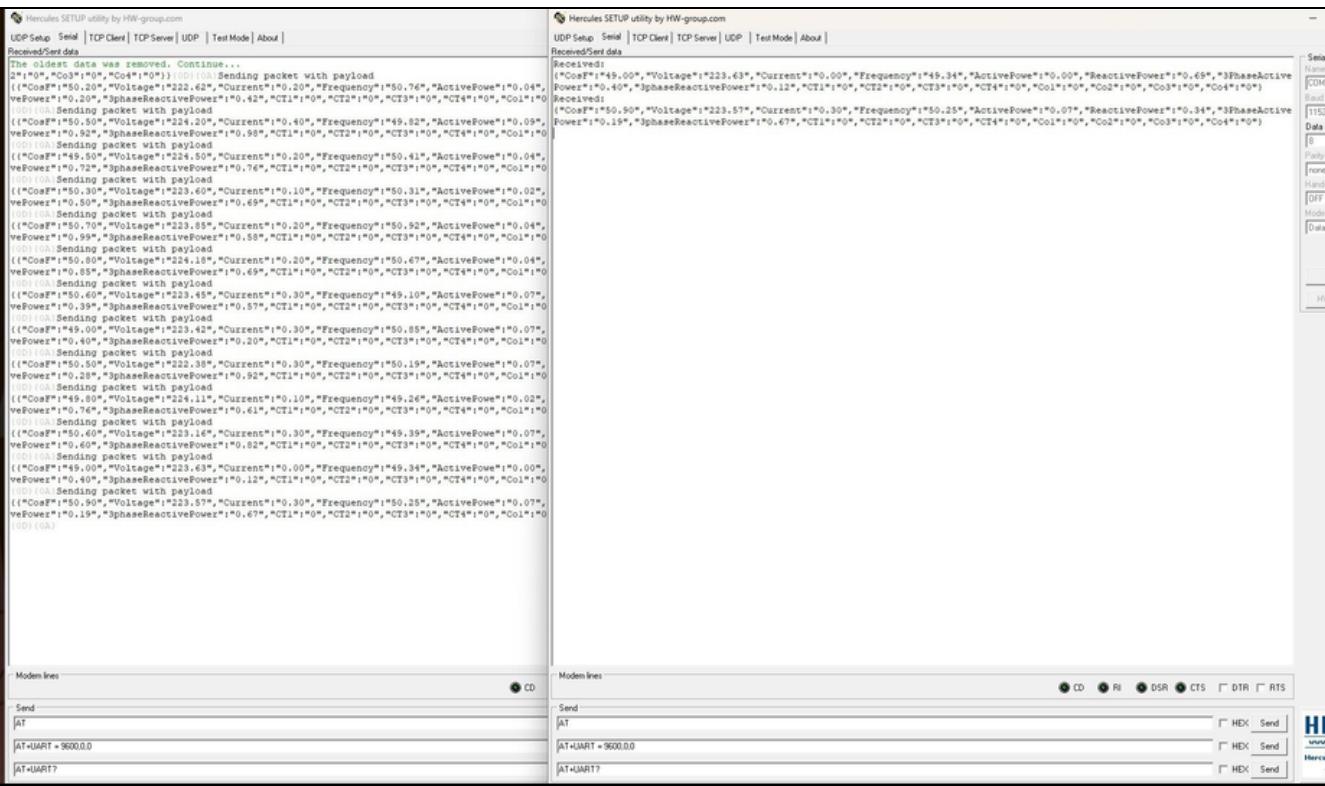
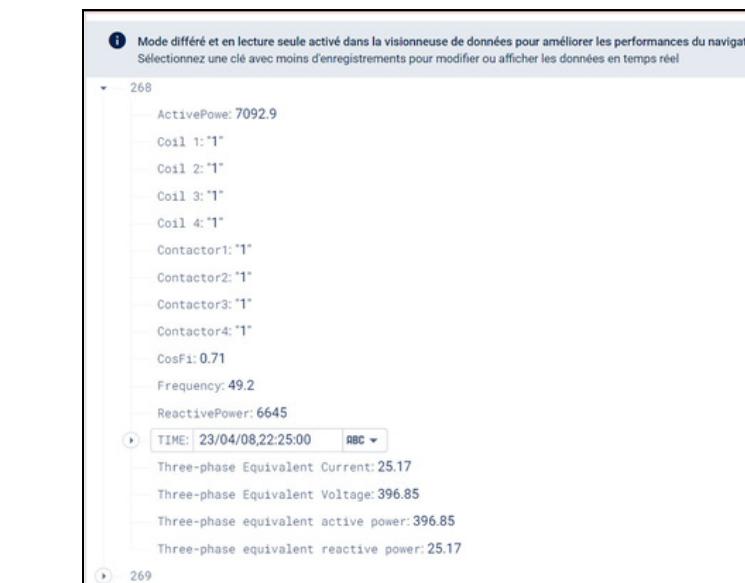


Chart data statistics



The screenshots show the Hercules SETUP utility interface. The left window shows serial communication with a modem line, displaying AT commands like "AT+UART = 3600.00" and "AT+UART?". The right window shows a log of network traffic, including sending and receiving packets with payload details such as voltage, frequency, current, and power values.



This screenshot shows the Hercules SETUP utility interface with a database connection. It displays various parameters and their values, including ActivePower: 7092.9, Coil 1: "1", Coil 2: "1", Coil 3: "1", Coil 4: "1", Contactor1: "1", Contactor2: "1", Contactor3: "1", Contactor4: "1", CosFi: 0.71, Frequency: 49.2, ReactivePower: 6645, and a timestamp of 23/04/08 22:25:00. It also lists three-phase equivalent values: Current: 25.17, Voltage: 396.85, active power: 396.85, and reactive power: 25.17.

Data push to database

Data communion with lora and push data to database

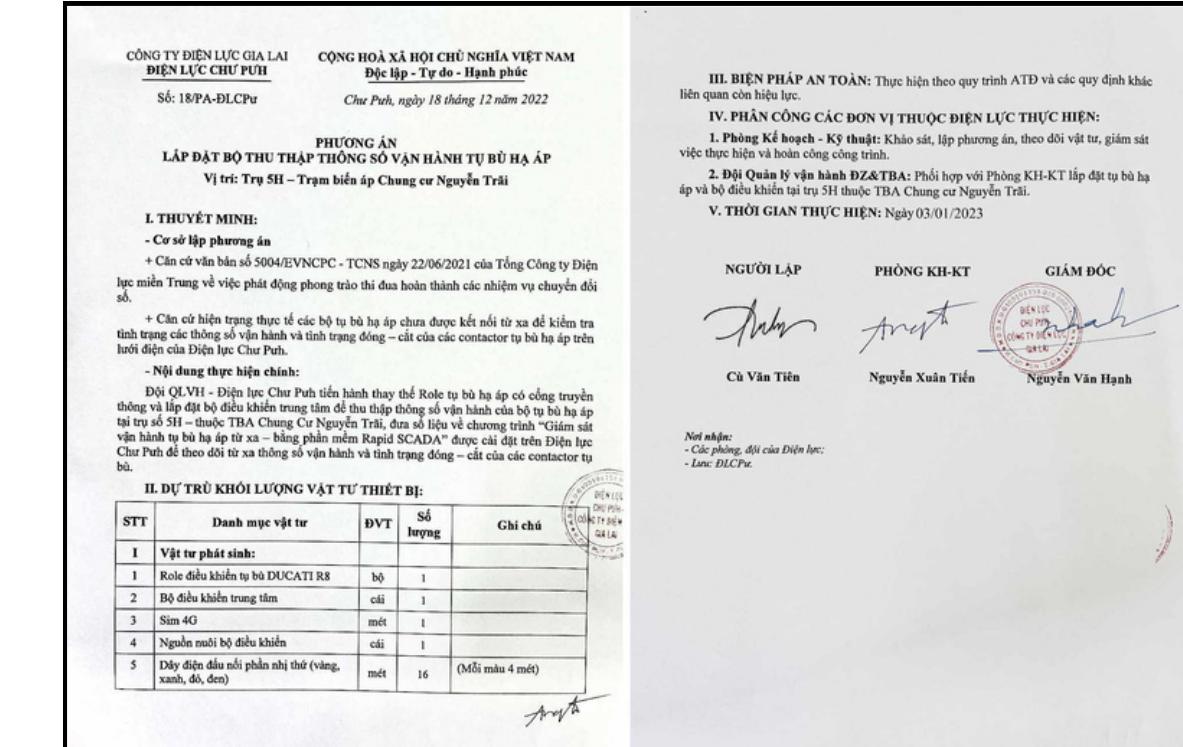


## Results gained and Feedbacks from customer

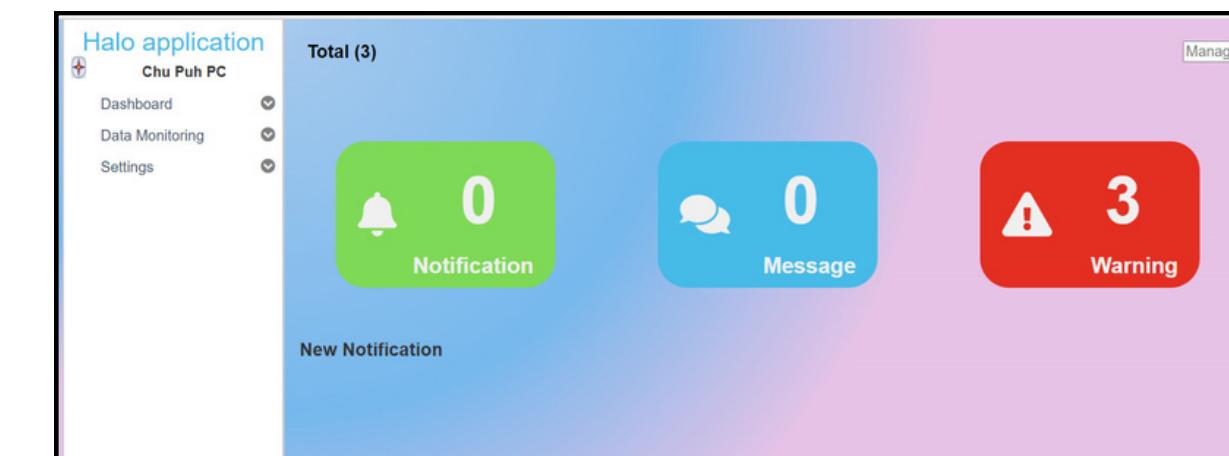
The power loss declines up to 14% of total power loss amount (from 3.5% to 3.02%)

Thanks to the new system, we've detected 3 times of abnormal status of the station timely

The workers are no more needed to go examining periodically cause now all is managed in real time remotely



## Certificate of successful installation and operation



Display of abnormal condition detection at Nguyen Trai station

## PRODUCT COMPARISON

	<b>Abnormal status detection</b>	<b>Old data synchronization</b>	<b>Ability to become a data center</b>	<b>Monitor transmission parameters via web, mobile app</b>	<b>Continuous operation and energy saving</b>
<b>CONTROL DEVICE SPFC03 (2018)</b>	✗	✗	✗	✗	✓
<b>CAPACITOR CURRENT MONITORING DEVICE (2016)</b>	✗	✗	✗	✗	✓
<b>MODULE ARP 600 (ABB)</b>	✗	✓	✗	✓	✓
<b>OUR DEVICE</b>	✓	✓	✓	✓	✓



**CONTROL  
DEVICE SPFC03  
(2018)**



**CAPACITOR  
CURRENT  
MONITORING  
DEVICE (2016)**



**MODULE ARP  
600 (ABB)**



**OUR DEVICE**

## REVENUE FROM SELLING

**COST: 450 USD**

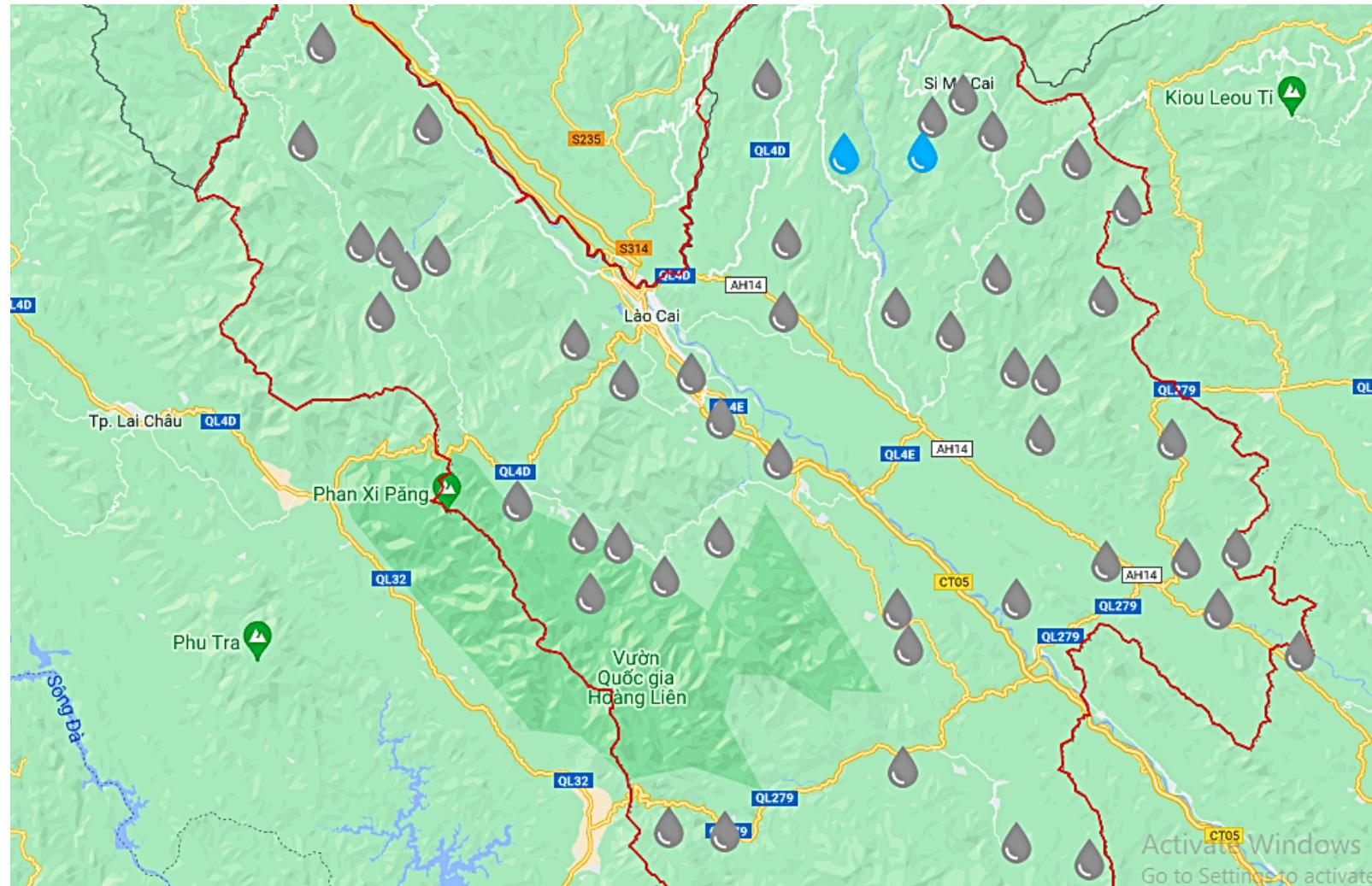


- 01** Cost-Plus Pricing Strategy
- 02** Value-Based Pricing Strategy

**For Chu Puh PC:  
payback after 3.5 months**



# STATISTICS ON THE NUMBER OF POWER QUALITY MANAGEMENT STATIONS



<b>Viet Nam</b>	<b>105.000</b>
<b>Gia Lai Province</b>	<b>5.500</b>
<b>Chu Puh District</b>	<b>47</b>

*According to EVN (2022)*

## TARGET CUSTOMER



**EVN**



## MANUFACTURING ENTERPRISES



Preventing businesses from incurring  
reactive power penalties from EVN



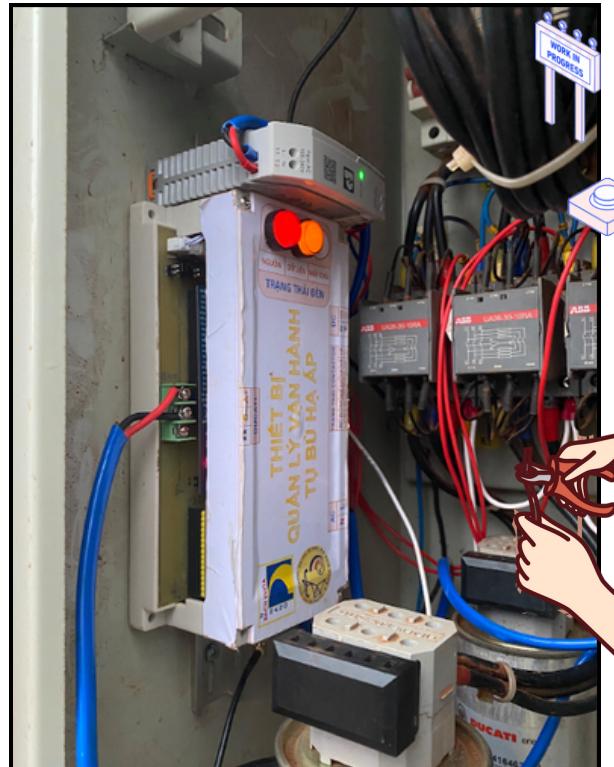
Ability to save more than 33.000 USD  
per year in Chu Puh district



Helping manufacturing enterprises save 15%  
on their electricity bills each month.



# MARKETING PLAN



Deployed successfully



Direct sales



Expanding market



Future work: Integrating AIoT





## Meet Our Team



Tien Luu Manh



Phong Nguyen Tuan



Tham Nguyen Thi Hong



Trung Dang Van

# THANK YOU !!!