CRE Exploitation Plan and Romanian Trial Updates Using NORM in Networks with Renewables
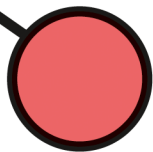
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CRE
Romanian Energy Center

success

securing critical
energy infrastructures

CRE ROLE in SUCCESS

- **WP3** - especially the development of Next Generation Smart Meter for Trials (NORM)
- **WP4** - Securing Smart Infrastructure
- **WP5** - Demonstrating secure solutions for Smart Metering.

EXPLOITATION PLAN

#	Project Exploitable Result	Responsible partner(s)	Action	Time to market (months after end of project) Actions to be performed (if you are and end user)
1	*Dissemination and communication activities*	*CRE*	*Scientific dissemination to members and other interested parties (general public to raise awareness, Romanian institutions, other NGOs interested in sustainability and low-carbon technologies, etc.) in the form of scientific papers and media articles.*	*During the project and after if subject is in line with the project*
2	*Consultation with selected Utilities members of CRE: DSOs mainly*	*CRE and Members*	*Individual bilateral meetings to present the results of SUCCESS to all interested members of CRE, based on a carefully defined Questionnaire addressed to them in advance, in order to measure their individual interests to exploit these results for the benefit of their businesses.*	*During the project and after*

EXPLOITATION PLAN

3	Exploitation Workshop with all Partners and interested Stakeholders	CRE and SUCCESS Partners	Exploitation Workshop to measure the SUCCESS Project foreground available for exploitation	During the project and after
4	Networking	CRE	Besides dissemination and communication activities, networking includes liaison with relevant organisations and participation in various events (fairs, conferences, round tables) and clusters	During the project and after if subject is in line with the project

EXPLOITATION PLAN

5	Education and Trainings	CRE	Sessions to allow interested parties to know project's results, products and services. Sessions to allow interested parties to know about sustainability, RES integration and storage technologies, electric vehicles, etc.	During the project and after if subject is in line with the project
6	Capacity Building	CRE	Participation in SUCCESS project increases association's knowledge over the project's topics which ultimately allows for future applications in projects funded by the European Commission.	During the project and after
7	Employment of specialised personnel in R&D&I activities	CRE	Participation in SUCCESS project increases association's team, adding highly skilled workforce	During the project and after

Romania trial deals with networks with renewables penetration:
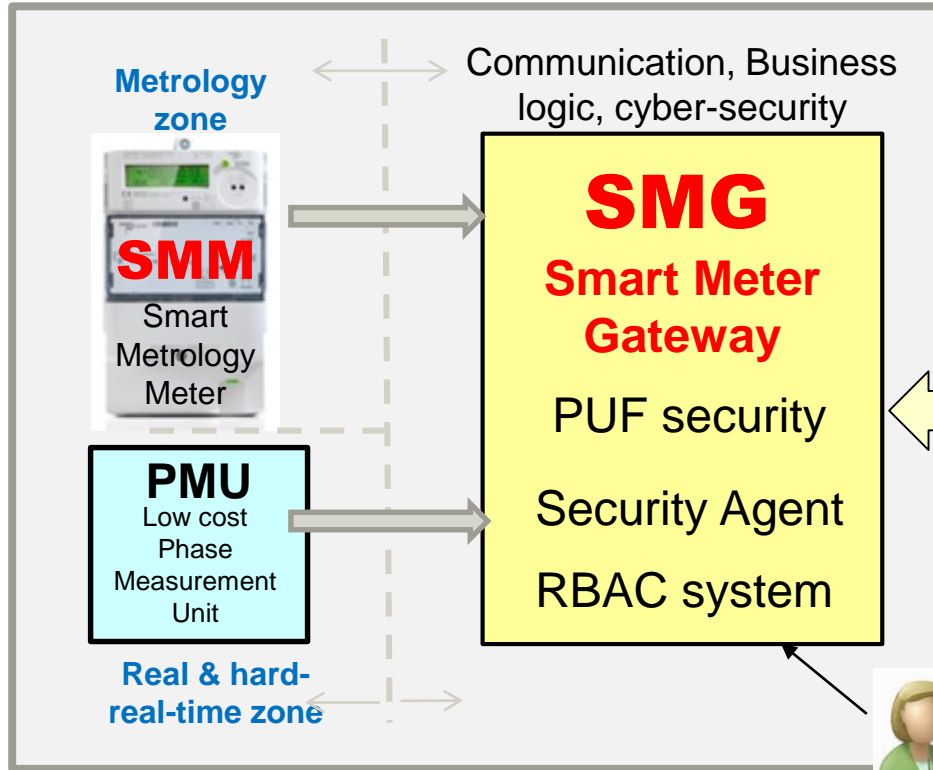
Task leader: ELECTRICA

Partner: CRE

Support: EXIMPROD (advanced phase for being project partner)

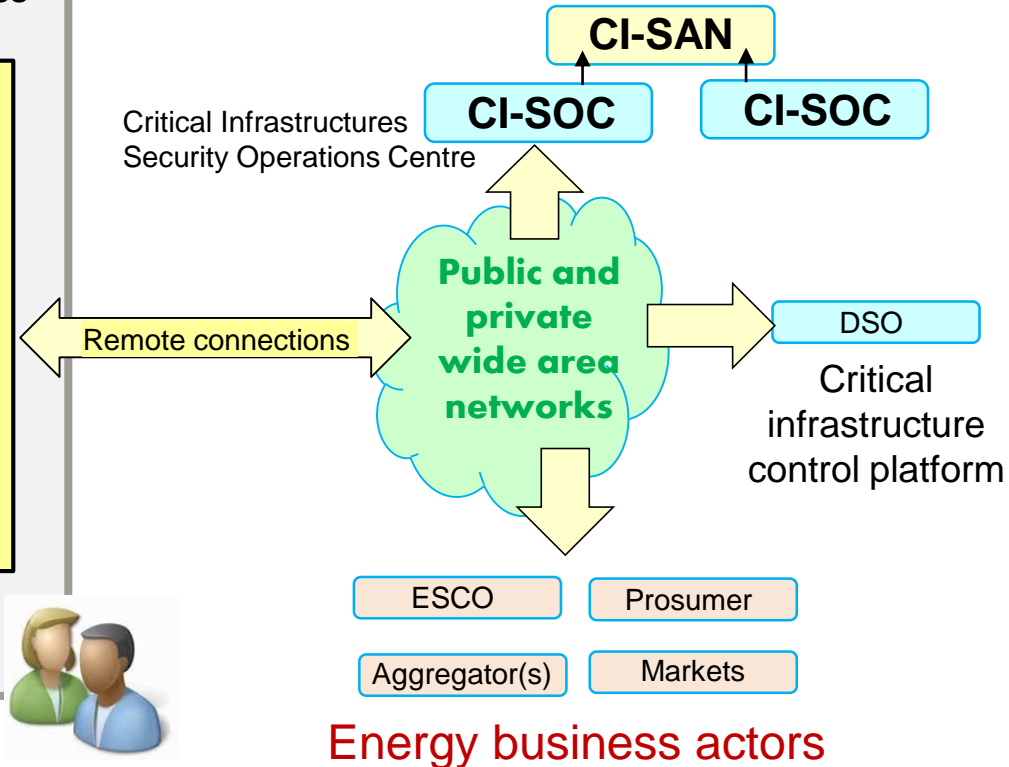**NORM development** – an evolved Smart meter concept for the future

Task leader: CRE

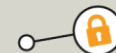Partners: RWTH, SYNELIXIS, TEAMWARE, ENGINEERING, ERICSSON

SUCCESS High level cyber-security

NORM (Next Generation Open Real Time Smart Meter)

Energy business actors

Data security assessment on each level, using **frequency as real-time "marker"**

Checking consistency at each grid level (using redundancies):

Redundancy at NORM level:
{ Frequency from meter (each 1 second)
Frequency from PMU (each 1 second)

Redundancy at local grid level:
{ Grid frequency from NORM_1
……
Grid frequency from NORM_n

Redundancy at national and Pan-European level:
{ Frequencies from regional/national grid 1
……
Frequencies from regional/national grid n

SUCCESS - Romanian Trial,   NORM deployment

All 7 x NORM metering points have been deployed in networks with renewables:

- One metering point in Sibiu / Balea Lac region (Hydro)

- One metering point in Sibiu / Talmaciu region (PV)

- Two metering points in Buzau / Stalpu region (PV plants)

- Two metering points in Ploiesti region (microgrids with PV production)

- One metering point in Pliesti / Busteni region (microgrid with Hydro production)
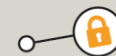
7 metering points in networks with renewables
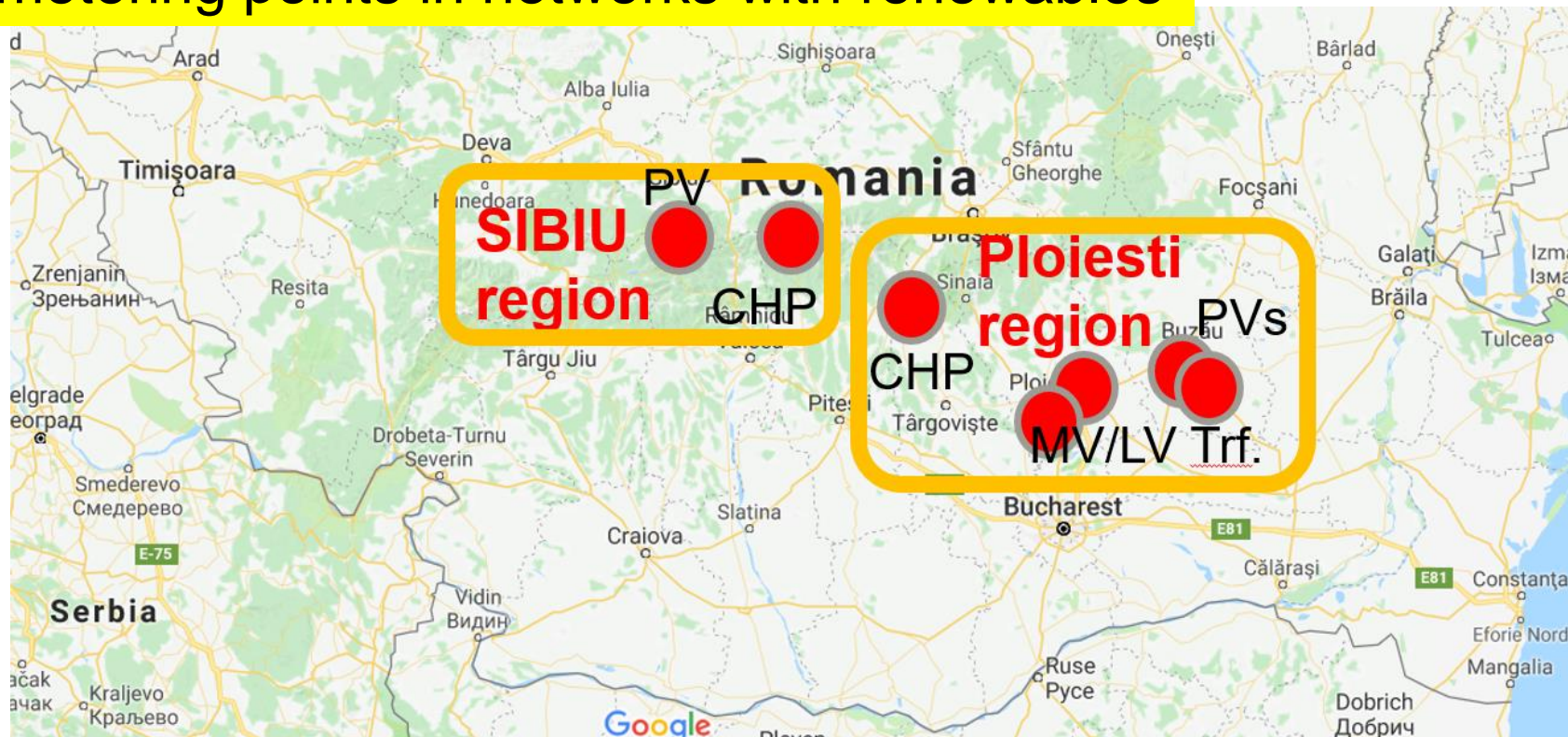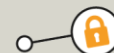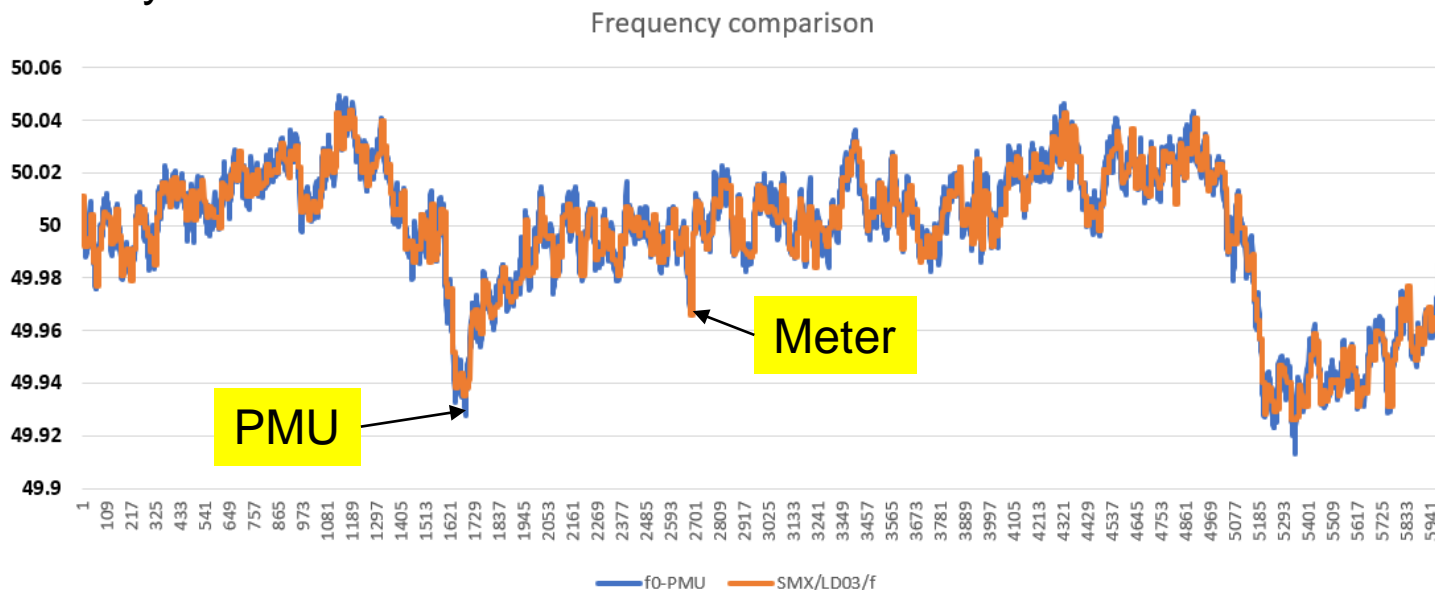
Redundancy at NORM level:
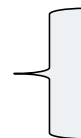
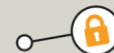Frequency from meter (second based)
Frequency from PMU (second based)
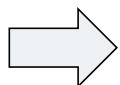
Data consistency

It is the first time that **Smart Meter** measurements are paired with **PMU**, in real-time – each 1 second, based on NORM architecture

Frequency comparison

Meter

PMU

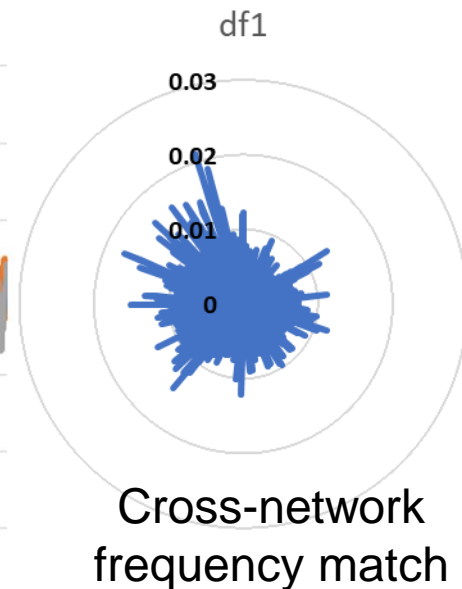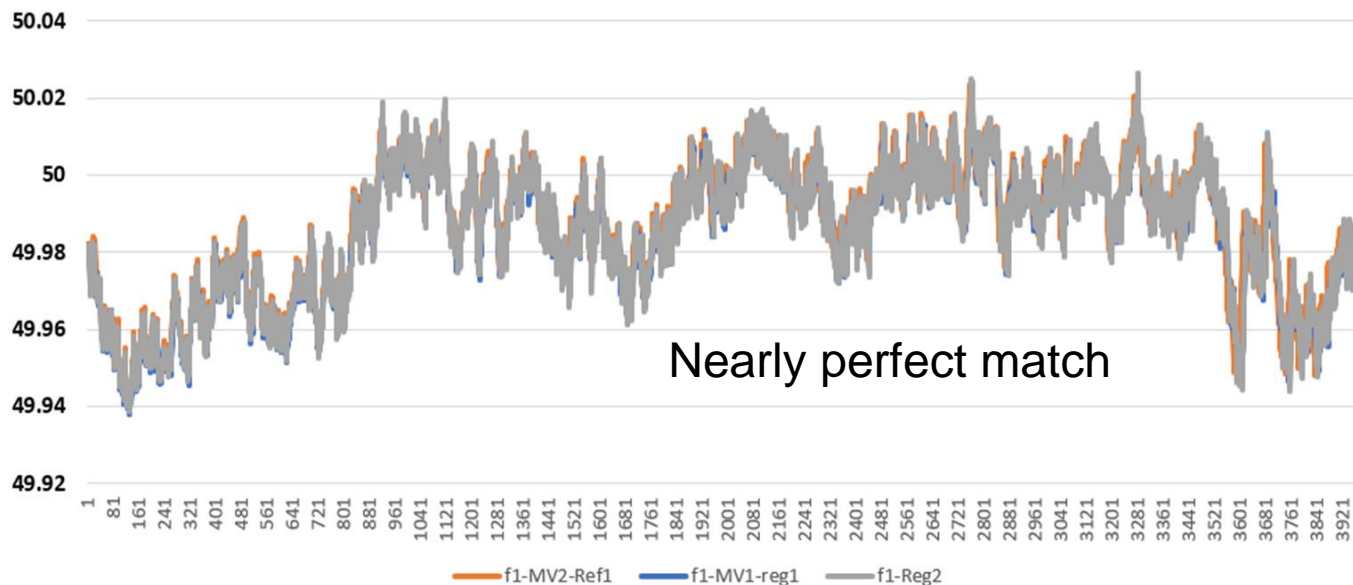f0-PMU   SMX/LD03/f

Real measurements in Romanian trial

Redundancy at local grid level: — Grid frequency from NORM_1
…….
Grid frequency from NORM_n
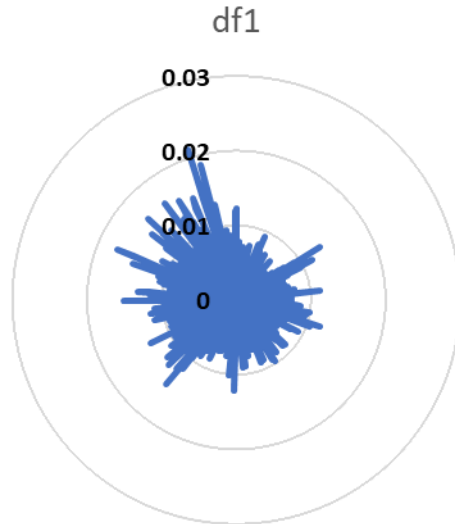
NORM-PMU frequencies in different national locatios

df1

Nearly perfect match

Cross-network frequency match

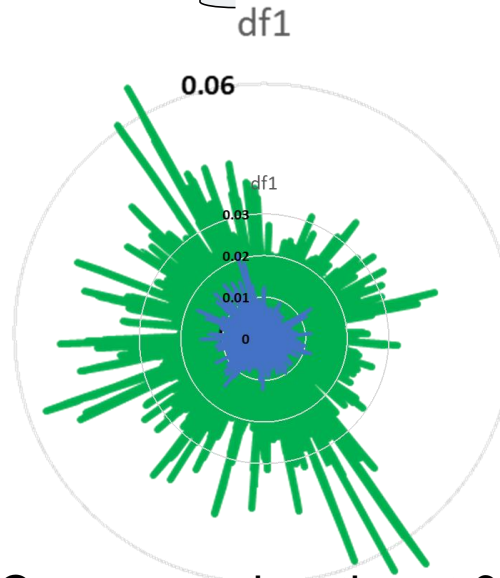f1-MV2-Ref1 f1-MV1-reg1 f1-Reg2

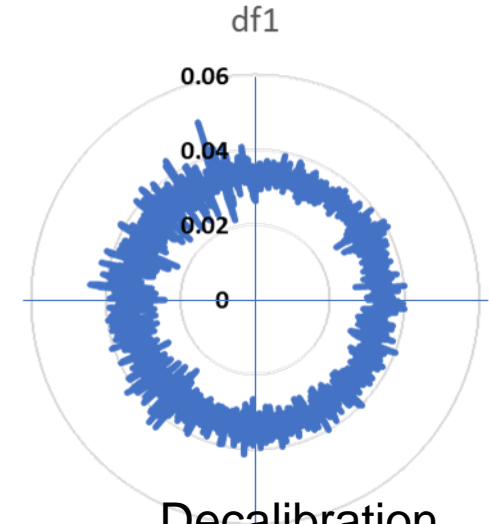**Redundancy at grid level:**

Grid frequency from NORM_1 - PMU
……
Grid frequency from NORM_n - PMU

Normal pattern

Concern: cyber threat ?

Decalibration,
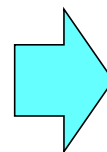Microgrid,
Cyberthreat

Frequency conformity check at CI-SOC
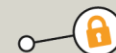
Redundancy at national and Pan-European level:
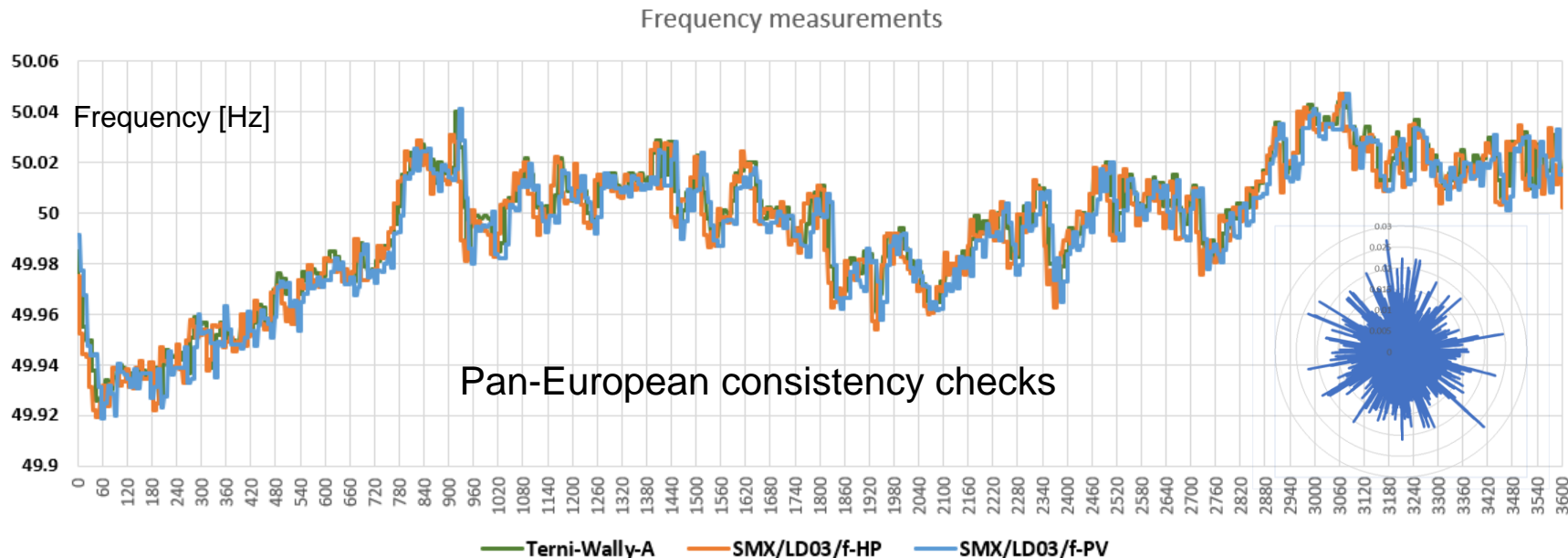
Frequencies from regional/national grid 1

……

Frequencies from regional/national grid n

Measurements:
- PV in Romania
- Hydroplant in Romania
- MV distribution grid in Terni / Italy

Frequency measurements

Frequency [Hz]

Pan-European consistency checks

Terni-Wally-A   SMX/LD03/f-HP   SMX/LD03/f-PV

Different security related measures are applied:

Data integrity check: Performed by SMM, PMU, SMG

Detecting tampering at device level

Communications spoofing / data altering

Security Agent and CI-SOC recognizing bad traffic

High level encryption: PUF technologies

Questions ?

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