

# Energy Harvesting Temperature Sensor & Monitoring

## PRODUCT

BTH250 | CTH010 | Transceiver



# Company History



**POSCO** Research Center Distribution panel

Nov **2019**

**KEPCO** Youngheung Thermal Power Plant  
6.6KV high voltage distribution board

Apr

**KEPCO** Jinju Transforming Station 154KV  
Transforming Bushing Lead-in Busbar  
Unmanned Transforming Station Power line

Mar

**LS Cable & System**

Feb

Donghai Plant Busduct - System

"Self-Generation Wireless Temperature Diagnosis System" Joint Development of Prototypes with **KERI**

Feb **2017**

**2020**

Sep **Hyundai-steel** 154KV Main VCB / TR Panel  
100Ton Steelmaking Plant 3.3KV TR

Aug **Pukyong National University**  
"Baik-Kyung-Ho" Hands-on Ship MSBD Panel

Jun **Korea Procurement Service**  
Product Registration

May **Hyundai-steel** Product Registration

Apr **KT** Yeouido IDC Low Voltage Distribution Panel

Feb **Kwater** Bucsan Purification Mold TR Panel

Jan **KT** Kangnam IDC Low Voltage Distribution Panel

**2018**

Sep Technology Transfer Agreement with KERI  
"Self-Generation Wireless Temperature Diagnosis System"

Aug **L-signature Co., Ltd** Establishment

# Development Background

## Electrical Facilities Temperature Monitoring and Management – Switchgear, MCC, Power Transformer, Panel board, Bus-duct, Power Cable etc

**Current Measuring Method** – Measuring bus bar and cable temperature with thermal camera  
– Not accessible for blind spot



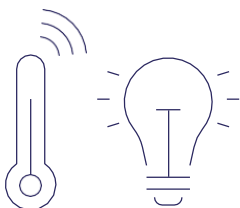
**Disadvantage**

- Unable to monitor real-time temperature
- Unable to acquire periodical temperature data
- Unable to measure conductor temperature without opening the door
- Limited access to high elevation cable tray , Bus-duct or confined space
- High Risk of shut down by sudden Electrical Accident

**Safety Issue** – Risk of electric shock during temperature measurement with door opening



## Improve

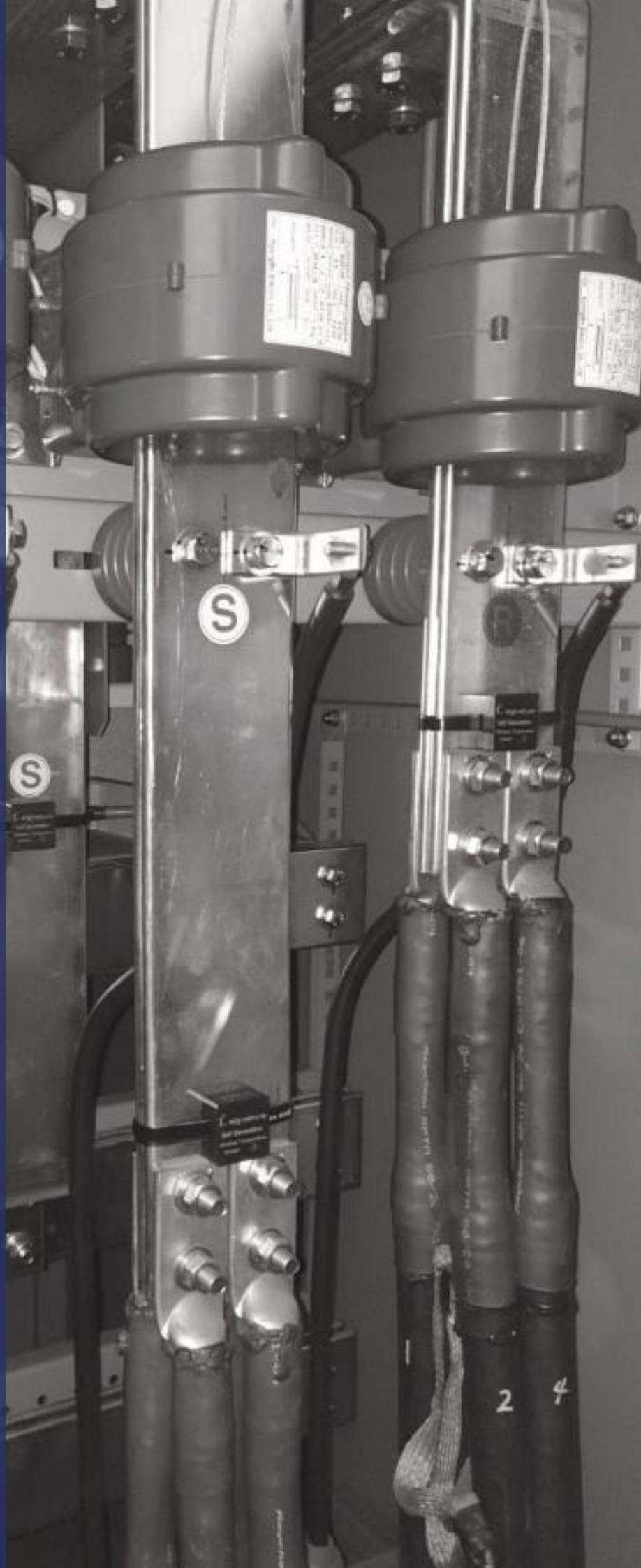


- ✓ 24 hours and semi-permanent monitoring by Self-energy harvesting
- ✓ Securing insulation safety through a wireless communication technology
- ✓ Reliable temperature measurement with contact-type temperature sensor
- ✓ No blind spots and 100% accessibility
- ✓ Ensuring Safety with no door opening maintenance
- ✓ Accumulating big data of digital temperature record on all electrical facilities
- ✓ Predicting the replacement timing of electric facilities by using big data
- ✓ Preventing Electrical accident or shut down by advanced action



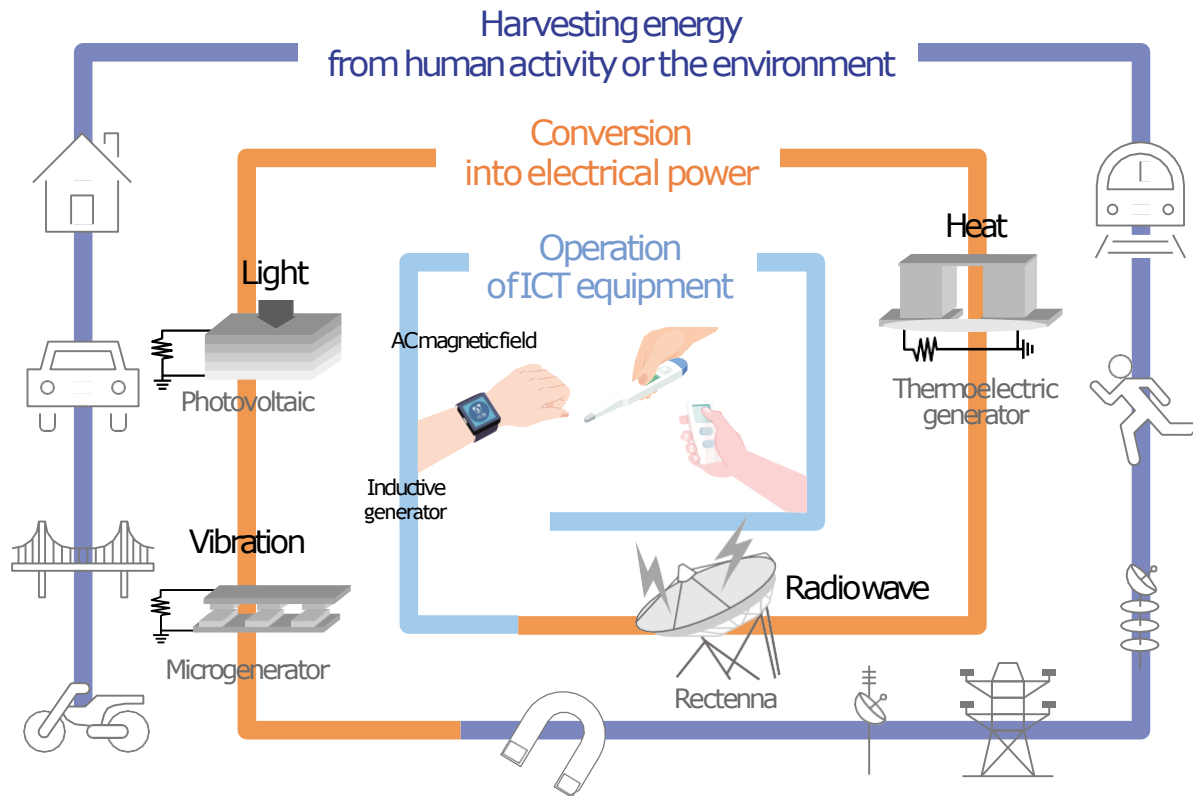
# *PRODUCT*

Energy Harvesting?  
BTH250 (Clamp Type)  
CTH010 (Band Type)  
Transceiver  
Under Development



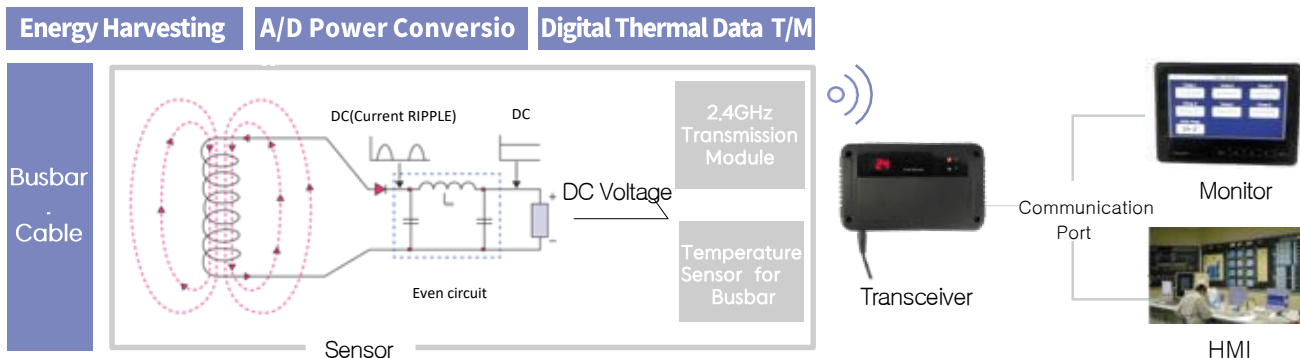
# Energy Harvesting?

Energy harvesting refers to a technology that collects energy from energy sources that have been abandoned in nature, such as solar, vibration, heat, wind, and magnetic fields, and converts them into usable electrical energy.



## Self-Generating Wireless Temperature Sensor & Monitoring

- **Energy Harvesting** : Use of magnetic induction coil to collect stray magnetic fields around bus-bar / cable to generate A/C voltage
- **A/D Power Conversion** : Supply operating power to temperature sensor and wireless transmission module
- **Wireless Temperature Transceiving** : Transmit temperature from sensors to indicators



# Products

## BTH250



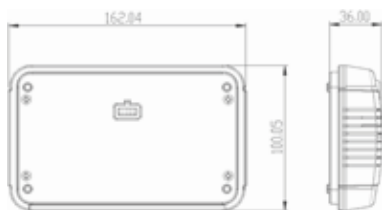
Min current	50A
Dimensions	W52 x D47 x H29
Weight	150g
Housing	Plastic, Non-conductive, Non-Flammable
Installation by	High elastic clamp
Applicable for	Bus-bar (Width 50mm ~ 150mm)
Sensor Type	Contactable semiconductor type
Frequency	2.4 GHz ISM band
Range	-20 ~ 200 °C
Transmission distance	10m ~ 15m (wireless)
Transmission cycle	4 Sec

## CTH010



Min current	5A
Dimensions	W36 x D36 x H16
Weight	35g
Housing	Plastic, Non-conductive, Non-Flammable
Installation by	Bandage with removable stainless steel band
Applicable for	Bus-bar width 100mm max or Cable diameter 12mm min
Sensor Type	Contactable semiconductor type
Frequency	2.4 GHz ISM band
Range	-20 ~ 200 °C
Transmission distance	10m ~ 15m (wireless)
Transmission cycle	4 Sec

## Transceiver



Number of Sensor Allowable	30 sensor max
Number of wireless Channels	40 Channels
Wireless Reliability	Scheduling and Channel hopping support
Receiving Frequency	2.4 GHz ISM band
Receiving Distance	10m ~ 15m (Wireless)
Temperature measurement method	Semiconductor Type
Temperature measurement Scope	-20 ~ 200 °C
External communication support	RS-232 x 1 port
	RS-422 x 1 port
	RS-485 (MODBUS-RTU) x 1 port
	Ethernet (MODBUS-TCP) x 1 port
Dimensions	W162.3 x D100.3 x H36
Weight	220g
Housing	ABS Plastic
Fixing method	Direct Fastening (Screw)
Power	DC 12V, 1.5A

## Under Development

### LORA Type Sensor



Housing	Plastic, Non-conductive, Non-Flammable
Sensor	backside of housing with contact to busbar
Range	-20°C~200°C
Transmission distance	100m ~ 200m (wireless)
Transmit frequency	2.4GHz ISM band
Transmission cycle	4 Sec
Communication method	Star or Mesh Type

### LTE Transceiver



Allowable Sensors	30 sensor max
Wireless Channels	40 Channels
Wireless Reliability	Scheduling and Channel hopping support
Receiving Frequency	2.4 GHz ISM band, LTE
External communication support	RS-485(MODBUS-TCP) x 1Port
Transmission distance	LTE possible range
Option	Mobile App



01



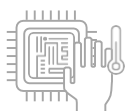
Powered by self-Generating Energy harvesting and with no external power supply required

02



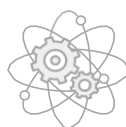
Securing insulation safety with no signal wire and by wireless 2.4GHZ communication technology

03



Reliable temperature measurement with direct contact type of temperature sensor

04



System can be implemented without additional construct on existing electric facilities

05



Advanced technology applied in Sensor to avoid electromagnetic interference even in high voltage environment

06



Maintenance performance enhance and Predictable for replacement timing of Electrical facility by acquiring huge digital data of temperature

07



Prevention of electrical accident with real-time temperature monitoring

08



Temperature measurement without opening door of electric equipment and Facilities located at difficult accessibility

09



Support for on-site customized product development by applying source technology

10

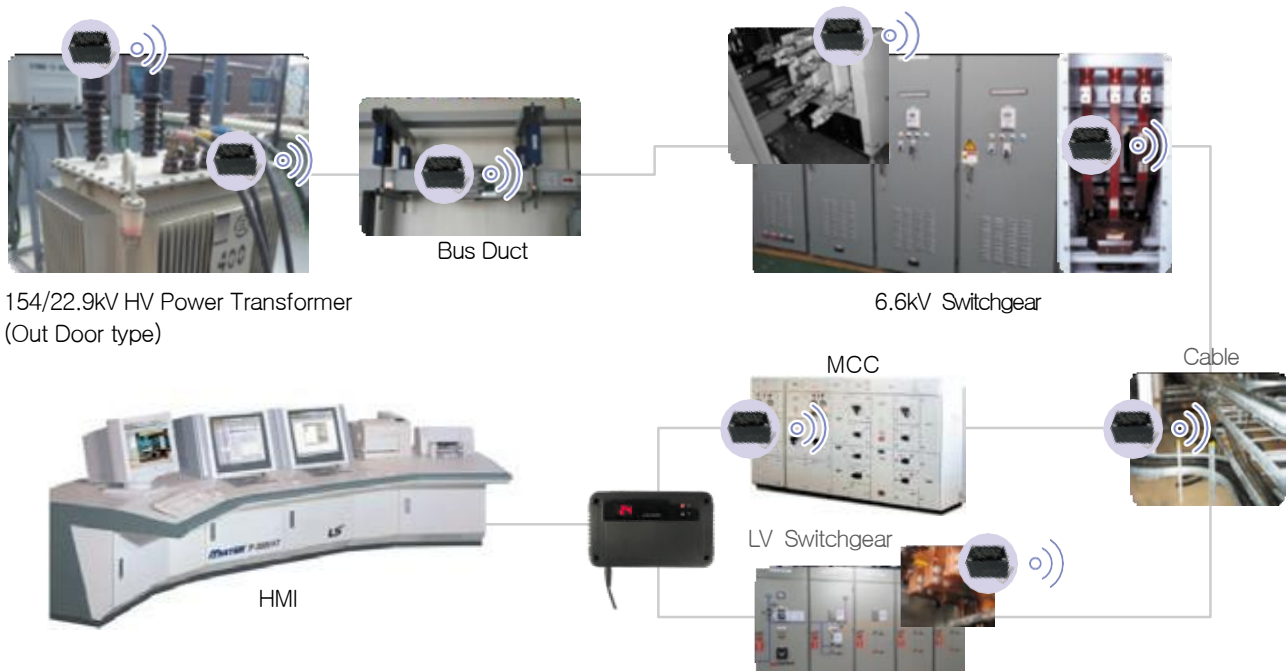


Rapid Customer Service

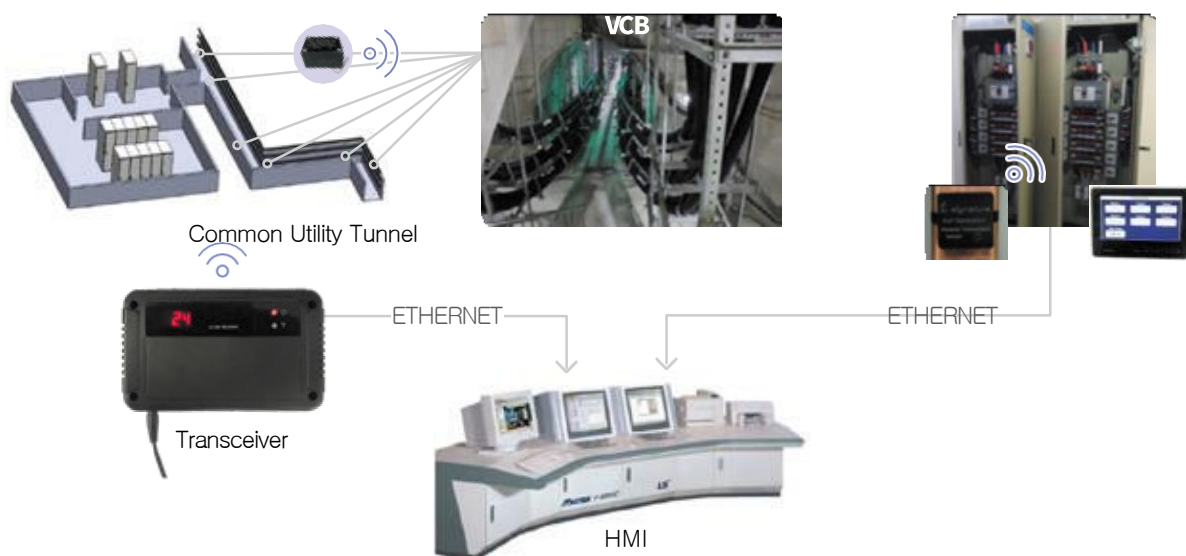


# APPLICATION

## Electric Facility

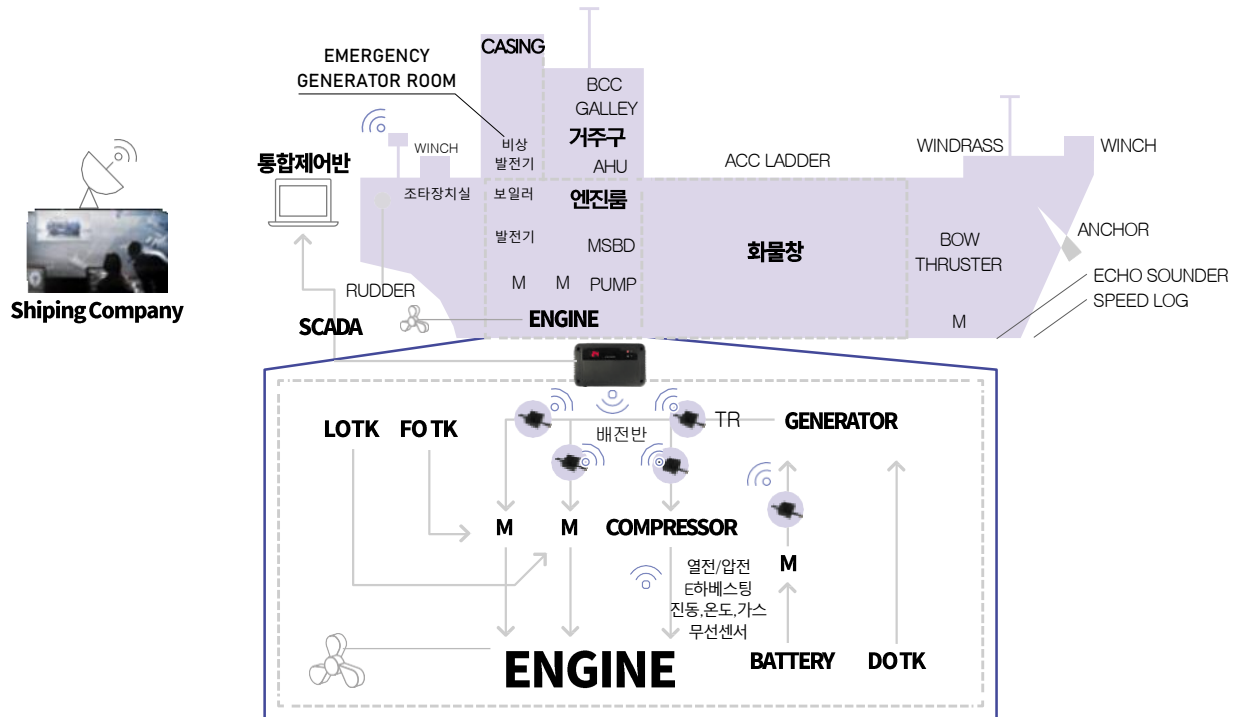


## Common Utility Tunnel





## Vessel



## ESS Room



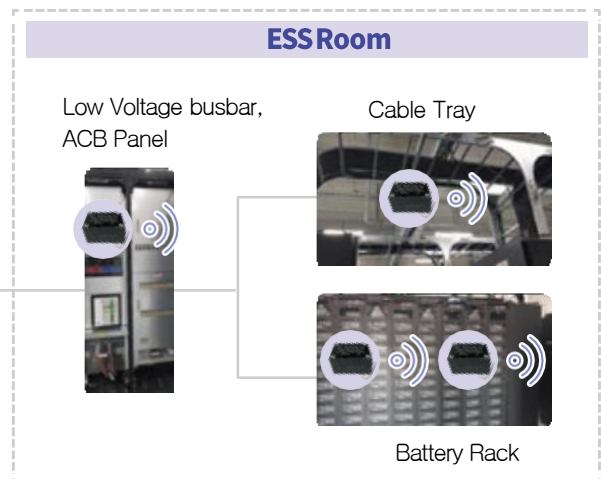
Bus Duct



High Votage T/R, VCB Panel



Cable Tray

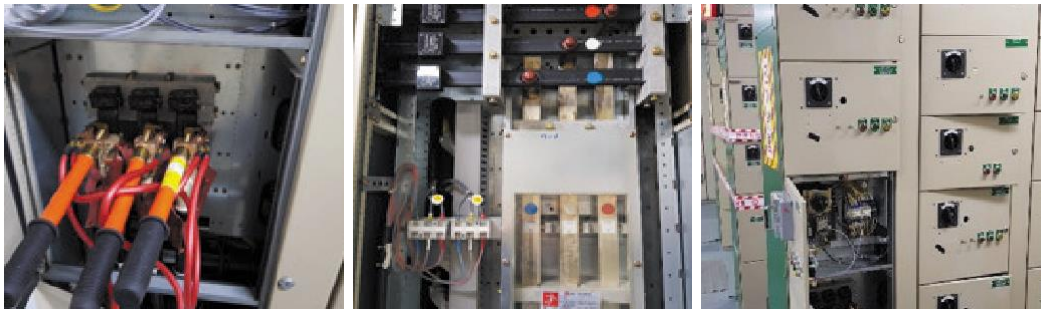


# PERFORMANCE

## Power Facility



KEPCO Jinju Trasforming Station 154 KV T/R Bushing, Lead-in Busbar, Unmanned Transforming Station Power line



KEPCO Youngheung Thermal Power Plant 6.6KV High Voltage Pannel

## Telecom



KT Kangnam IDC, KTYeouido IDC Low Voltage Panel



# PERFORMANCE

## Ship Building



**HHI** – Ulsan Plating Plant MCCB



**Pukyong National University “Baik-Kyung-Ho” MSBD**

## Water Supplier



**Kwater** Ducsan Purification MOLD TR Panel



# PERFORMANCE

## Production Facility



**LS Cable & System** Donghai Plant Busduct



**Hyundai Steel** 154 KV Main VCB Panel, 33000V ACB Panel

## Others

Client	Reference	
Kwangmyung Electric	Smart Switch Gear	
Hyundai Electric	Sun-am Plant Factory	SK Hynix, KCC
Samsung Display	Test Bed	AI Box
POSCO	Po-hang Research Institute	





