G3-PLC Alliance

Enabling the smartest grid...together

Clean-up after roll-out of G3-PLC smart meters

Sharing experiences among DSO's

G3-PLC Alliance
February 3rd 2021

Introduction

- The objective of this webinar is to share experiences from DSO's about clean-up process
- addressing the following topics:
  - Describe one or two typical examples requiring clean-up:
    - Situation, problem
    - How is the process? How do you find the noise source?
    - Which measurements do you do with what equipment?
    - How does the team look like and what training did they get?
  - Filters
    - What kind of filters do you use?
    - How many filters were needed?
    - How do you deal with the customers?
  - What are lessons learned?

DSO's attending

DSO	Presenters
Enedis (France)	Thibaut Mollier, Monitoring Expert, thibaut.mollier@enedis.fr Rémi Dubaele, PLC Expert remi.dubaele@enedis.fr
EVN (Austria)	Wolfgang Lehner wolfgang.lehner@netz-noe.at Nicole Gugerel, Smart Meter Operation Center nicole.Gugerel@netz-noe.at
ST (Latvia)	Vilis Volcenoks, Senior Engineer vilis.volcenoks@sadalestikls.lv





Eskom (South Africa)

Gibelec (Gibraltar)

Electricity of Cyprus

STEG (Tunisia)

Electric Energy Distribution Operator Romania

Energie Steiermark (Austria)

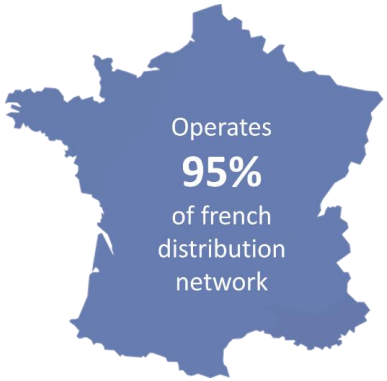
Israel Electric Corporation

G3-PLC Alliance

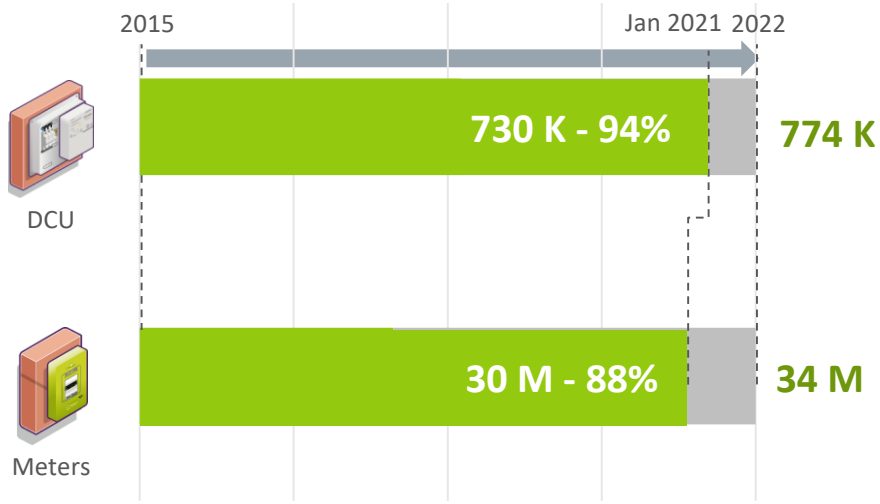
DSO experience with clean-up after G3-PLC roll-out

Enedis experience – Thibaut Mollier and Rémi Dubaele

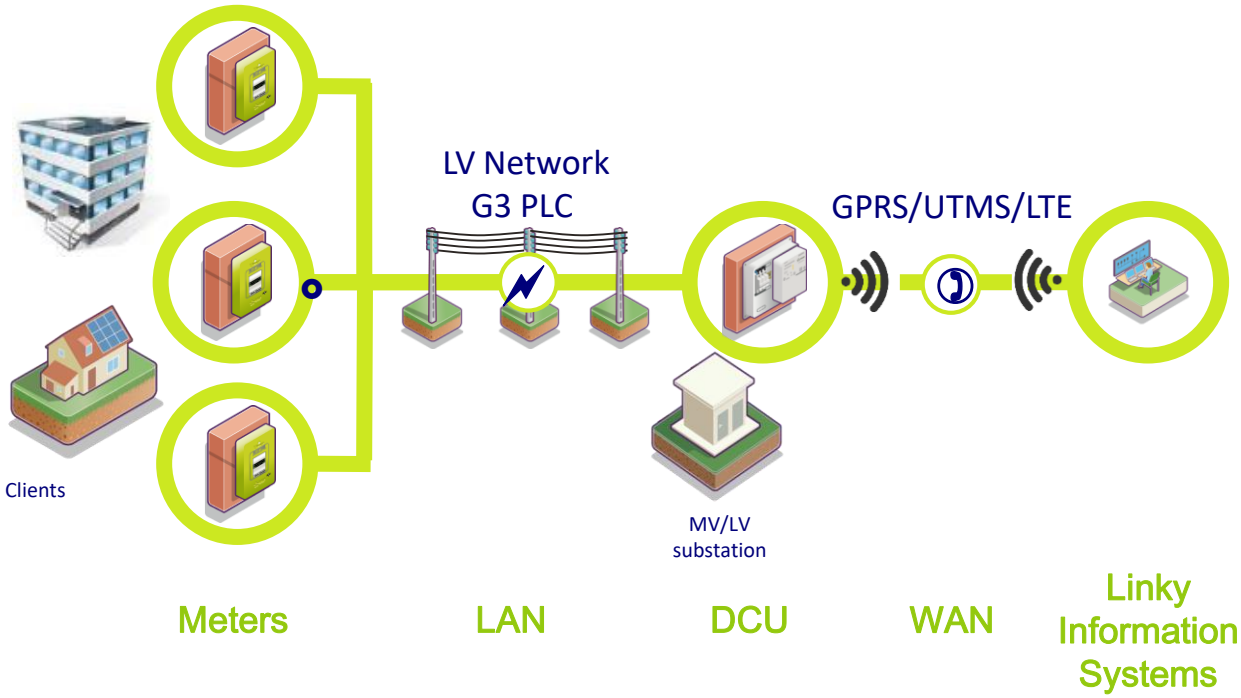
Enedis, the main french DSO, is responsible for rolling-out, operating and maintaining the smart-grid infrastructure and system



Mass roll-out



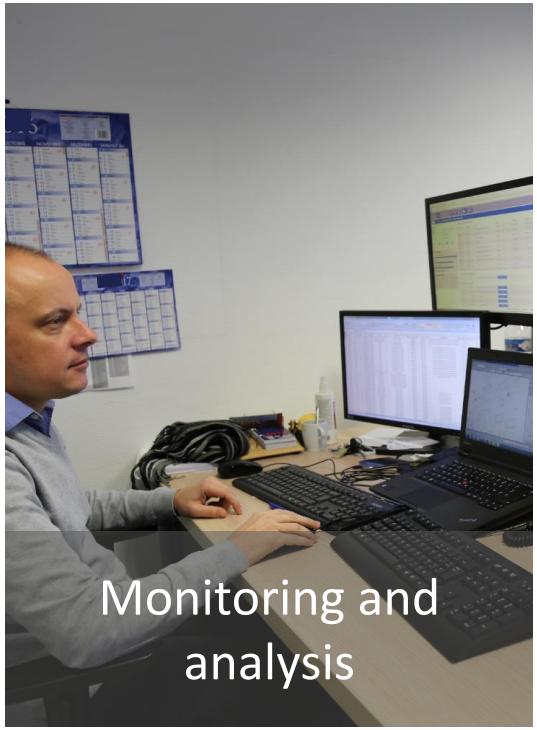
A brief introduction to the Linky Advanced Metering Infrastructure

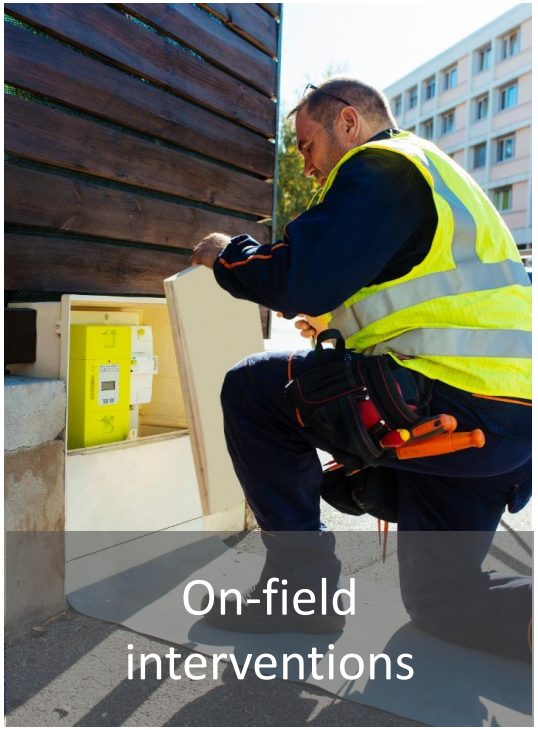


>98% DAILY COLLECTION RATE (11.59 PM)

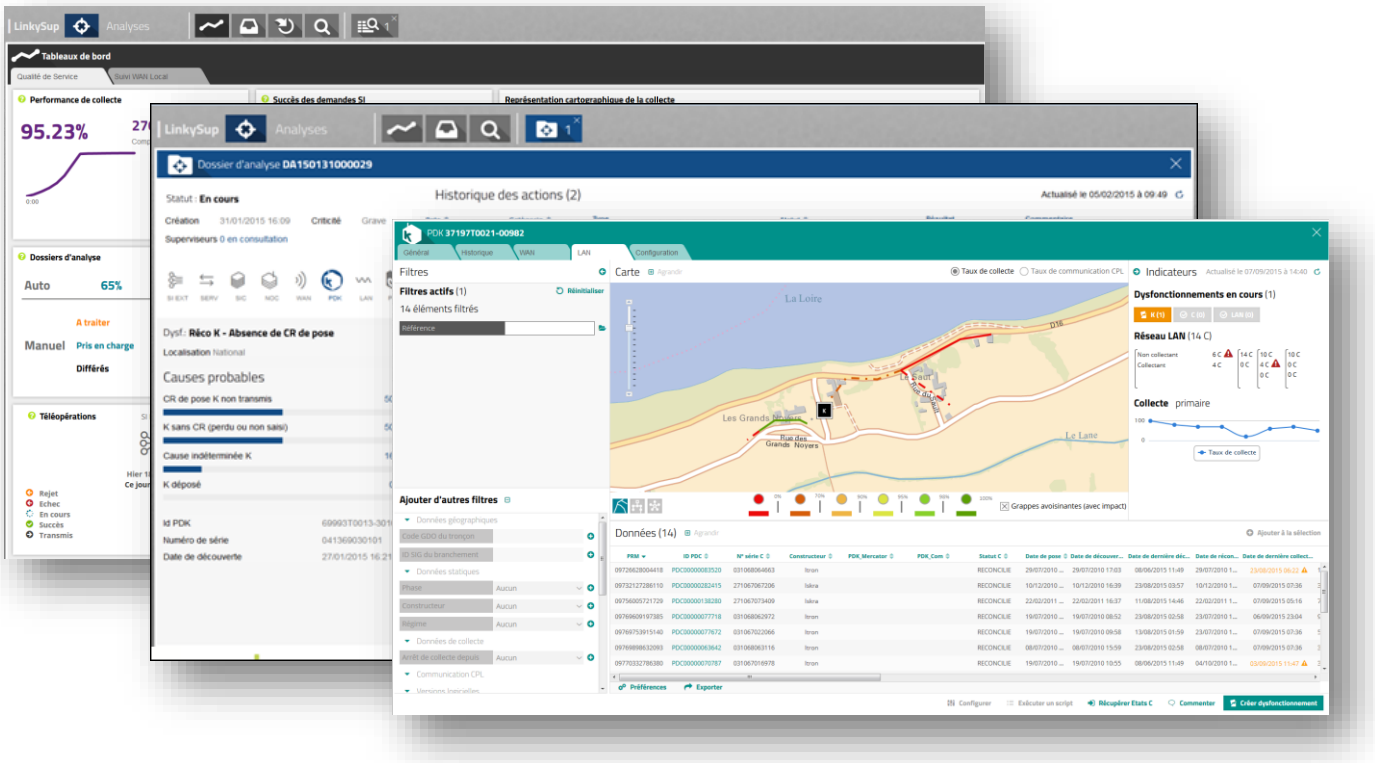
>3 billion **DATASETS COLLECTED** / TRANSFERRED / STORED PER DAY

Problem solving on PLC networks during and after roll-out





Linky Sup : a dedicated tool to detect and treat incidents



A fleet of PLC-trained technicians

~60 local technicians
not full-time / 38 700 employees

Enedis workforce
not Telco specialists

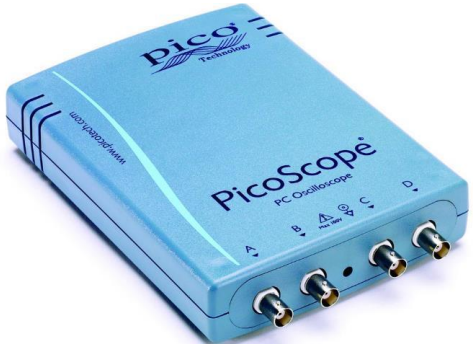
In-house
Training

Theory and practice
experimental network

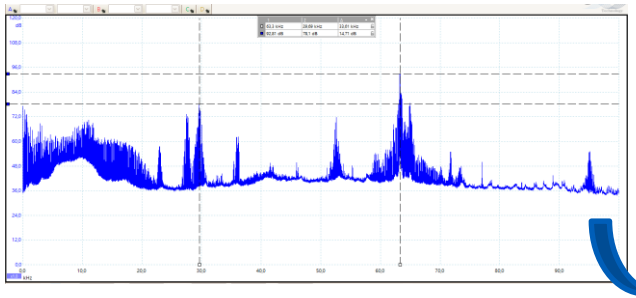
3 days
training

Training started in
2016

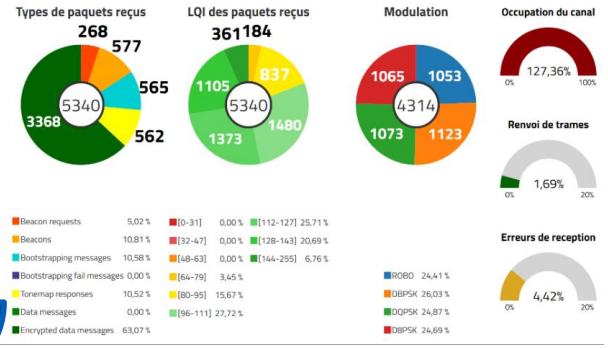
An all-in-one toolcase to facilitate field interventions



Oscilloscopes

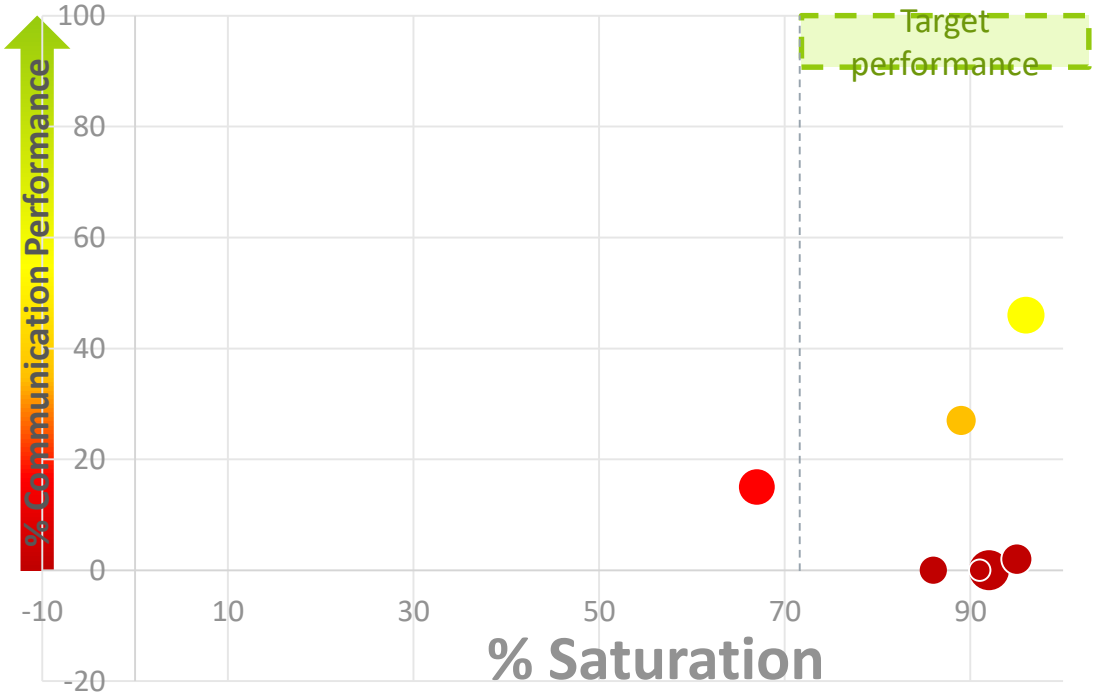


PLC Sniffer



Case Study 1 : Filter the noise

7 substations with low performances detected

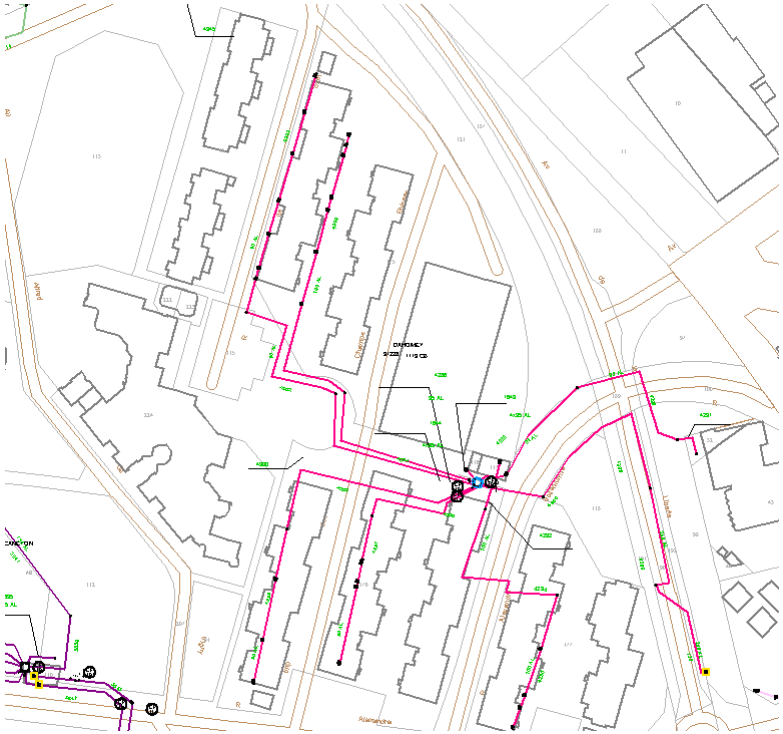


Case Study 1 : Filter the noise

In-room analysis

- DCUs are reachable, connected
- Collective Housing (urban development in the 70’s / 80’s)

Noisy neighbour (s) ?
District heating ?



Case Study 1 : Filter the noise

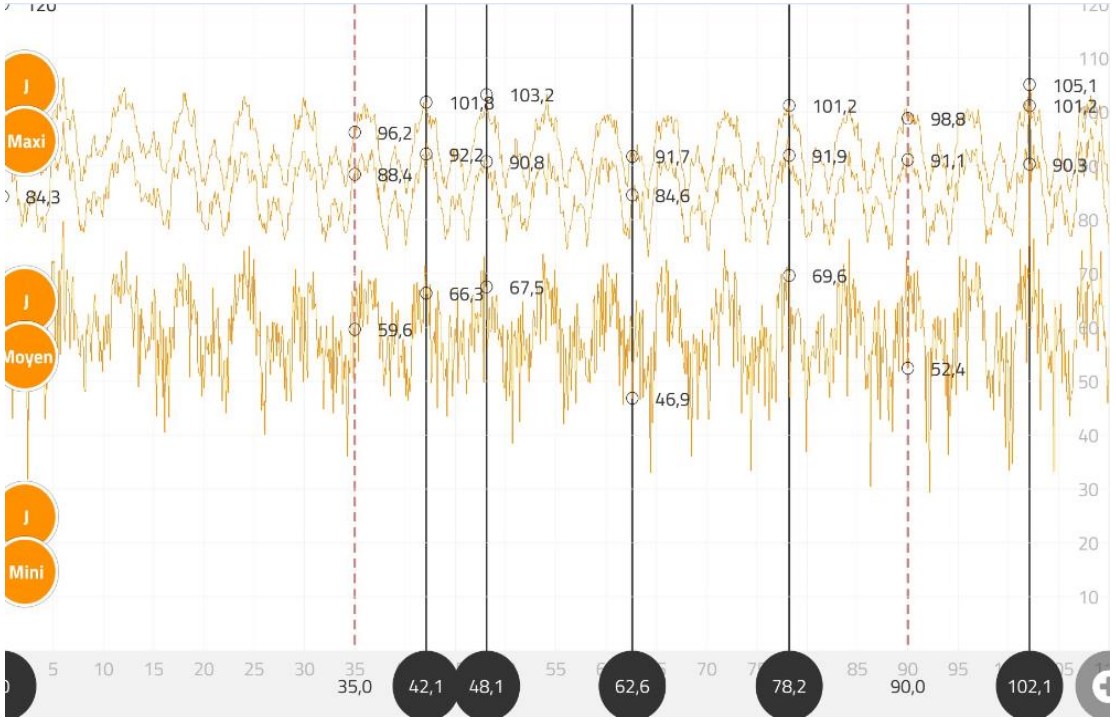
Measure
In the substation

Measure
Close to the boiler room

Measure
Close to the boiler room

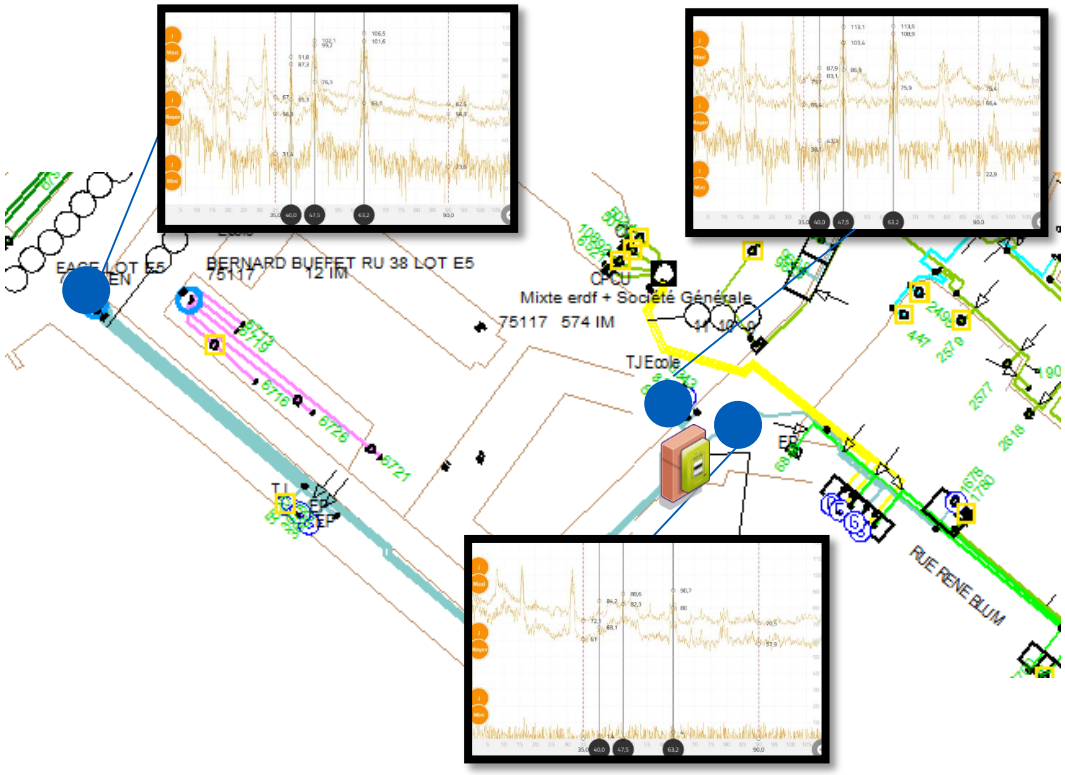
Ask the operator
to filter the noise

Performances
went up



Case study 2 : Saturation and PLC performance

- Measure
  In the substation
- Measure close to a feeder
- Measure close to a feeder
- Install new meter
- Performances went up




Thank you for your attention

DSO experience with clean-up after G3-PLC roll-out in Lower Austria

03.02.2021

EVN – Competence from Lower Austria
Energy business in six countries

	Network	Electricity	Gas	Heat	Hydropower	Wind power	Photovoltaics	Biomass	Thermal generation
Albania					✓*				
Bulgaria	✓	✓		✓		✓	✓		✓
Germany		✓	✓		✓**				✓***
Croatia	✓		✓						
Macedonia	✓	✓			✓				
Austria	✓	✓	✓	✓	✓	✓	✓	✓	✓

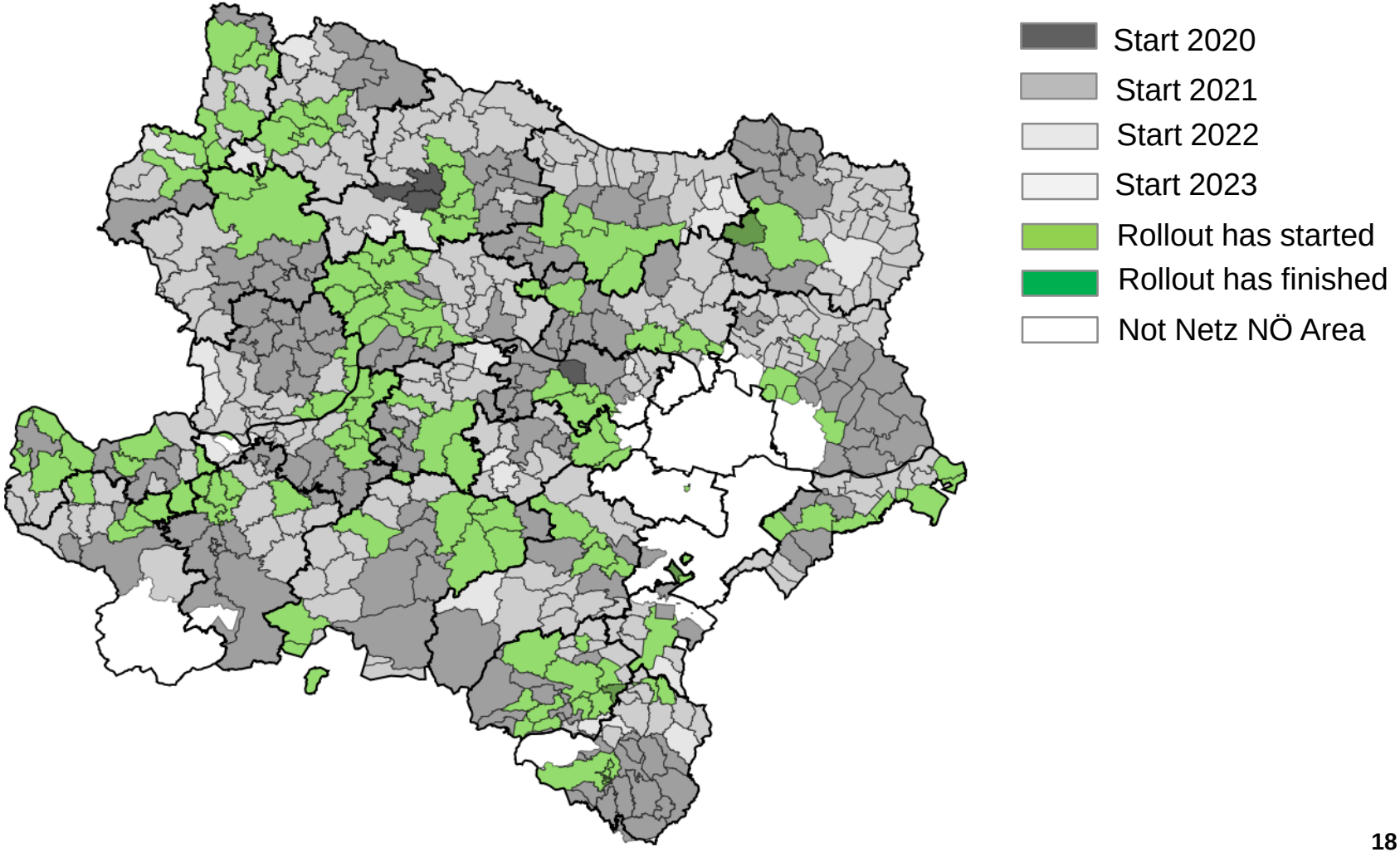
* EVN stake: 50%
** EVN stake: 13%
*** EVN stake: 49%

Netz Niederösterreich: DSO from LowerAustria

Smart meter: Rollout

- On balance, 800,000 meters have to be replaced in Lower Austria
- 95 percent of all meters are legally required to be “smart“ by 2022. The rollout plans of the company Netz Niederösterreich are oriented to this.
- Long-term testing phase for system- and software suppliers
- Roll-out in Lower Austria started on September 1st 2020
- Installed meter Feb 1st: 126.646
- Smart Meter PLC technology G3 FCC 150-480kHz

Web Portal www.netz-noe.at



Smart Metering infrastrukture

„Animation“

CUSTOMER MANAGEMENT

MON. CONSUMPTION / COST INFO

EVN monatliche VSK-Info

EVN Monatliche Abrechnung

Web, @, ✉

HHU

EXISTING METER INFRASTRUCTURE

SAP ISU

EVN Jährliche Abrechnung

PLC – SMART METER INFRASTRUCTURE

PLC-SM

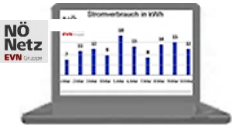
Funk

LWL

HES

MDM

SAGEMCOM



www.netz-noe.at

DAILY CONSUMPTION

METER EXCHANGE TEAM

SM – OPERATION CENTER

P2P METER INFRASTRUCTURE

Mobile-SM

EVN – Clean-Up Equipment and Training

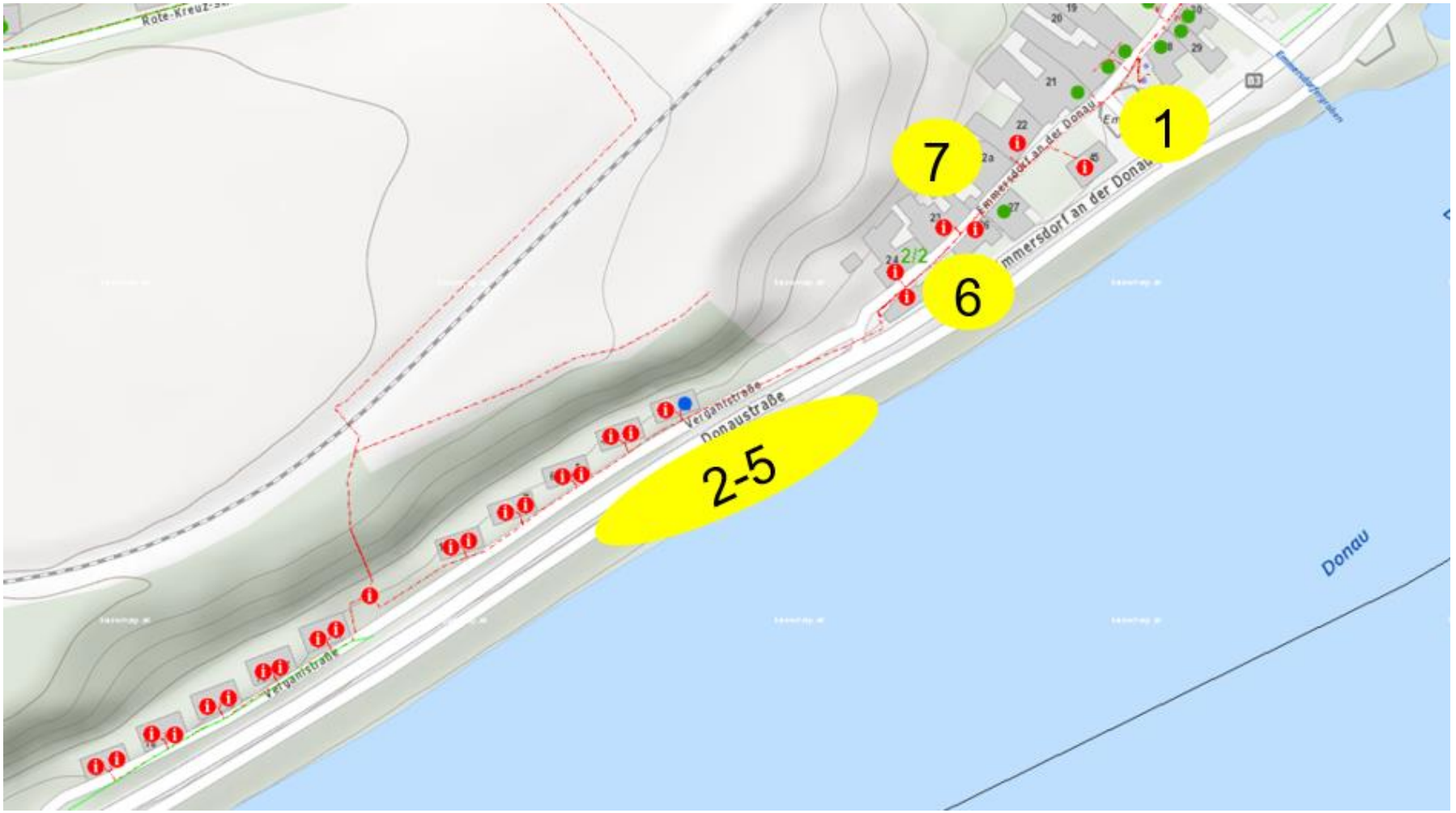
- Which measurements do you do with what equipment?
  - PLT M1503 & Notebook
- How does the team look like and what training did they get?
  - At least one technician located in each service center in lower Austria
  - 1 day basic training about the topic in general (organization, documentation, PLC measurements, internal processes, …)
  - Measurement device training at the handover of the devices
  - The first major clean-up job is accompanied by a technician from the technical department
  - Remote support from Operation Center every time

EVN – Procedure & Example Emmersdorf
Example 1 – situation and procedure

- Normal behavior for a PLC Measurement
  - comparing the noise level on different points in the grid, starting at the beginning of disturbance
  - switching off the customer to narrowing down to one customer plant
  - switch off circuits in the house, locate the noise

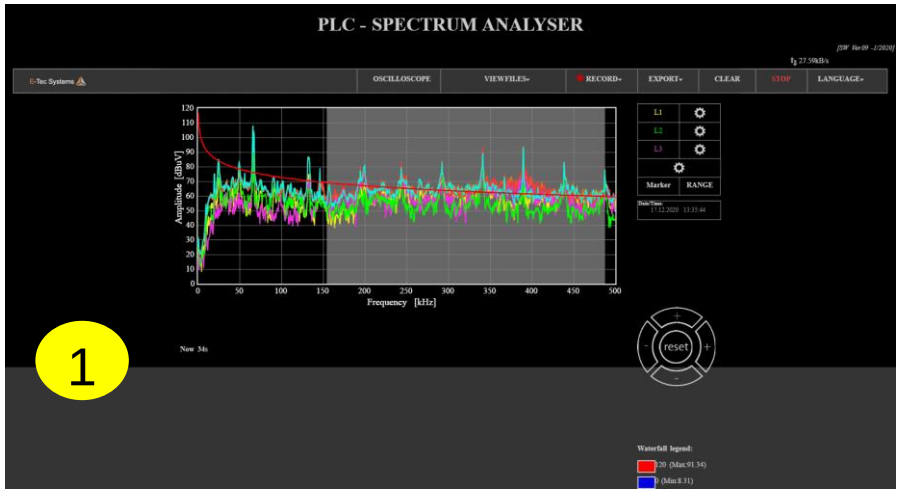
- 26 meters on a low-voltage branch were no longer accessible

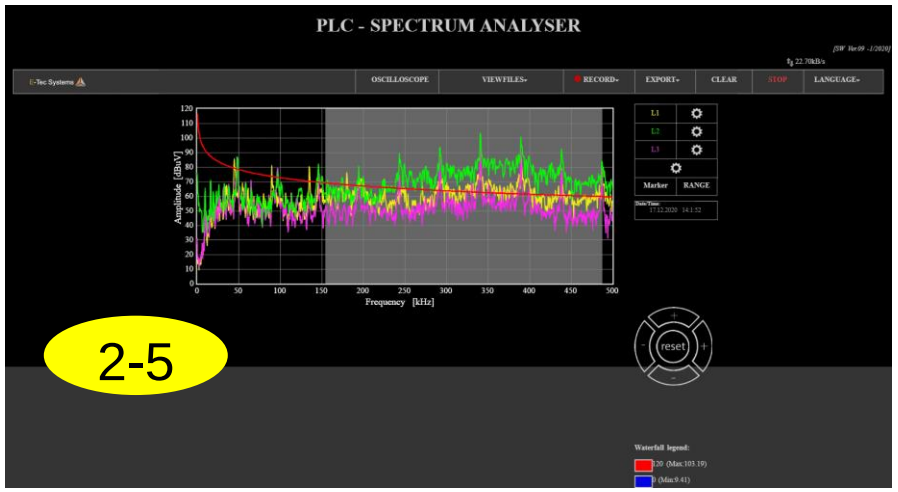
EVN – Procedure & Example Emmersdorf
Example 1 - measuring points

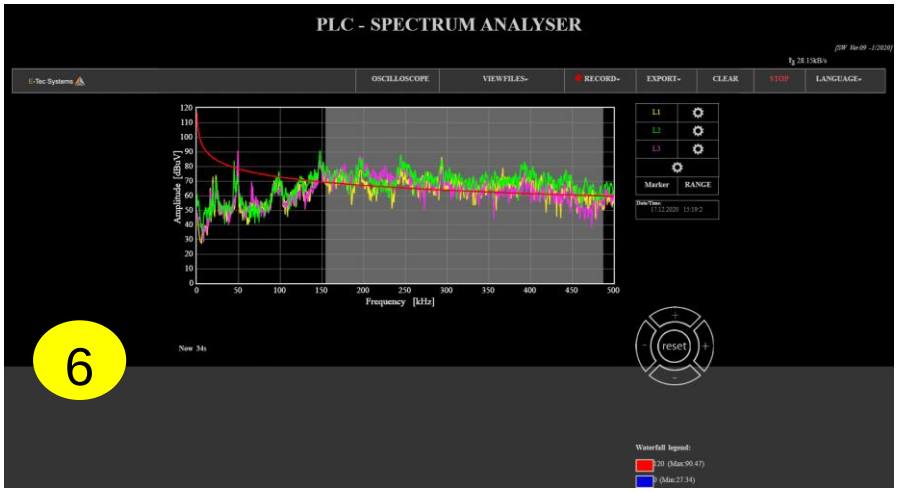


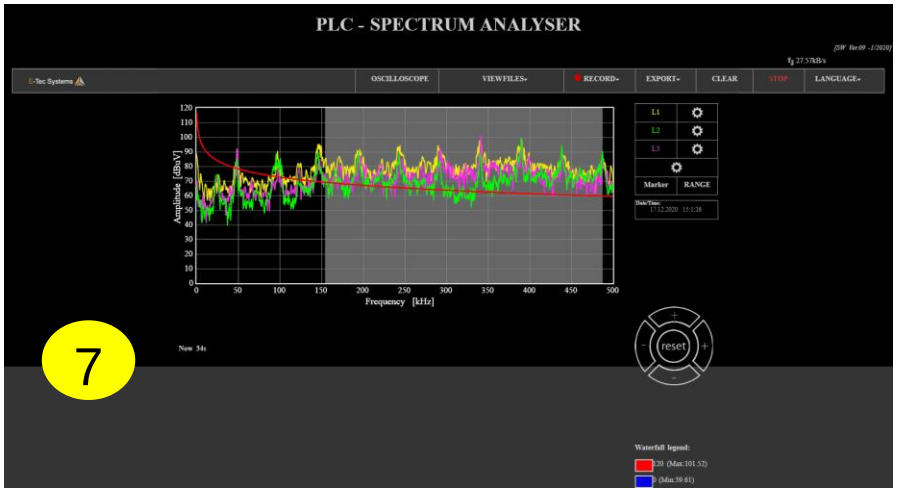
EVN – Procedure & Example Emmersdorf
Example 1 - evaluation

- comparison of the interference levels and their **characteristics**









EVN – Procedure & Example Emmersdorf
Example 1 – result and solution

- interferer was a sat receiver, located near the beginning of the disturbance
- sat receiver removed from the grid

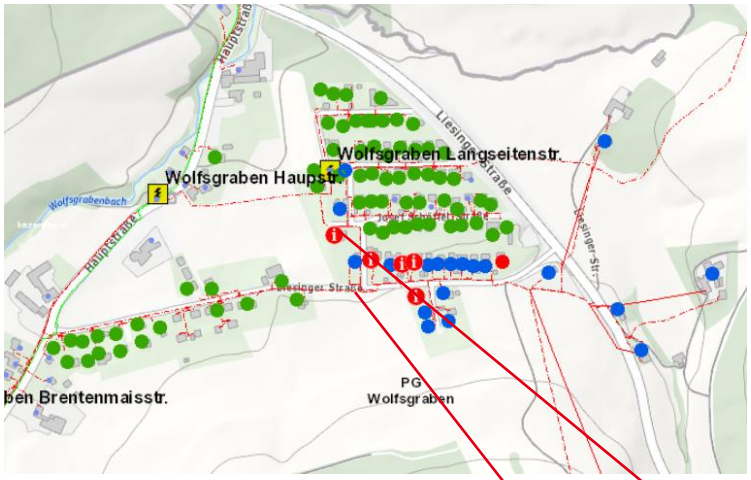
EVN – Procedure & Example Emmersdorf
Example 2 - situation

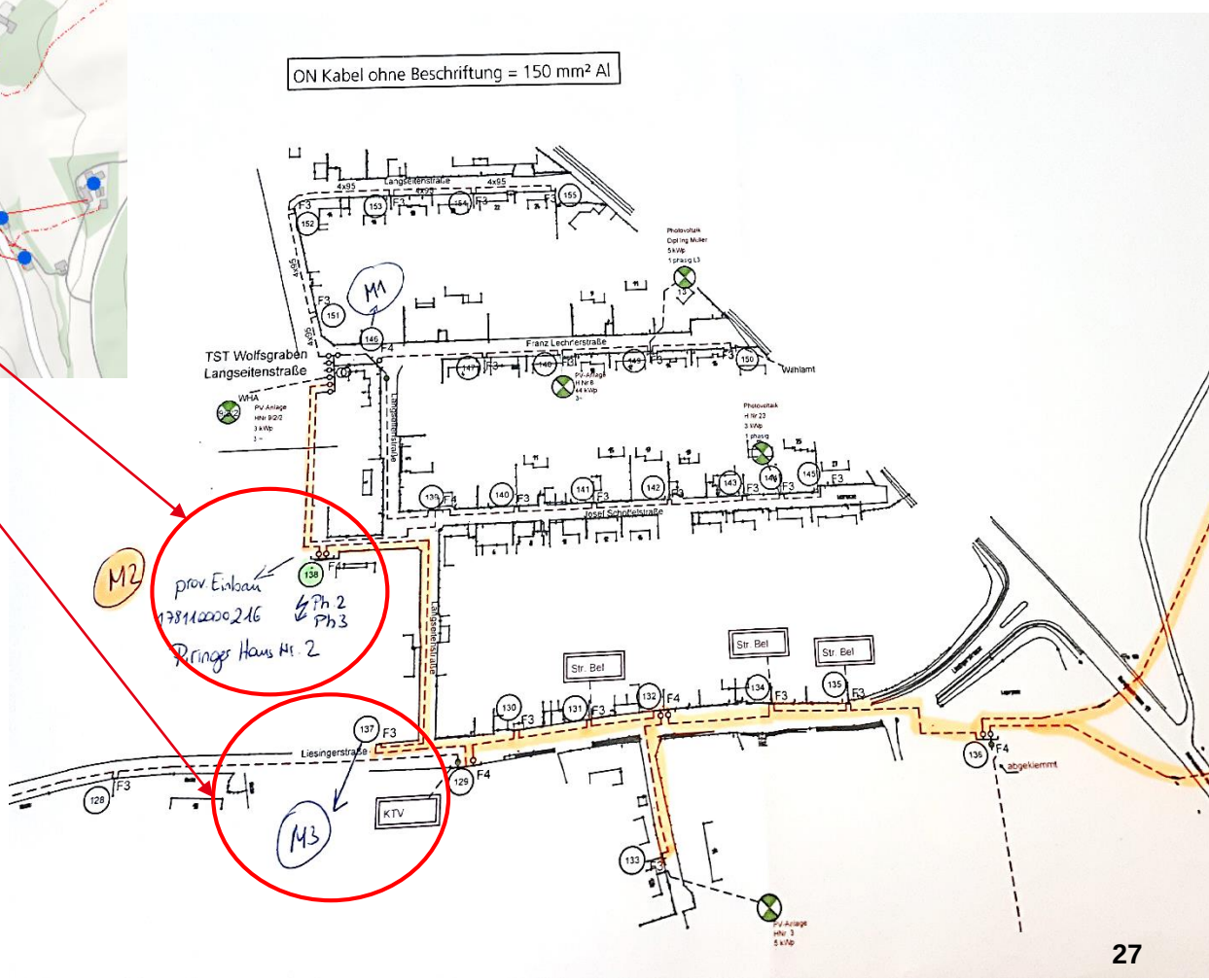
- 1 meter was not reachable
- Interference were detected 2 blocks beside

EVN – Procedure & Example Emmersdorf
Example 2 – result and solution

- PLC socket filter EICHHOFF F066-110/016-019 was installed

EVN – Procedure & Example Wolfsgraben
Example 3 – situation





EVN – Procedure & Example Wolfsgraben
Example 3 – result and solution

- 2 interferences in one household detected

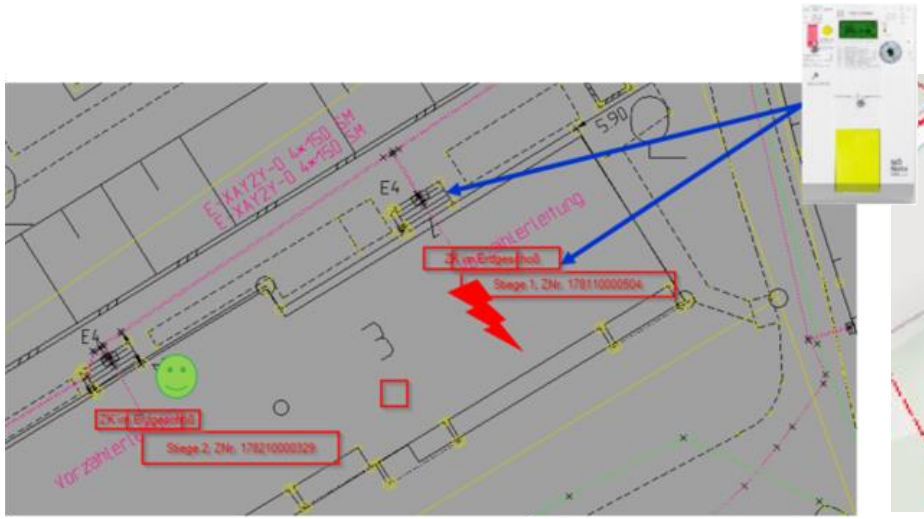
EVN – Filters and dealing with customers

- What Kind of Filters do we use?
  - PLC top-hat rail filter 16A **REO CNW163/16 & 161/16** (no experience)
  - PLC socket filter 16A **EICHHOFF F066-110/016-019**
    (6 PLC filters installed)
  - PLC main filters 63A **EICHHOFF F066-410/063-002** (no experience)

- How do you deal with the customers?
  - Customer device disturbs PLC network → PLC Filter will be installed for free
  - **Better way:** uninstallation of the device which disturb the PLC network
  - our assumption is based on defective devices, which would also damage other devices in the household in the long term
  - in case of customer complaints: Collection of all data f.e. device characteristics, CE mark, how often do the disturbances occur, ….

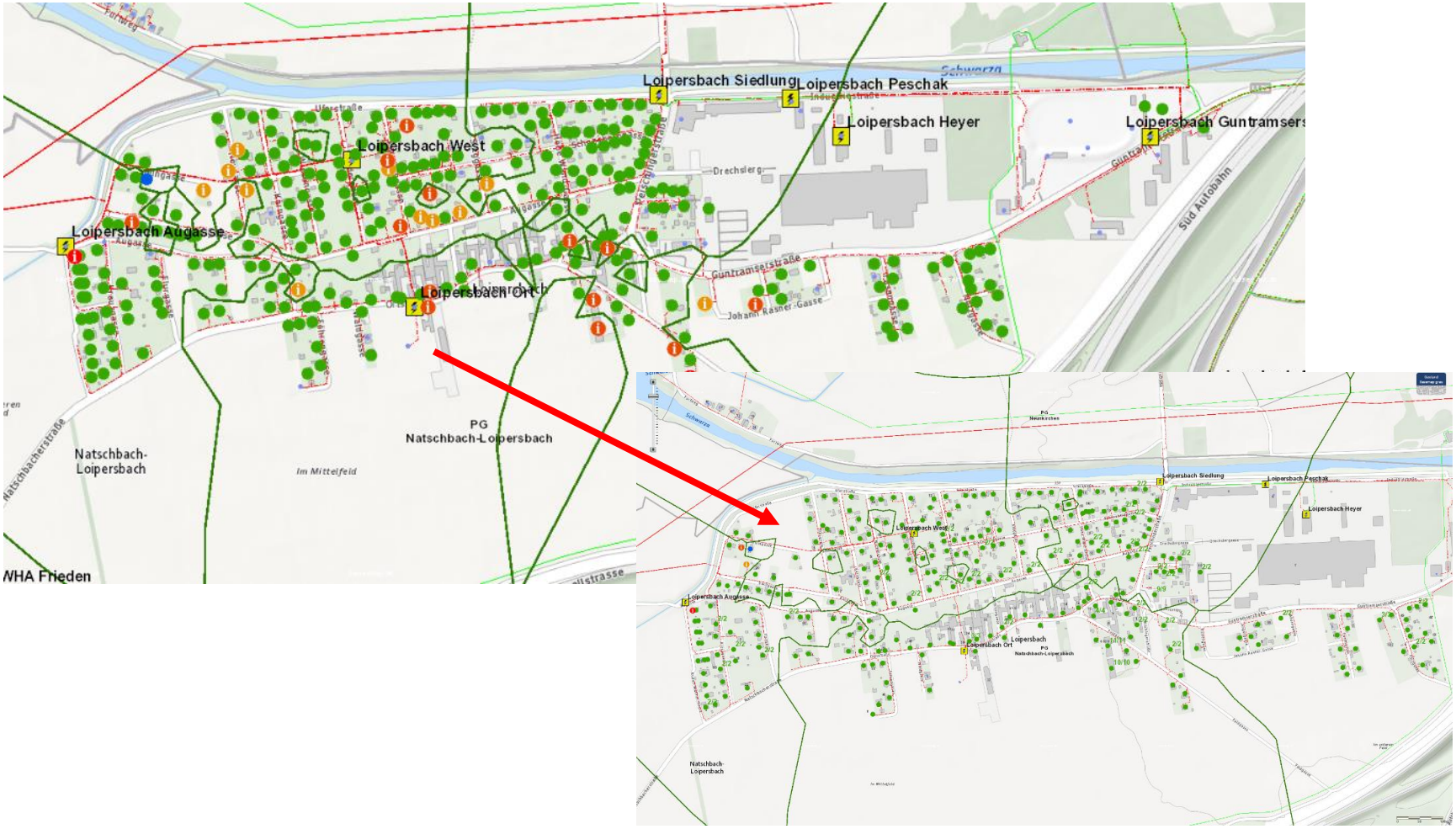
EVN – What are your lessons learned?

- Rollout should be finished up to 95 - 100%, more meters may help to reach meters which didn´t reached before



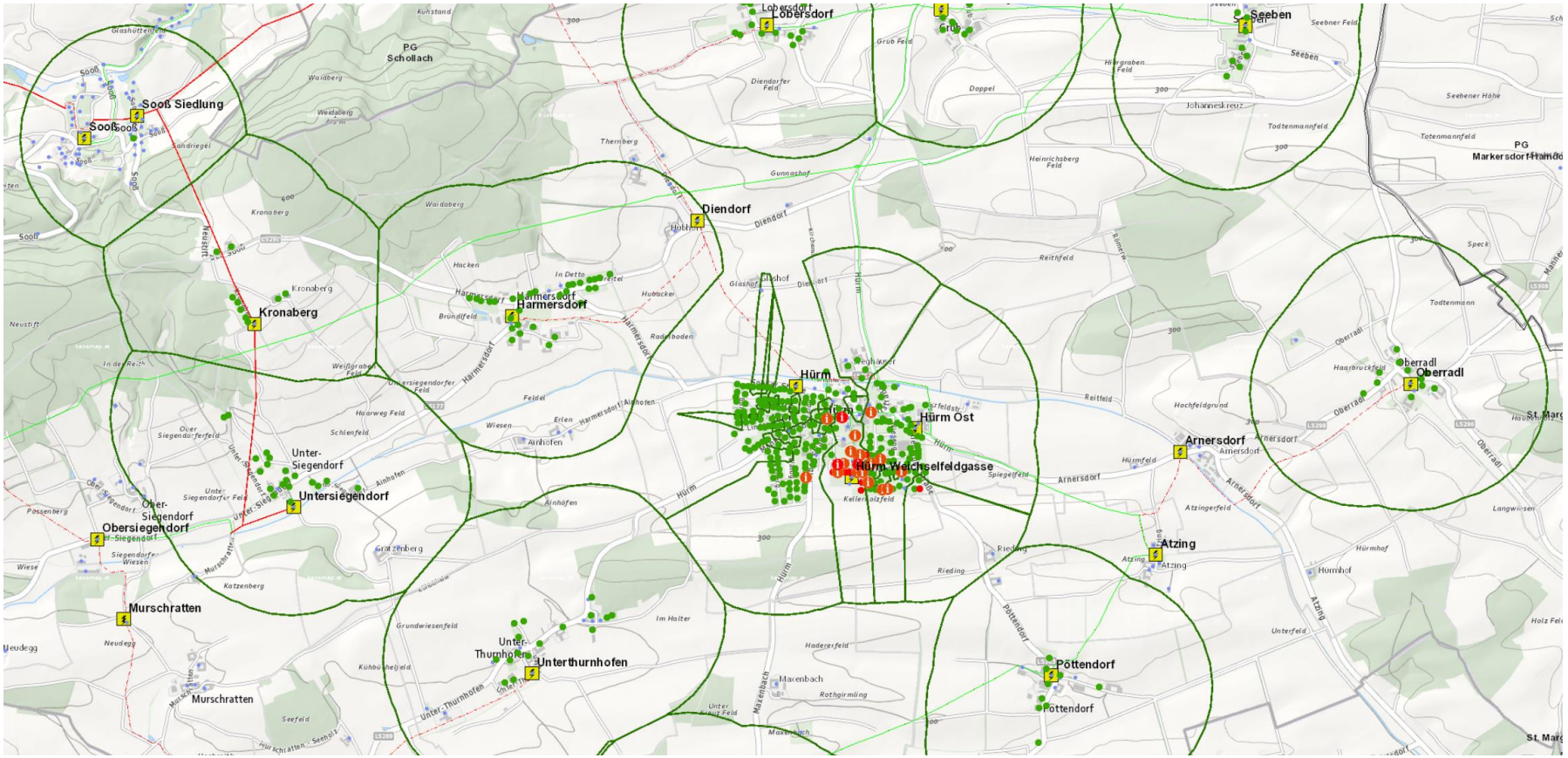
EVN – What are your lessons learned?

- PLC organization of the grid needs time for stabilization (f.e. 6 weeks on the following pictures)



EVN – What are your lessons learned?

- cross talking in areas with more than one Data Concentrator
- PLC communication works independent of the switching state of the low voltage grid



EVN – What are your lessons learned?

- learning of such topics is only possible with experiences
- we believe that defective devices **or** devices without CE mark are the cause of interference sources

Thank you for your attention!

Wolfgang Lehner

Wolfgang.Lehner@netz-noe.at

Nicole Gugerel

Nicole.Gugerel@netz-noe.at

February 3rd 2021

"DSO experience sharing: clean-up after roll-out of G3-PLC smart meters"

Smart meter roll-out

Installed till Y2022

1 096 000

Installed so far

79%

Execution plan Y2021

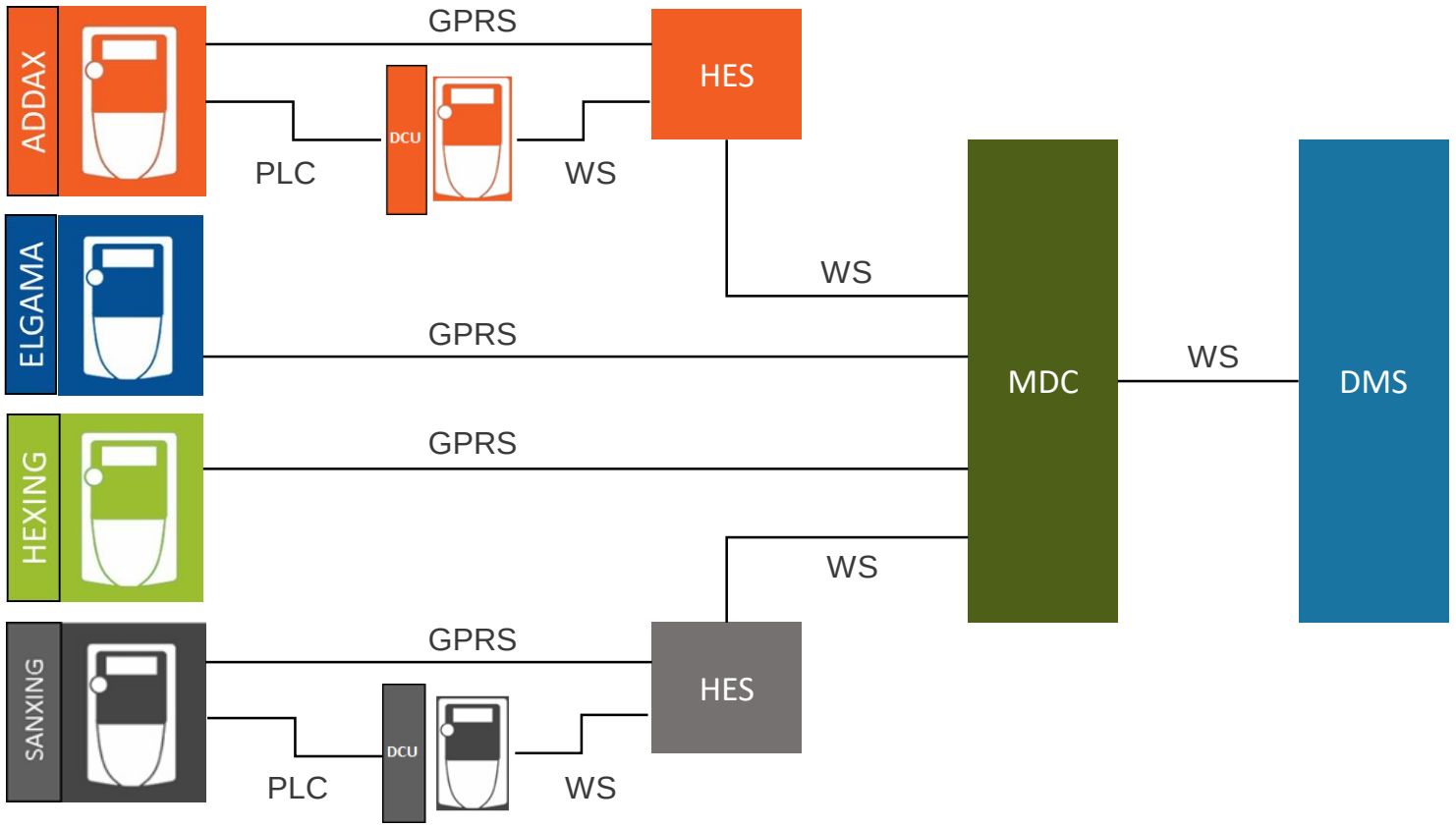
1 000 000

Target:

80% PLC smart meters

20% point-to-point meters (GPRS)

Smart meter system high level architecture



Two typical examples requiring clean-up.

First example :

Solution:

Second example:

Solution:

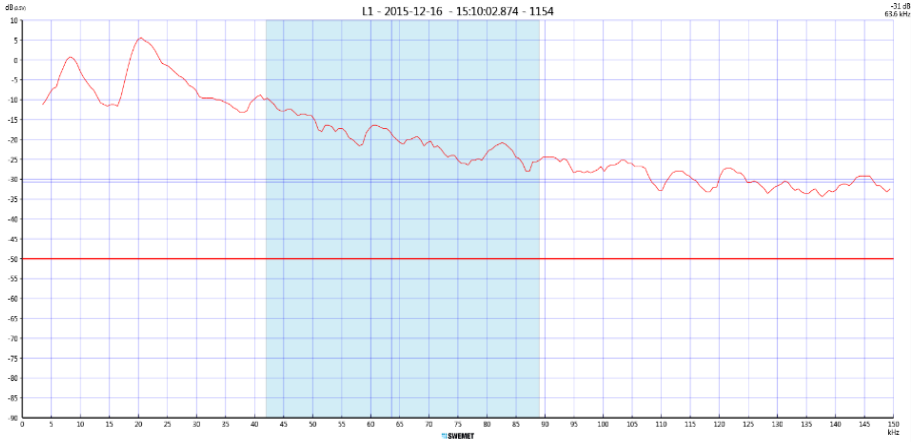
Replace

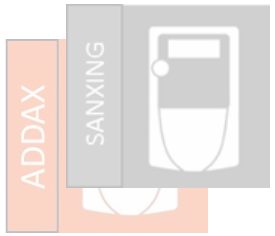
Troubleshooting

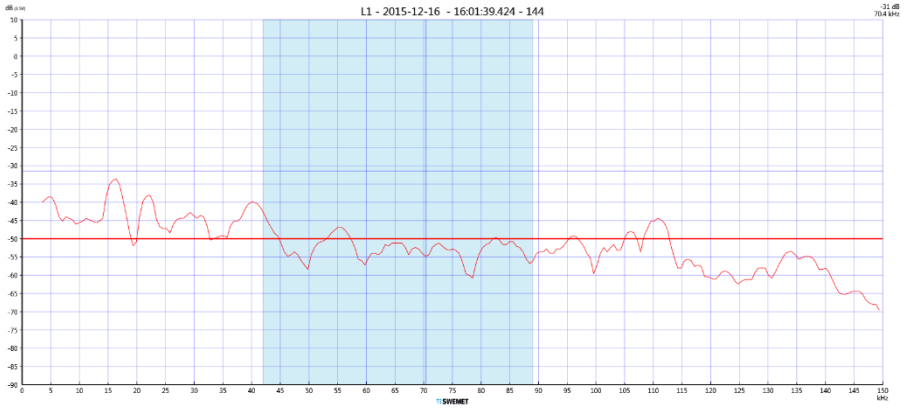
neuron
enabling networks

Smart meter readings&notifications – challenge

Challenge: PLC meter fast and reliable reading&notification delivery depends on noises in LV network



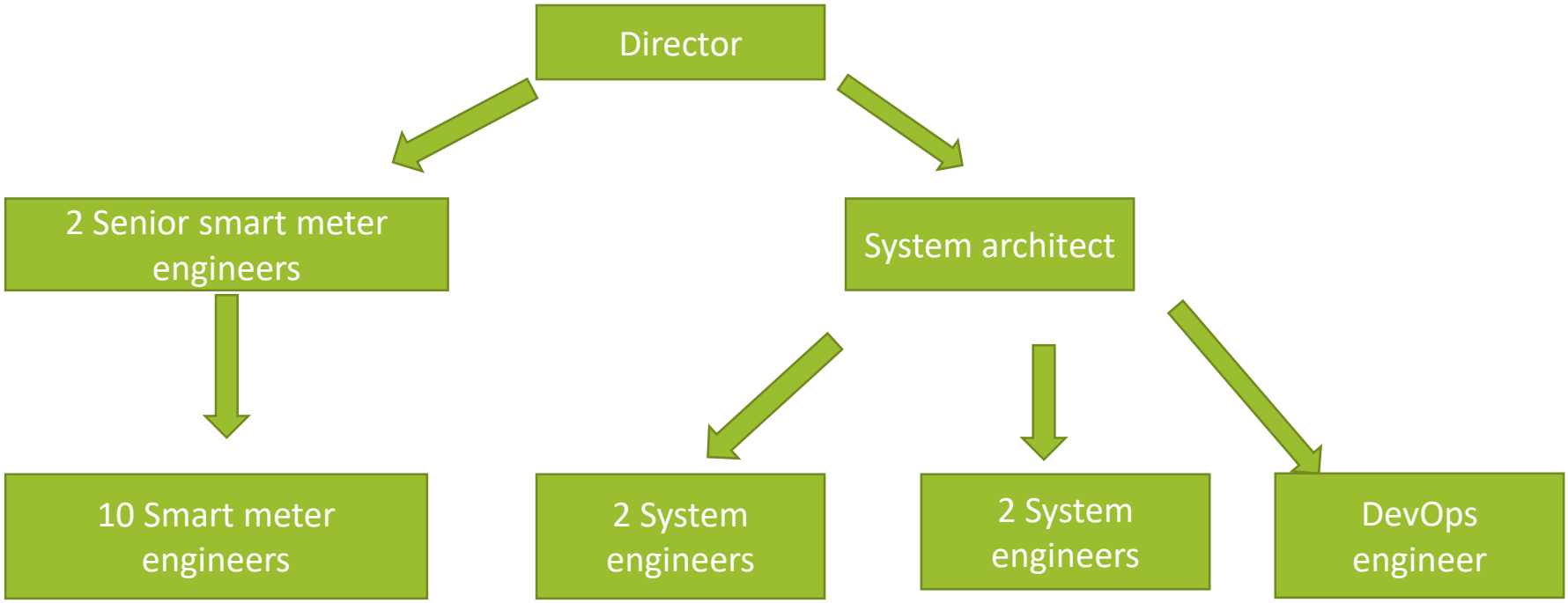




without &

with noise filter

Smart meter troubleshooting team



How we get better?

SWEMET

neuron
enabling networks

Trialog

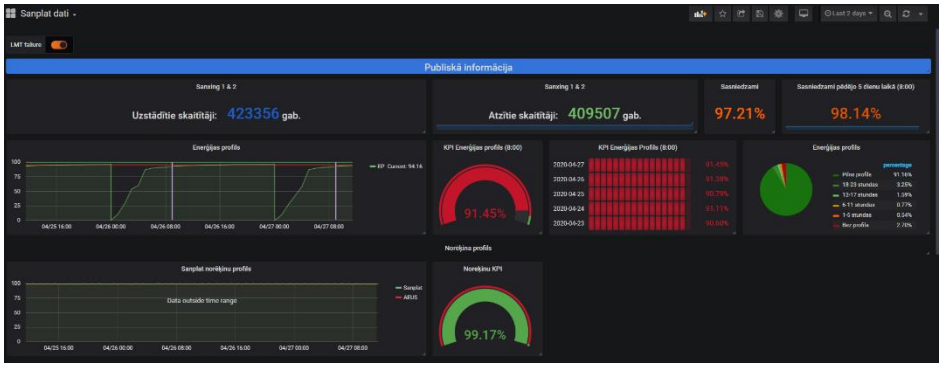
Filters

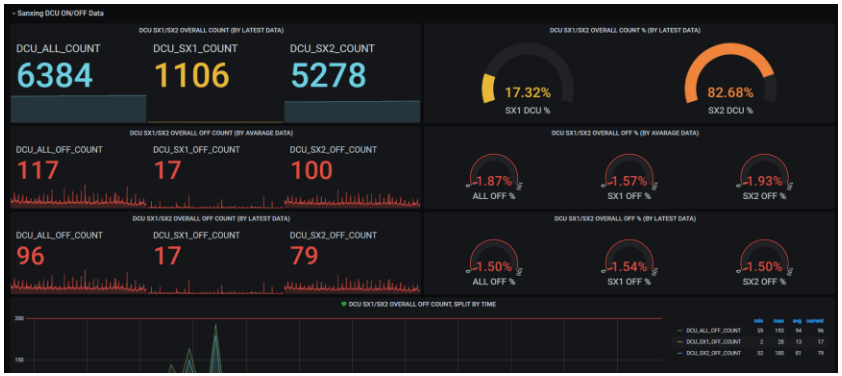
Emikon PLC filters

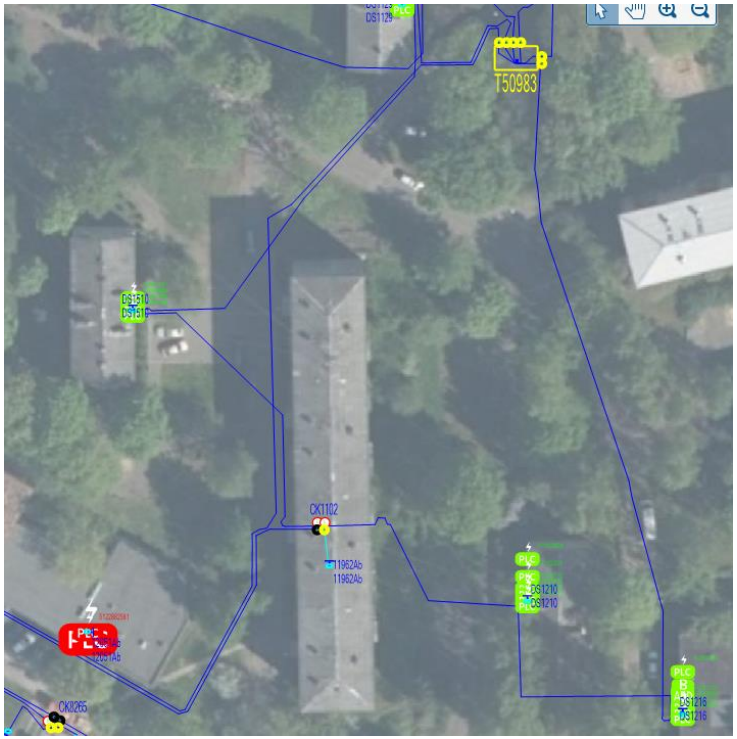
Capacitors

What we have learned?

Many problems can be identified and resolved remotely.







Thank you for your attention!

Šmerļa iela 1, Rīga, LV-1160, Latvija

+37167726000

info@sadalestikls.lv

@sadalestikls

Sadales tīkls

Discussion

Discussion

- Is this kind of information sharing useful for you?
- G3-PLC Alliance can organise future sessions to share experiences on the same or a related topic
- We will also try to organise a DSO meeting during European Utility Week in November 2020 in Milan!

Thank you very much for your attention!

- For further information please contact the presenters or generalsecretary@g3-plc.com
- Visit us at www.g3-plc.com
- Follow us on LinkedIn!

G3-PLC Alliance

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