LPU METER MANAGEMENT

KOBUS VAN DEN BERG (PR ENG)

SARPA ONLINE CONVENTION

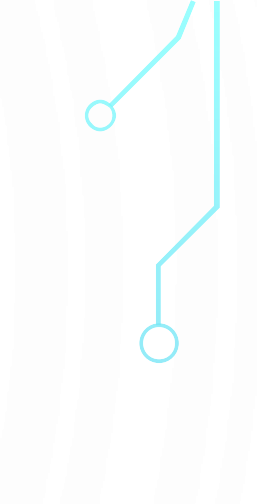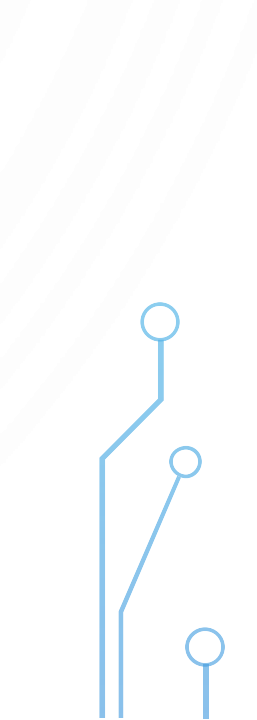### MARCH 2021

OVERVIEW

- Introduction

- Municipal Electricity Trading

- Management processes
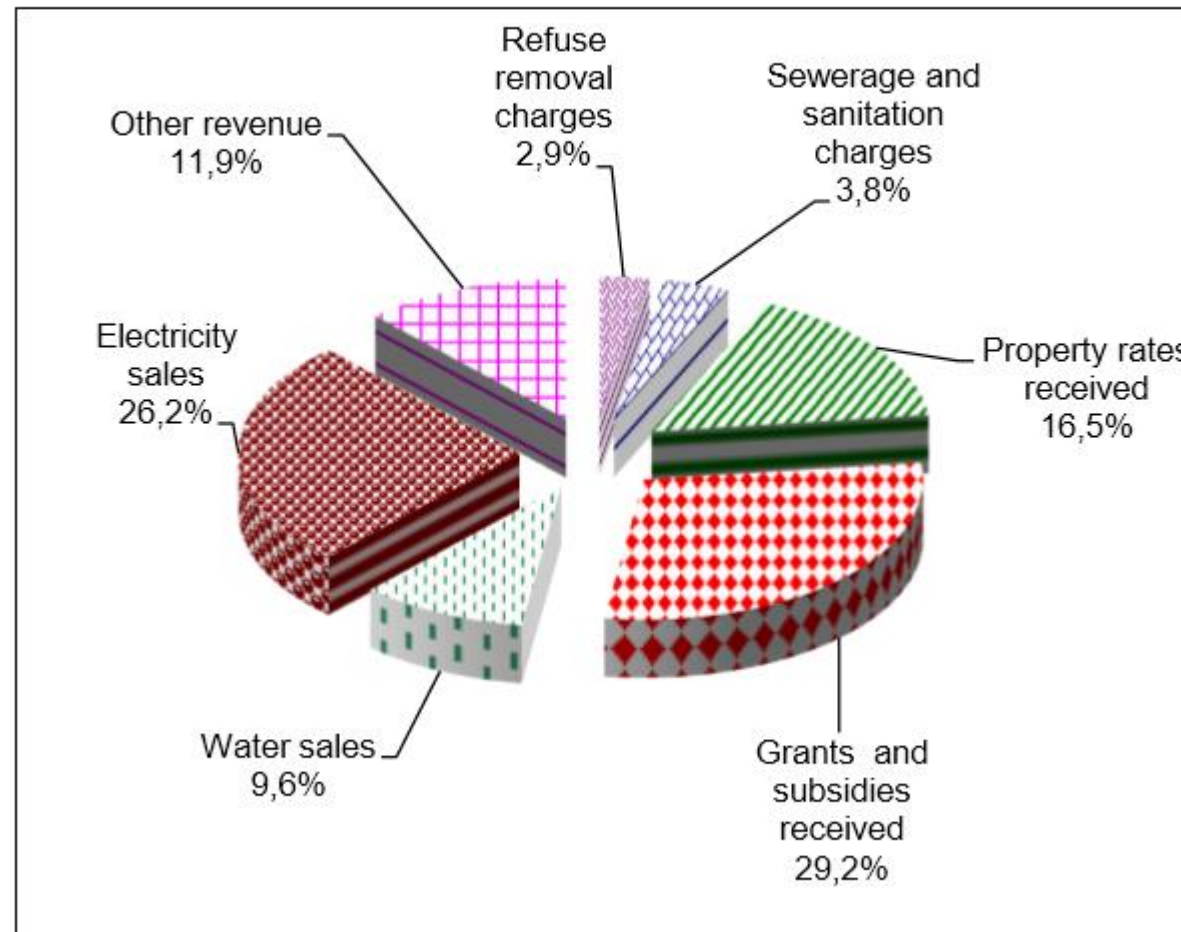
- Examples of LPU losses

- Conclusion.

INTRODUCTION

- In South Africa electricity distribution utilities, apart from Eskom, belongs to Municipalities.

- As shown in the next slide 26.2 % of municipal revenue originates from electricity sales

- If one analyses the revenue from Large Power Users it normally contributes about 60 to 65% of the municipal utility revenue.

- To manage the revenue streams effectively is essential

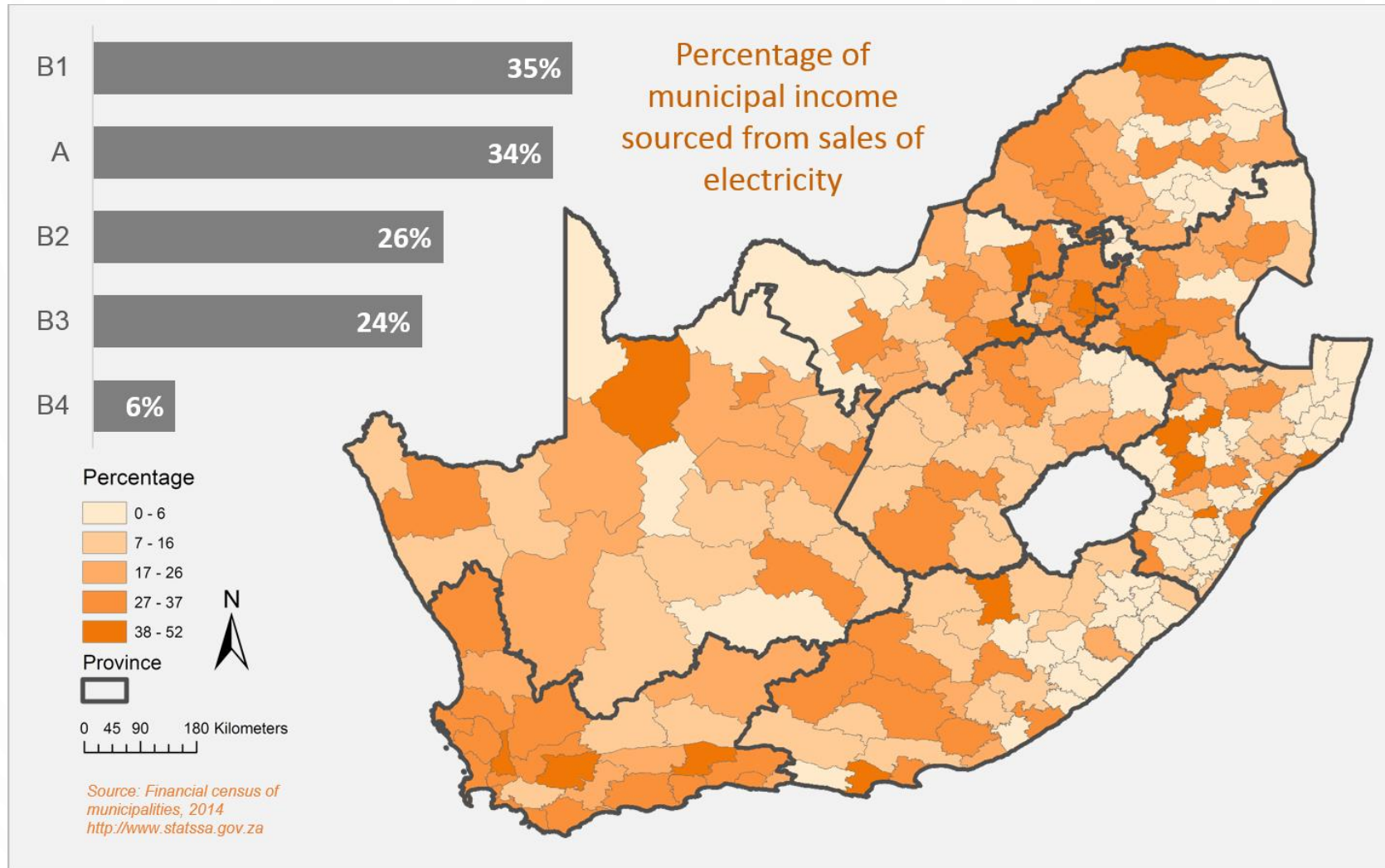- Municipal Electricity trading figures are shown in next slide.

LOCAL GOVT REVENUE
STATSSA REPORT P9114/ 2019

Figure B: Municipal revenue stream as a percentage of total revenue for the year ended 30 June 2019[¹]

Refuse removal charges 2,9%

Sewerage and sanitation charges 3,8%

Other revenue 11,9%

Electricity sales 26,2%

Property rates received 16,5%

Water sales 9,6%

Grants and subsidies received 29,2%

[¹]The sum of percentages might not add up to 100% due to rounding off of figures.

ELECTRICITY REVENUE

B1 35%
A 34%
B2 26%
B3 24%
B4 6%

Percentage of municipal income sourced from sales of electricity

Percentage
0 - 6
7 - 16
17 - 26
27 - 37
38 - 52

Province

N

0 45 90   180 Kilometers

Source: Financial census of municipalities, 2014
http://www.statssa.gov.za

ELECTRICITY TRADING IN MUNICIPALITIES
STATSSA REPORT P9110 JUNE 2019 TO JUNE 2020
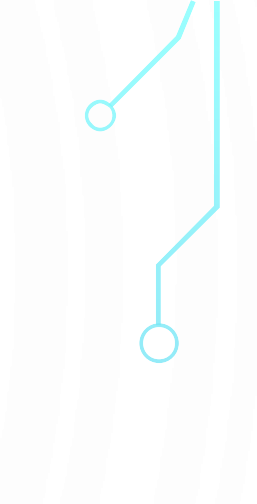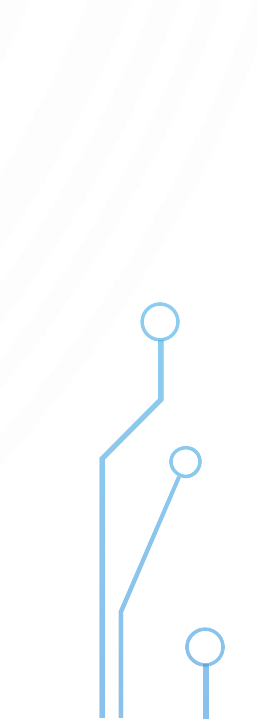
	Rand Millions				
Q	_Sept 2019	_Dec 2019	_Mar 2020	_Jun 2020	Total
Purchase	26210	19601	17889	21693	85393
Sales	30519	28057	28934	27319	114829
Surplus					29436

If we assume a total unit loss of 12% the we land up with the following revenue figures

	R mil
Total losses = 12%	10247
Tech losses 5.9%	5038
Non Tech Losses 6.1%	5209
LPU 60% of revenue	51236
LPU 6.1% non Tec losses	3125

LPU MANAGEMENT TEAM

- CoE Energy

- CoE Finance

- CoE Customer Services

- CoE PTM

- CoE Ops and maintenance

- EMMC contractor (Electricity Meter Management Contractor)

- AMR contractor (Remote Meter Reading Service Provider)

SERVICES IN COE

- EMMC teams in CoE contract focuses on the LPU customers.

- Large Power User (LPU) meter management (>60% of revenue)

- This amounts to more than R8bil per annum.

- Essential to manage this revenue stream

- EMMC responsible to manage contractors appointed by EMM

- Meter installation/ replacement

- Meter Audits/ QA inspections

- AMR services/ meter readings

- Bill correction reports

WHAT IS A LARGE POWER USER ?

- Connection parameters

➢ Normally commercial or industrial

➢ >100kVA

➢ 400V, 6.6kV, 11kV, 22kV >

- Tariff options

➢ Tar C (Demand, Units)

➢ Tar E (<1MVA , ToU)

➢ Tar D (>1MVA, ToU)

LPU MANAGEMENT TASKS

- LPU meter readings

- Meter installation and monitoring

- LPU fault reporting

- Meter installation QA

- Meters audits

- Tariff audits

- Lost unit recalculation

- Reading verification and upload

- Bill corrections

- Customer liaison

- Correction reports to CoE

- Job card management

- Meter/customer data manage
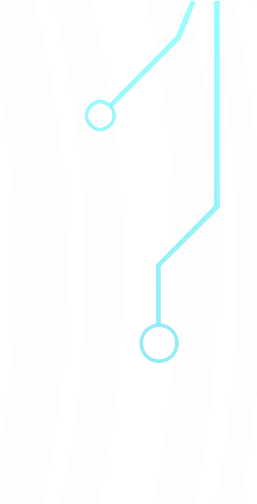
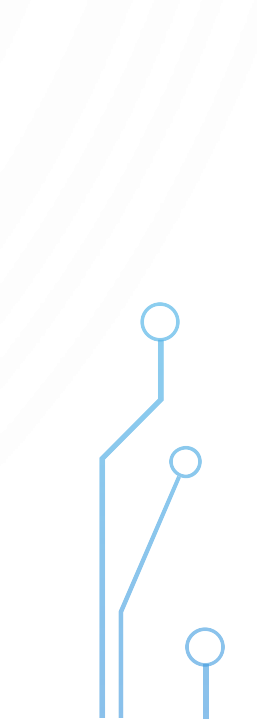- Monthly Reports EMM management

- AMR contractor

- AMR contractor/ EMMC LPU team

- AMR contractor/ EMMC

- EMMC technicians

- EMMC Technicians/ CoE PTM

- EMMC LPU team

- EMMC LPU team

- EMMC LPU team/ CoE finance

- EMMC LPU team/ CoE finance

- EMMC/ CoE Customer services

- EMMC LPU team

- EMMC LPU team

- EMMC LPU Team

- EMMC Project Team

INFORMATION ACCESS

- AMR system
  - Meter/ customer data
  - Consumption data (30m interval data)
  - Billing data
  - Meter events
  - Instantaneous readings and phasors (V, A, VAR, PF)
- Billing systems – All customer data
- CoE EMIS fault log and job control system
- EMMC IT systems
  - Jobcards
  - Audit data and photos
  - Meter commisioning sheets
  - GIS system
  - Reporting system

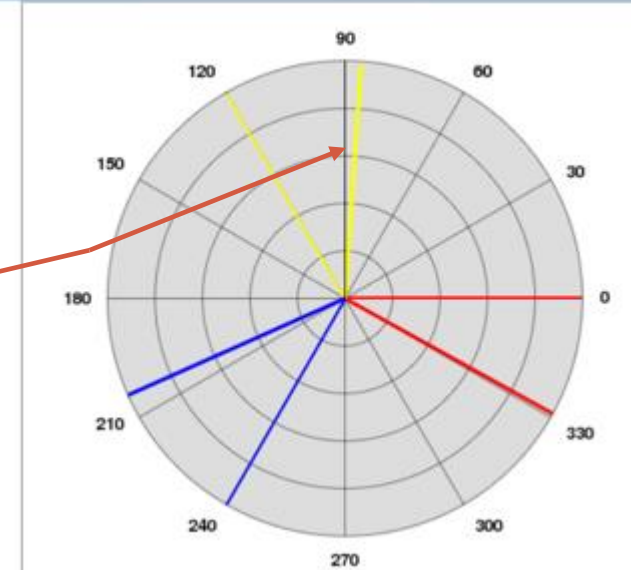# METER INFORMATION DOWN LOADED

- Profile 30min interval data (kWh and kvarh) time stamped

- Meter phasor data (voltage, currents, angles, pf)

- Meter event data (power fail, time adjust, phase failure etc)

TYPICAL USE OF PHASOR INFORMATION

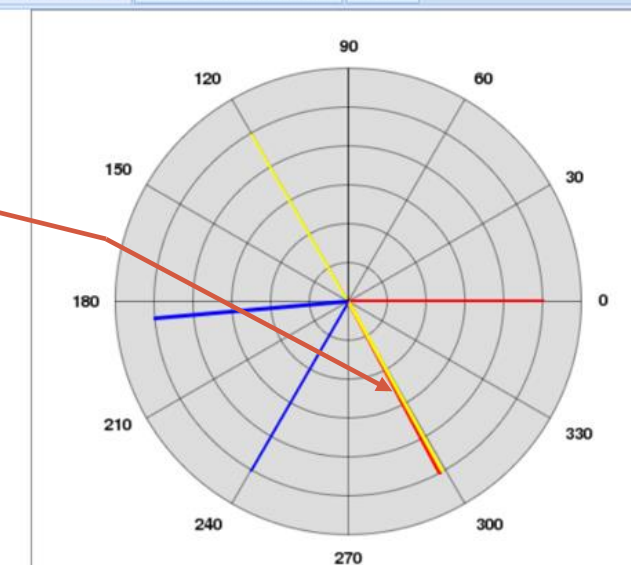WHITE PHASE CT WIRING REVERSED

LOSS MONITORING

- Use all Eskom supply point readings (54 in CoE)

- Use all CoE metering at POD (AMR on CoE infeeds)

- Use all AMR read LPU meter consumption readings

- Use all manually read readings

- Use al Prepayment consumption sales

- Calculate total purchases vs total sales every month over a 12 month window

- These loss figures are calculated by the EMMC as well as CoE and compared to verify overall loss figures and trends.

UNIT/ REVENUE RECOVERY VIA BILL CORRECTION

- During the 2017/2020 EMMC contract the following losses were recovered by using bill correction reports and back billing customers. The revenue also reflects cases where the tariffs have been corrected and the units were not affected.

- CoE has a meter reading correction policy in place to guide the correction process

- Unit recovery : 484 916 395 kWh

- Revenue recovery: > R 440mil

LESSONS LEARNT

- LPU meters on AMR system
  - Metering systems does not work all by itself
  - Dedicated management of meters , communication and database required
  - AMR systems provide very informative management data apart from billing readings
  - Meter installations have to be QA inspected after new or replacement installation
  - Audit primary equipment like CTs/ VTs
  - Audit tariffs
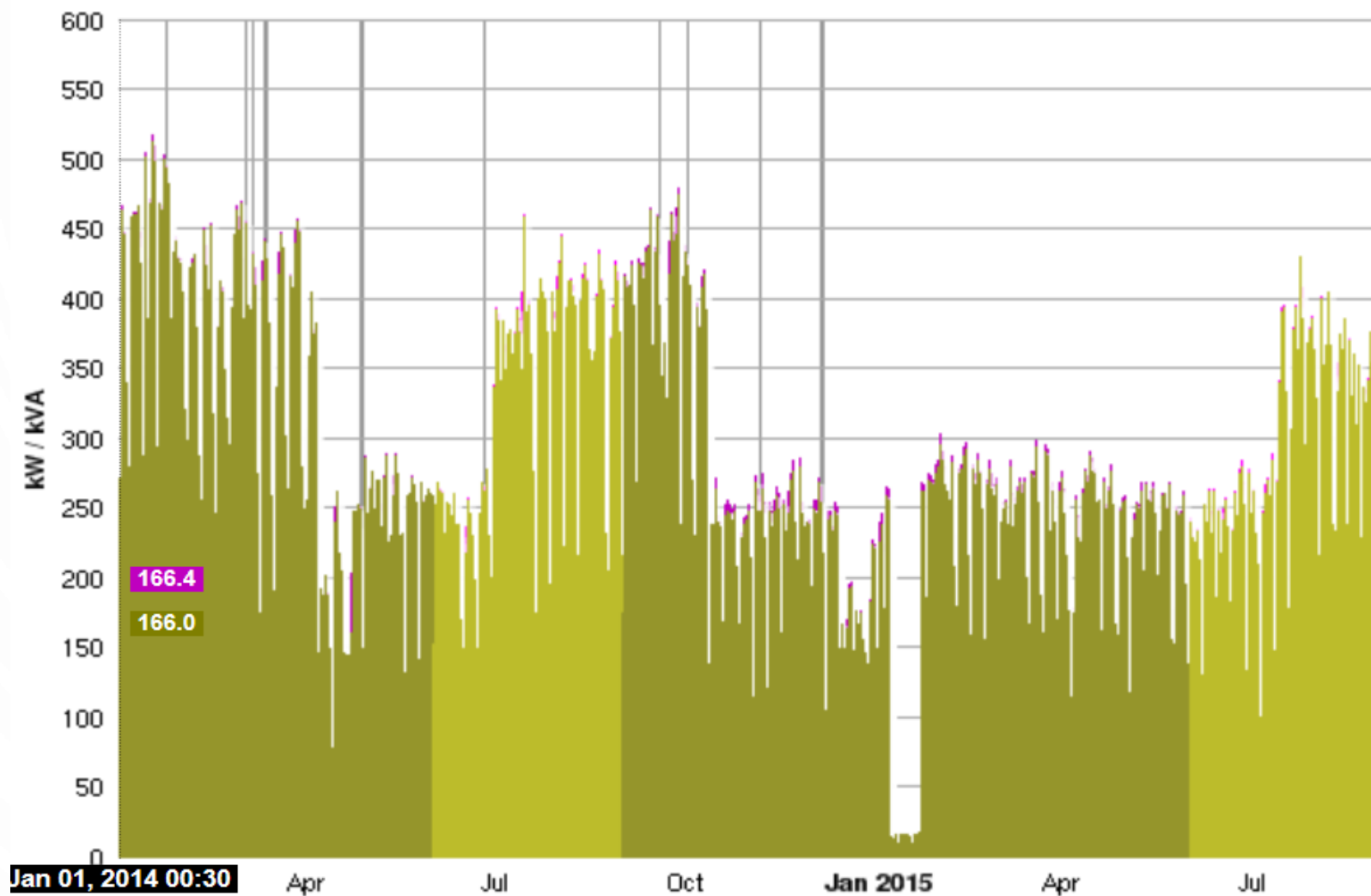 - Keep detailed data base of all meter operations
  - Ensure that customer data is correct

TAMPERING EXAMPLES

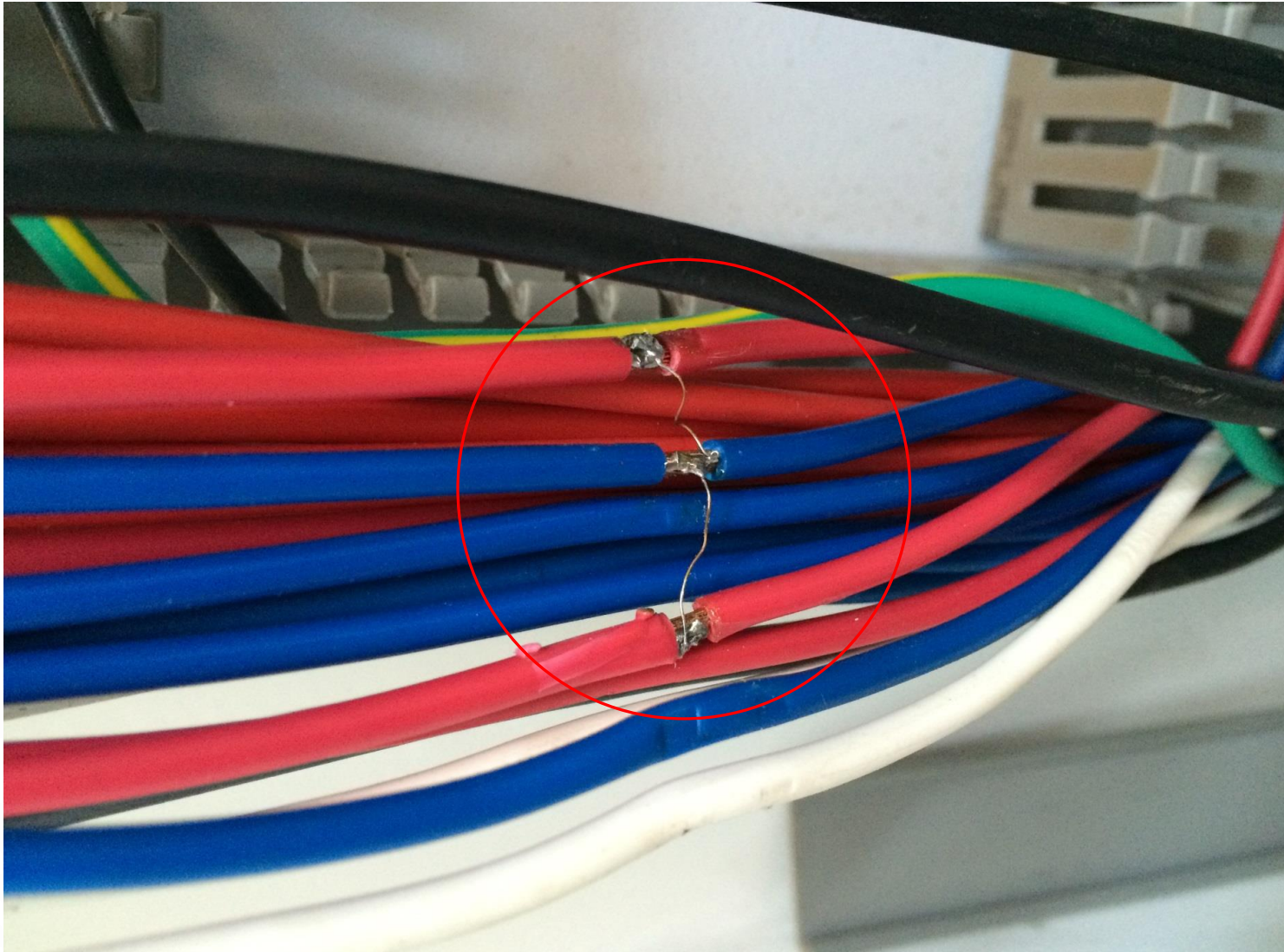Shorting links across s & s2 of Red, White and Blue Phase CTs

CT TAMPERING
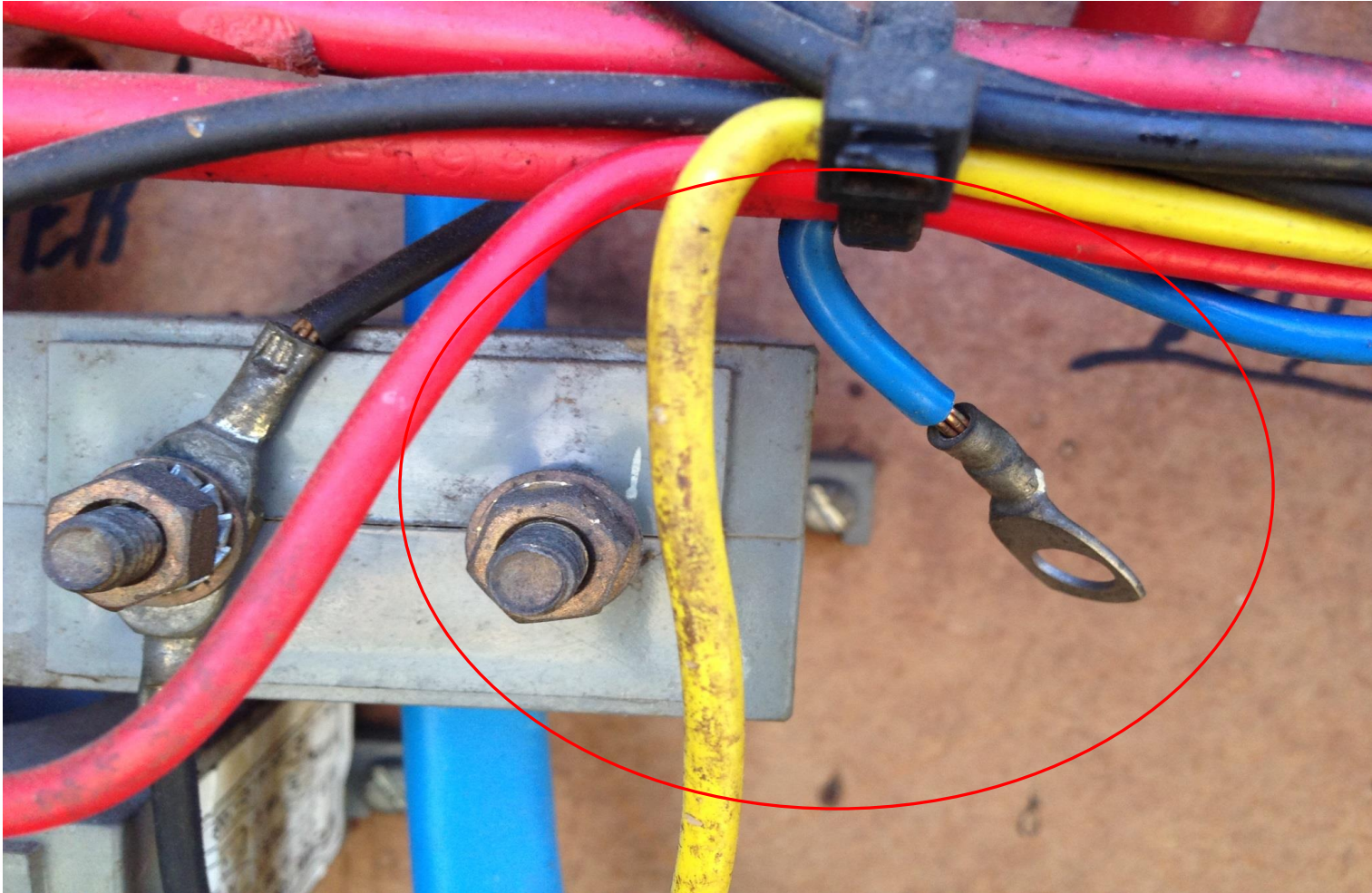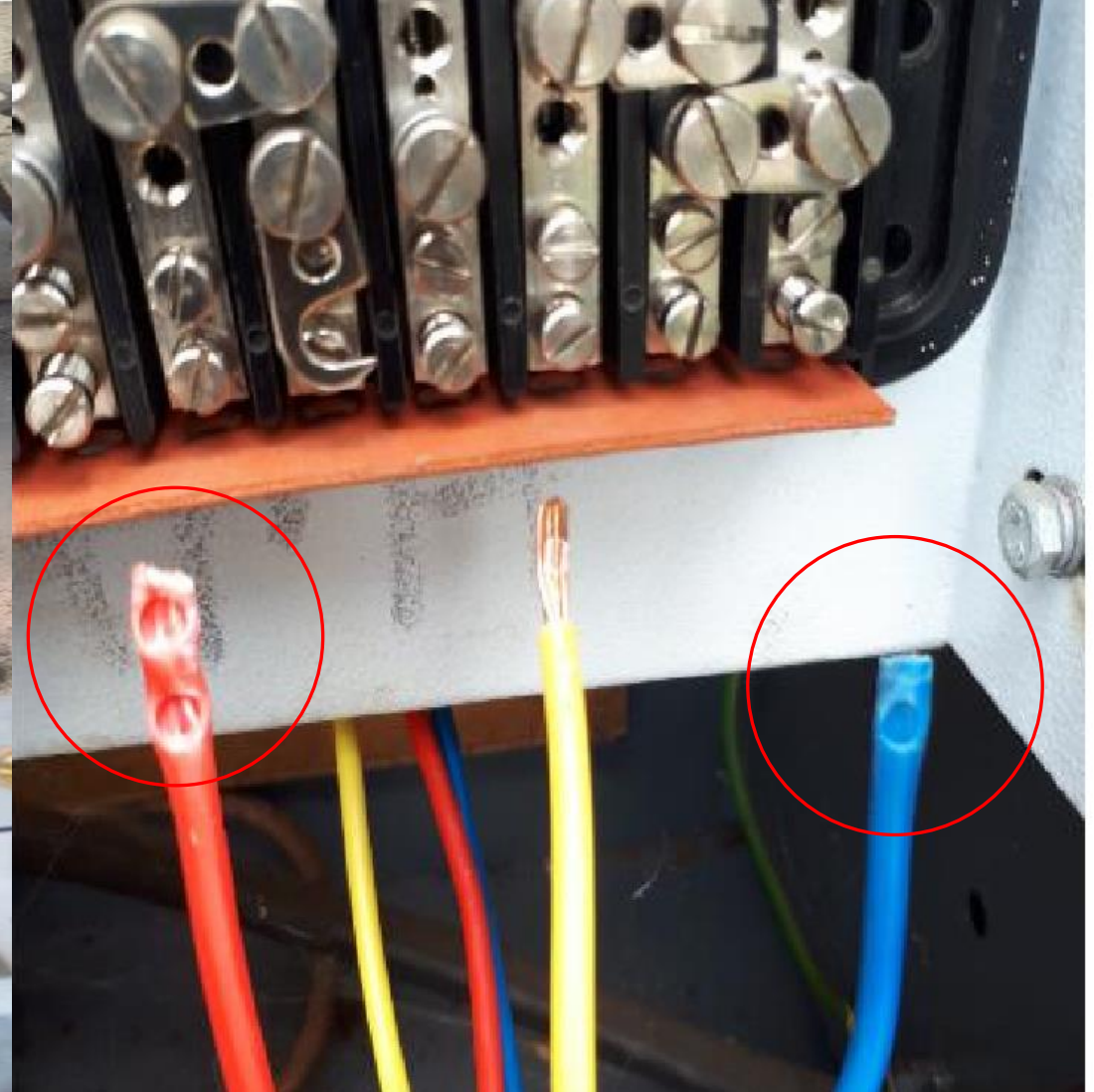
TAMPER PROFILE

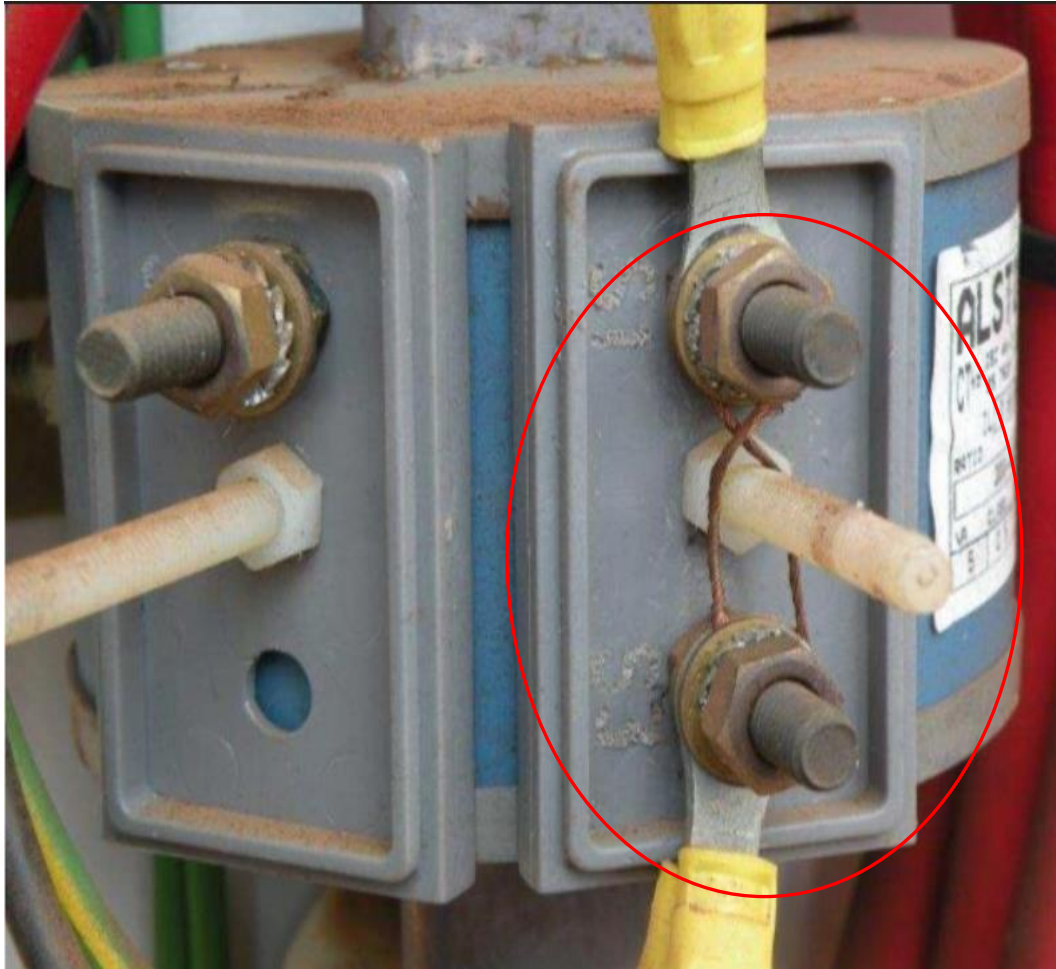# JUMPERS IN TRUNKING

WIRING TAMPERING

Wiring Cut

Wires terminated on insulation

CT TAMPERING

CT shorted
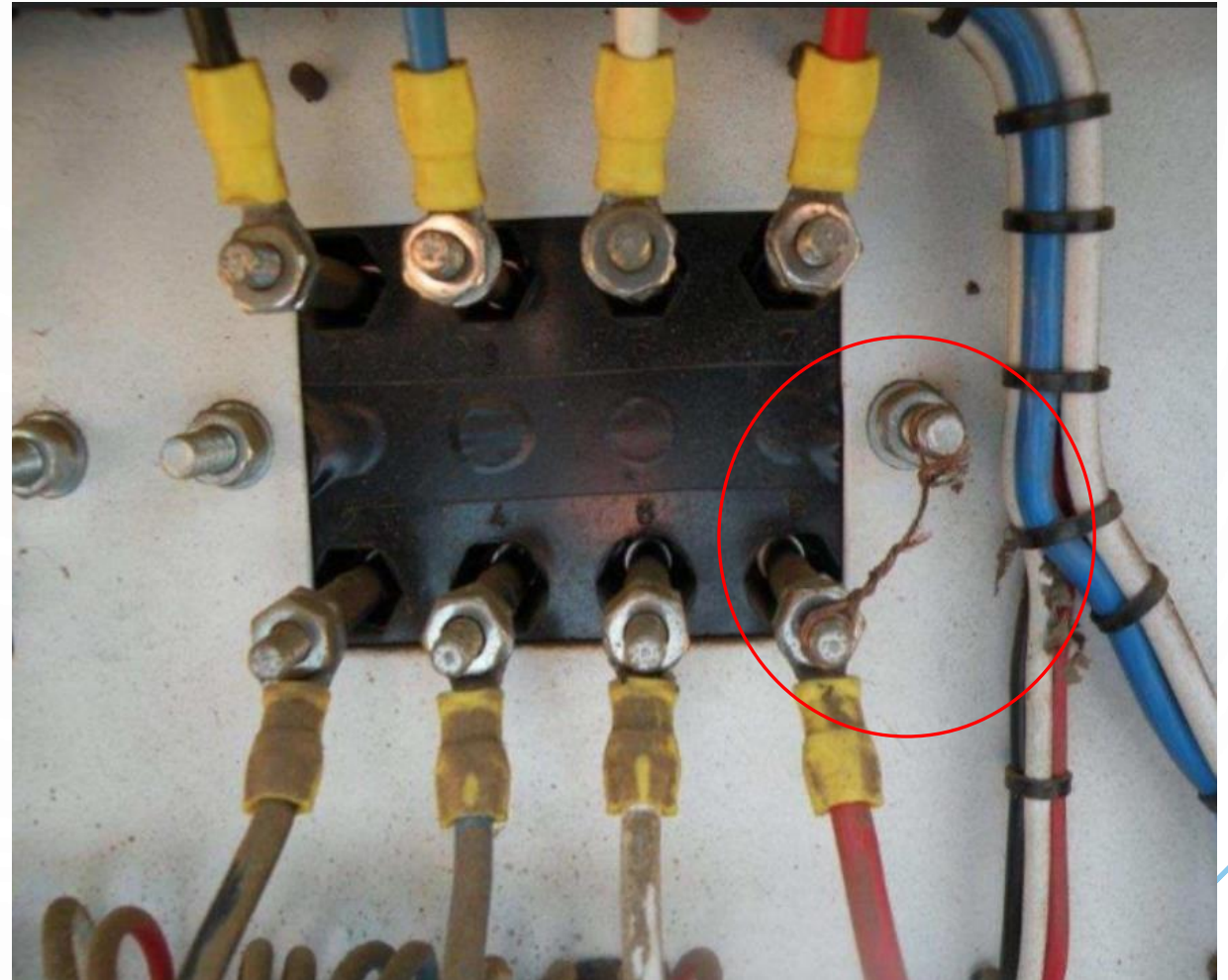
Customer cables connected before CTs
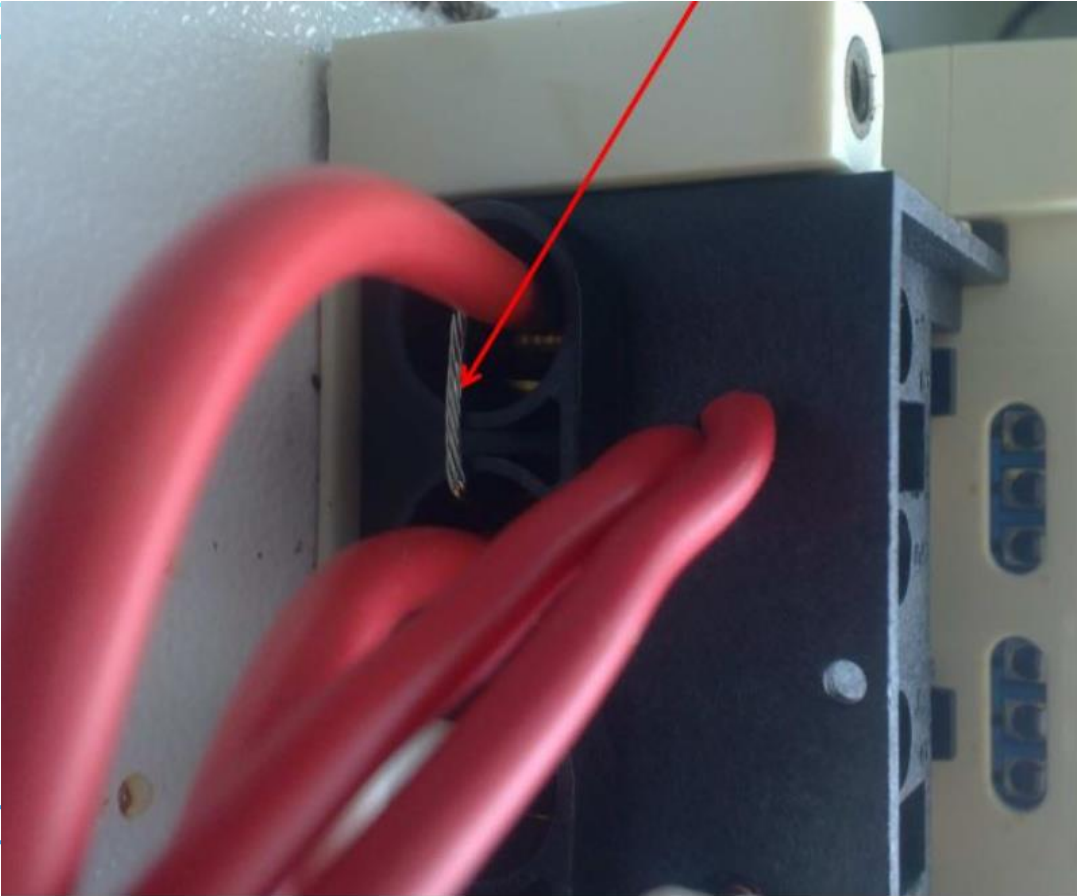
WIRES TAMPERING

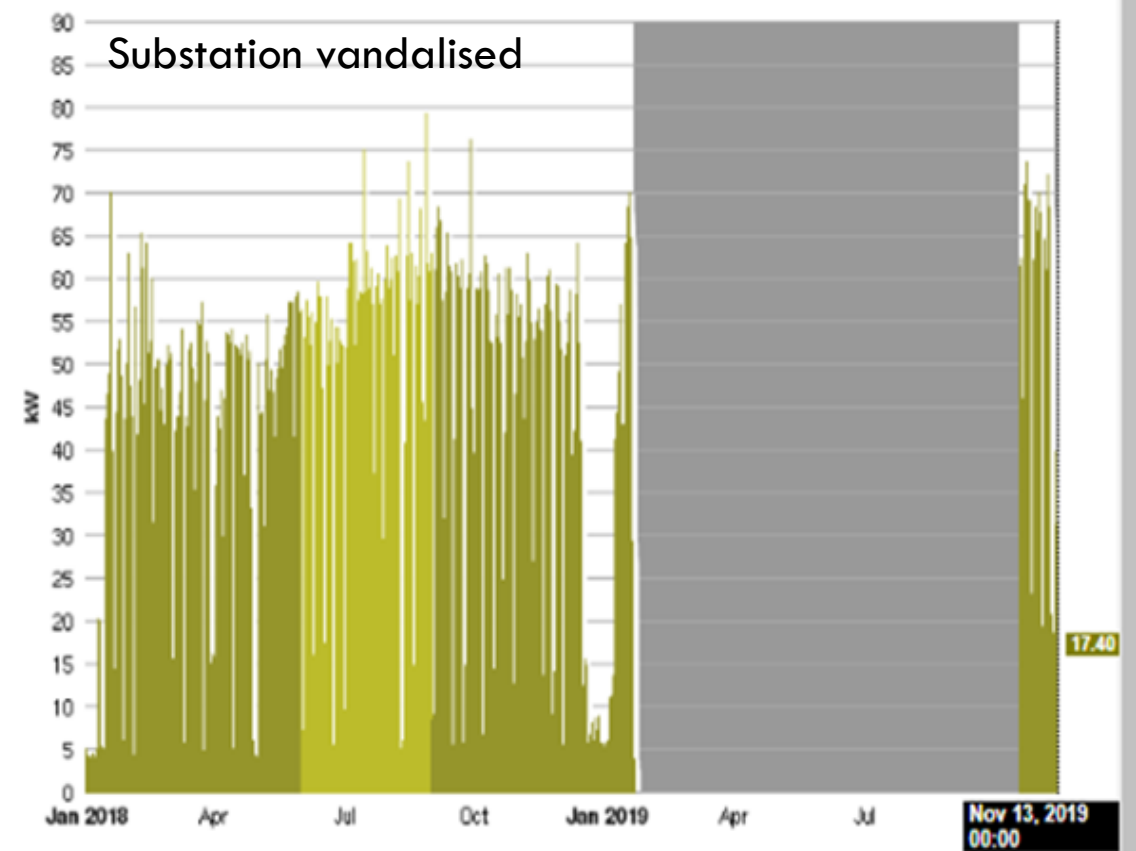Wires cut

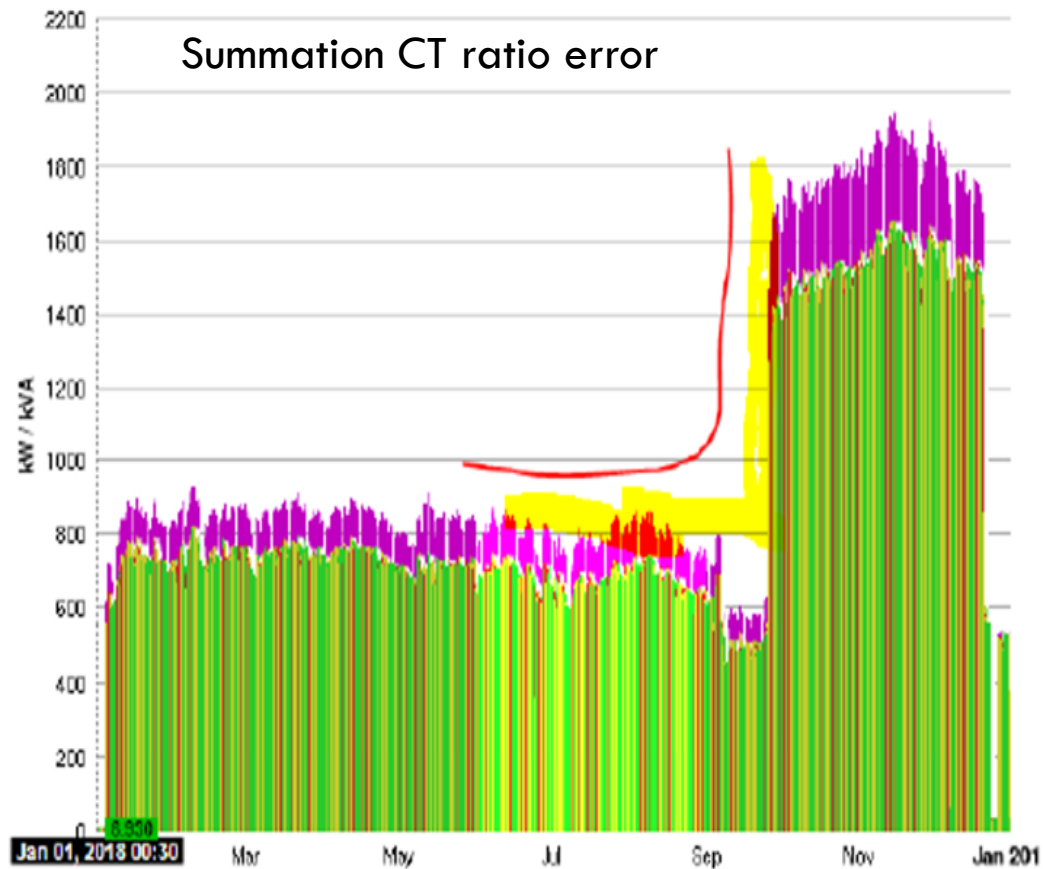Red phase shorted to earth

METER TAMPERING

Red phase shorted on meter

Red phase voltage switched off
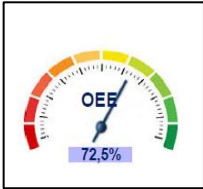
PROFILE FAULT INDICATIONS

Summation CT ratio error

Substation vandalised

CONCLUSION

There is a significant opportunity to optimise your operations and improve your revenue by using effective management processes.

Quick fixes are not effective. You need to address the key elements of your value chains and steadily raise your level of maturity. This takes a structured approach and time.
Metering and AMR systems do not work effectively without skilled support

Key success factors:
- ✓ Tight control of contractors
- ✓ Clear business processes that link your value chains
- ✓ Continuous data improvement
- ✓ Focused improvement on large customers and high losses
- ✓ Skilled support team and effective software tools.