LossPro

Solution for Power Loss Reduction

AI-based Metering System(Meter & CT/PT)
Fault Detector

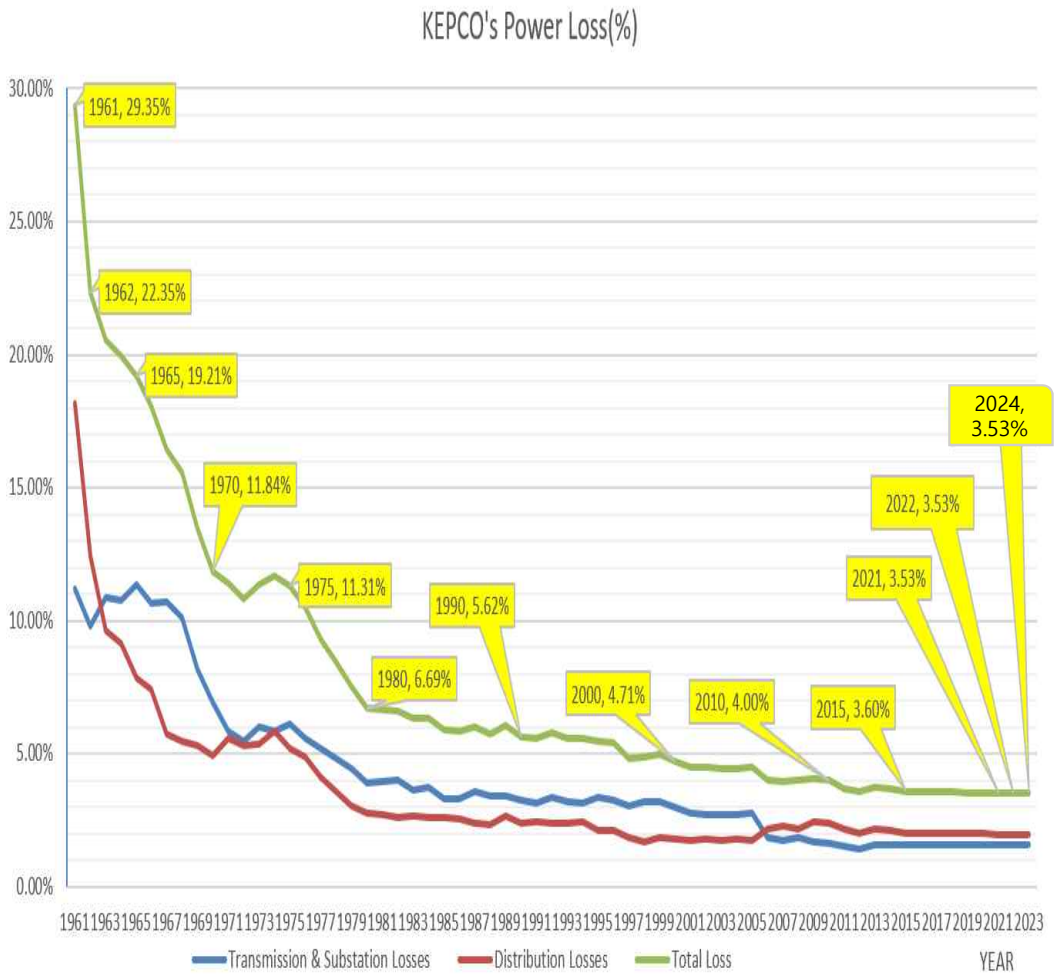
1 Power Loss – Power Losses in Korea

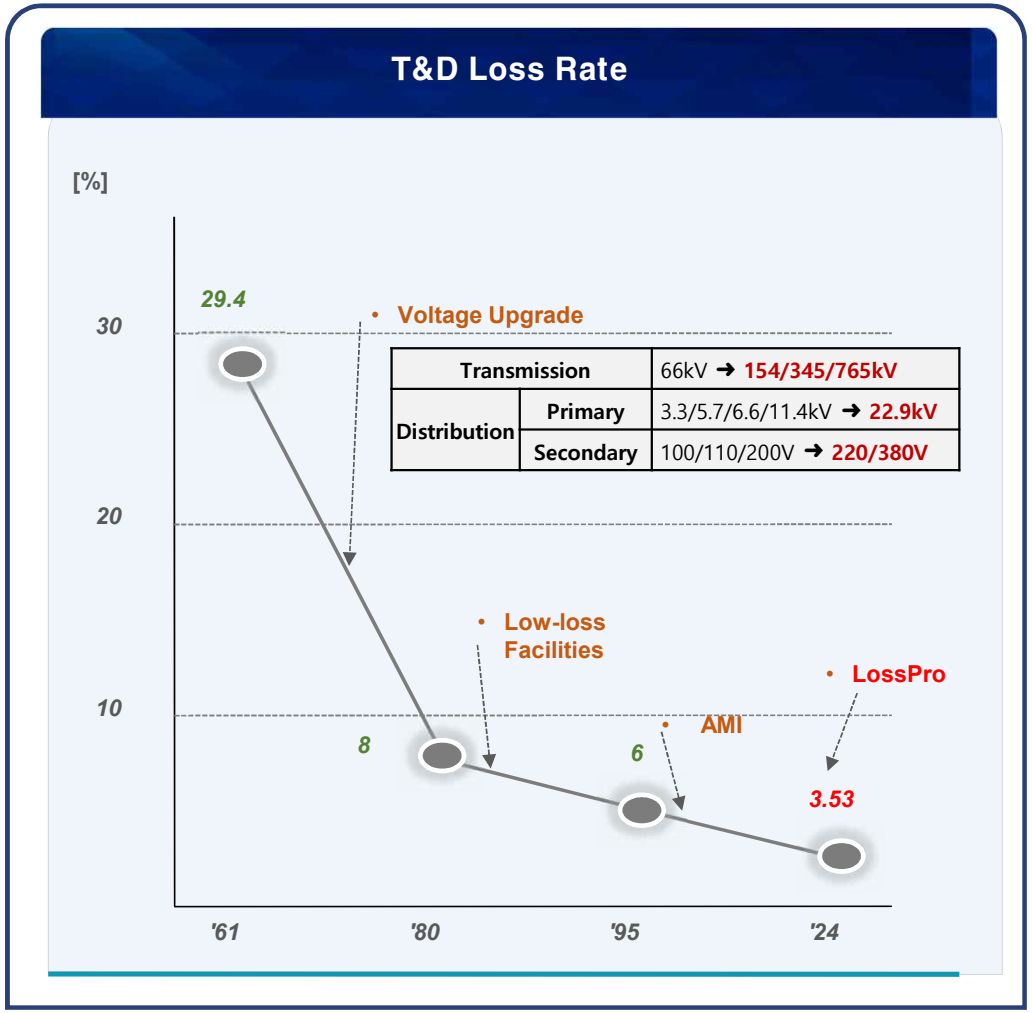
KOREA

Annual power generation :	600 TWh
Loss of power during transmission and distribution:	3.5%

Reducing just 1%p of annual Power loss(6TWh)
= 1 Thermal plant's Generation = USD 70mil saved per year

1 Power Loss – Power Losses in Korea

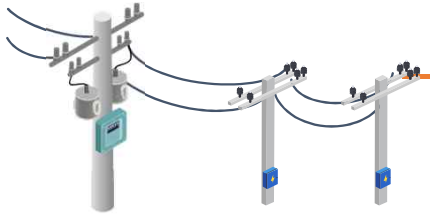




1 Power Loss – KEPCO's Efforts to Reduce Power Loss

	Technical Loss	Non-technical Losses	
Cause	Heat Dissipation (P loss= $3I^2RL\cos\theta$)	Pilferage	Metering Error
Solution	Voltage Upgrade (22/14/6.6/3.3⇒22.9[kV])	Incentive & Penalty by government	Fix Watt Hour Meter & Wiring Error
	DAS (Distribution Automation System)	Dedicated Team for Pilferage detection	Fix CT malfunctions & wrong Multiples
	Power Factor Improvements (PF based tariff, Time-of-Use tariff)		
	Conductor Upgrade Highly efficient equipment		
	Costly & long-term	**Practically Impossible** And needs national-level Economic growth	LossPro **The most cost-effective** Tackling the metering error is the most effective solution

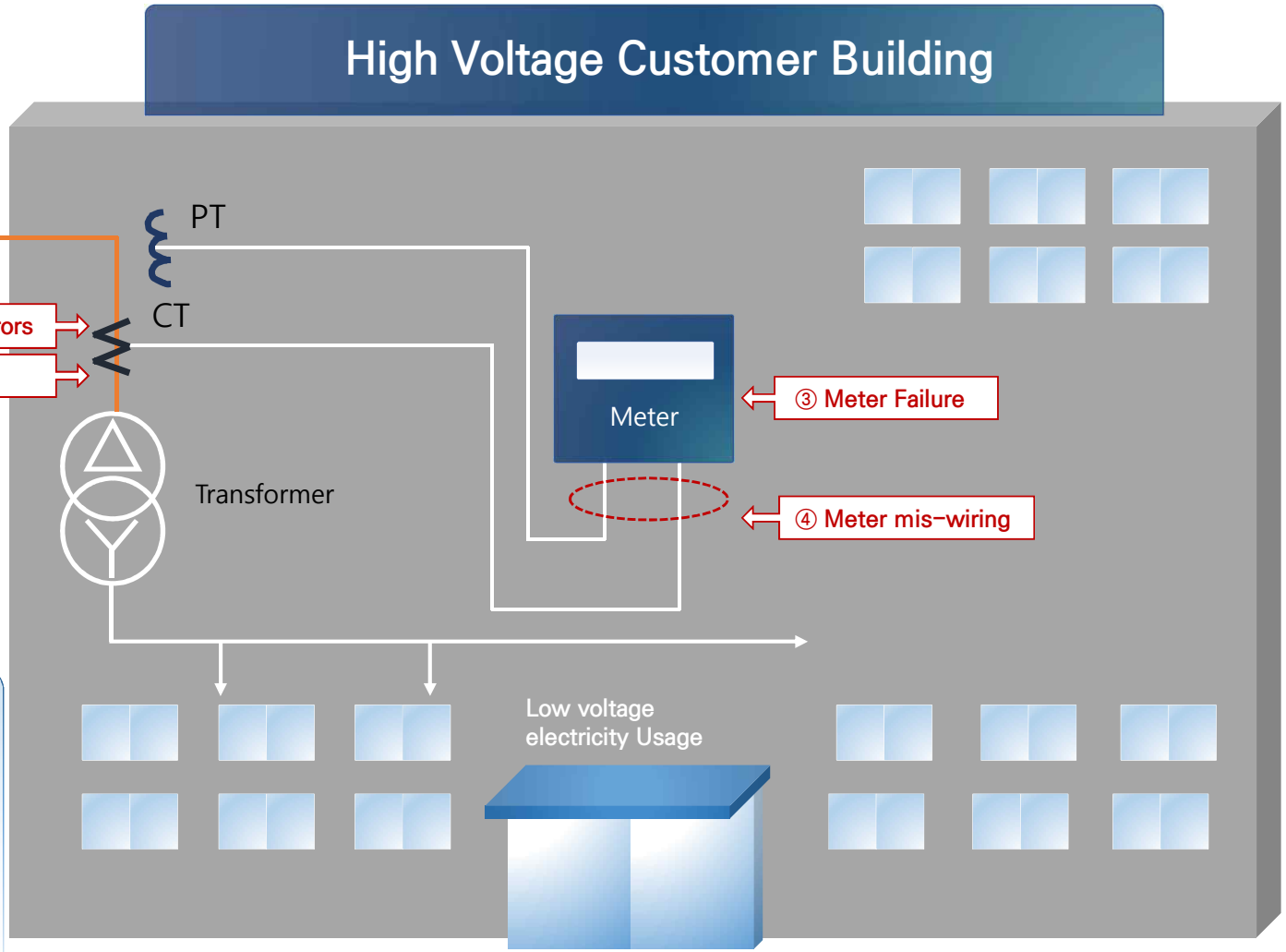
2 Metering Error – Configuration Diagram of High Voltage Customer Receiving Panel



3 phase 23kV

Utility Side (KEPCO Side)

Customer Side



Total electricity customers in Korea: 24 million
High-voltage customers: 240,000 (1%)

High-voltage customers account for over 70% of total power consumption (approx. 400 TWh).

By managing metering errors of bulk customers, KEPCO can achieve a significant reduction in power loss.

→ The most Complete Solution for power loss reduction

3 Power Loss – Metering Error Diagnosis Process

Diagnosis Process

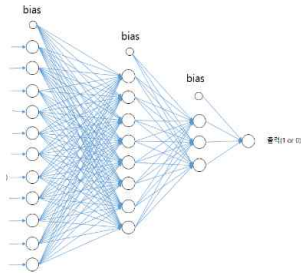
01 AI Engine Analysis

02 On-site Testing with 3 Diagnostic Devices

03 Calculating Un-paid Electricity Charges

Step 1 AI Engine Analysis (Algorithm Analysis)

- Selecting customers expected to have CT/PT failure



Step 2

1. Portable CT tester
2. Portable multi-functional tester- I
3. Portable multi-functional tester-II

- Testing CT/PT under live conditions is possible without the need for power outage

Step 3 Instrument for calculating un-paid electricity charges

- Testing CT/PT under power-outrage(offline)

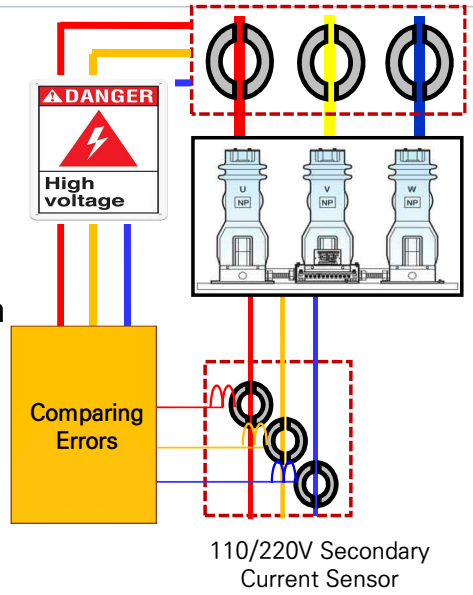
3 Power Loss – Metering Error Diagnosis Process

As-Is

(Korea)

· **Very Dangerous**
· Now banned in Korea

· Directly installing comparing CT on High Voltage conductor line



(Other Country)

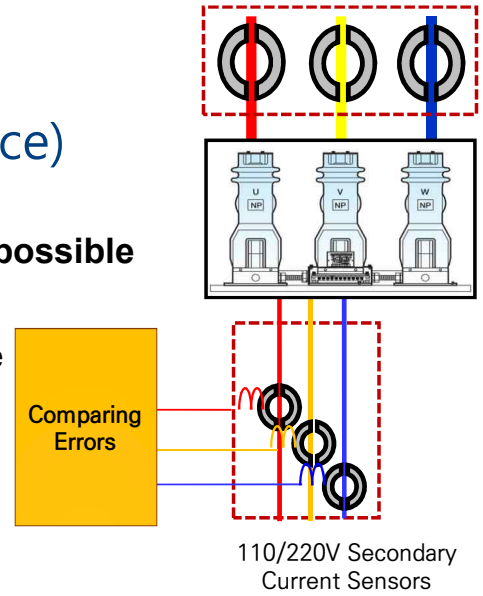
· Inspection under **power outage condition**
· Inspection **without power supply**
→ power outage, long duration
→ customer inconvenience

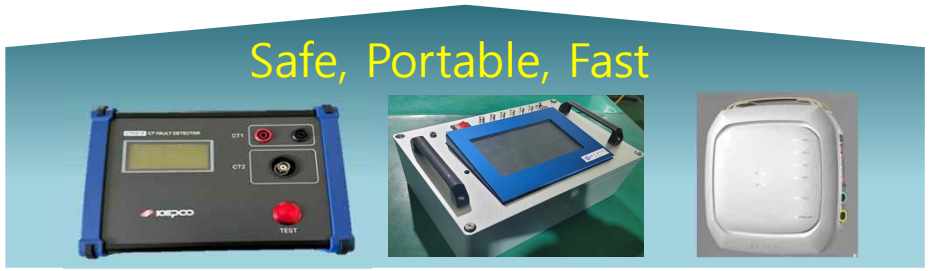
To-Be

(LossPro Device)

· **Very Safe**
· **Live-line work is possible**

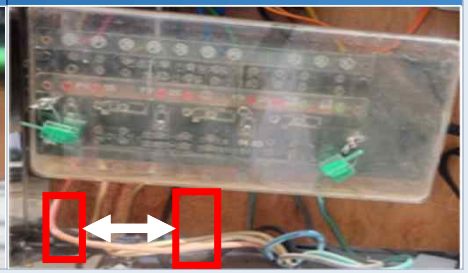
· only need to test on the low-voltage side of the CT





4 LossPro – Korea Field Cases

1 Miswiring

Customer ID	Customer	Contract Capacity	Energization Date	Suspicion type	On-site confirmation	On-site verification	On-site verification
0227262681	SAMSIBG	250kW	'18.11.11	Miswiring	Phase sequence B→A (Correct : ABC → Wrong : ACB)		

2 Abnormal Voltage

Customer ID	Customer	Contract Capacity	Energization Date	Suspicion type	On-site confirmation	On-site verification	On-site verification
0255565554	Admin	750kW	'16. 4.18	Abnormal Voltage	Low voltage detected		

4 LossPro – Korea Field Cases

3 CT Defect

Customer ID	Customer	Contract Capacity	Energization Date	Suspicion type	On-site confirmation	LossPro 1 Diagnosis: Defect	LossPro 2 Diagnosis: CT defect	Note: Low-metering on 2 phases due to CT defect
0343869521	Eko dream	500kW	'14. 5.10	CT defect	A, B phase CT defect			

4 Connection Defect

Customer ID	Customer	Contract Capacity	Energization Date	Suspicion type	On-site confirmation	On-site verification	Note: Low-metering due to TTB defect
0322074410	Green Special Industry	400kW	'12. 5.10	Low-metering (A, C phase)	A, C phase TTB **(Test Terminal Block)** connection defect		

4 LossPro – Indonesia Field Cases

REVIEW

Date / Place	July 29, 2025 (Thu), 09:00 – 18:00 / Jakarta
Inspection target	3 suspicious customers
Method	On-site inspection of suspicious customers and diagnosis using LossPro

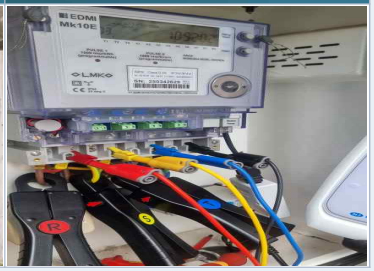
❶ PLN provided **1,770 AMI** data samples → ❷ **23 suspicious customers** identified by AI engine → ❸ **3 customers** selected for priority on-site diagnosis → ❹ **100%** meter faults **detected**

Results **100% Meter Faults Detected (Proven with High Accuracy)**

- Miswiring (1 case)
- Abnormal voltage (1 case)
- CT defect (1 case)

4 LossPro – Indonesia Field Cases

1 Miswiring

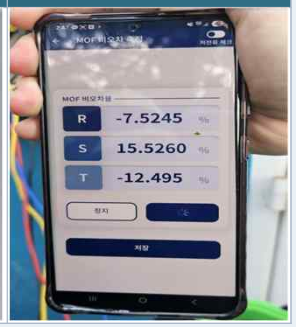
Customer ID	Customer	Contract Capacity	Energization Date	Suspicion type	On-site confirmation	On-site verification	On-site verification
541100447712	*****	****	'15.12.11	A phase → C phase miswiring	A → B → C phase misconnection detected (Correct: ABC → Wrong: CAB)		

2 Abnormal Voltage

Customer ID	Customer	Contract Capacity	Energization Date	Suspicion type	On-site confirmation	On-site verification	On-site verification
541102607992	*****	***	'14. 3.18	Overvoltage on C phase	C phase abnormal voltage 64V (Standard: 50V)		

4 LossPro – Indonesia Field Cases

3 CT Defect

Customer ID	Customer	Contract Capacity	Energization Date	Suspicion type	On-site confirmation	On-site verification	LossPro 1 Diagnosis: Defect	LossPro 2 Diagnosis: CT defect
541104048927	******	****	'12. 5.10	CT defect	phase CT defect			

5 Request & Plan

1. Please provide 5 sample sets of raw AMI data for our preliminary review.
   - period : Last 7days / Target : High Voltage or Medium Voltage customers
2. If you could then provide 3,000 AMI data sets, we will conduct an analysis on them.
   - period : Last 7days / Target : High Voltage or Medium Voltage customers
3. We can also conduct site demonstration of our metering solutions.

In Korea, we have 240,000 customers of high voltage level
Our solution has delivered minimum **USD 240 million** in annual cost savings and revenue increase

How do you currently manage your metering system?

Now, It's your turn!

KEPCO's LossPro & AMI

THANK YOU