

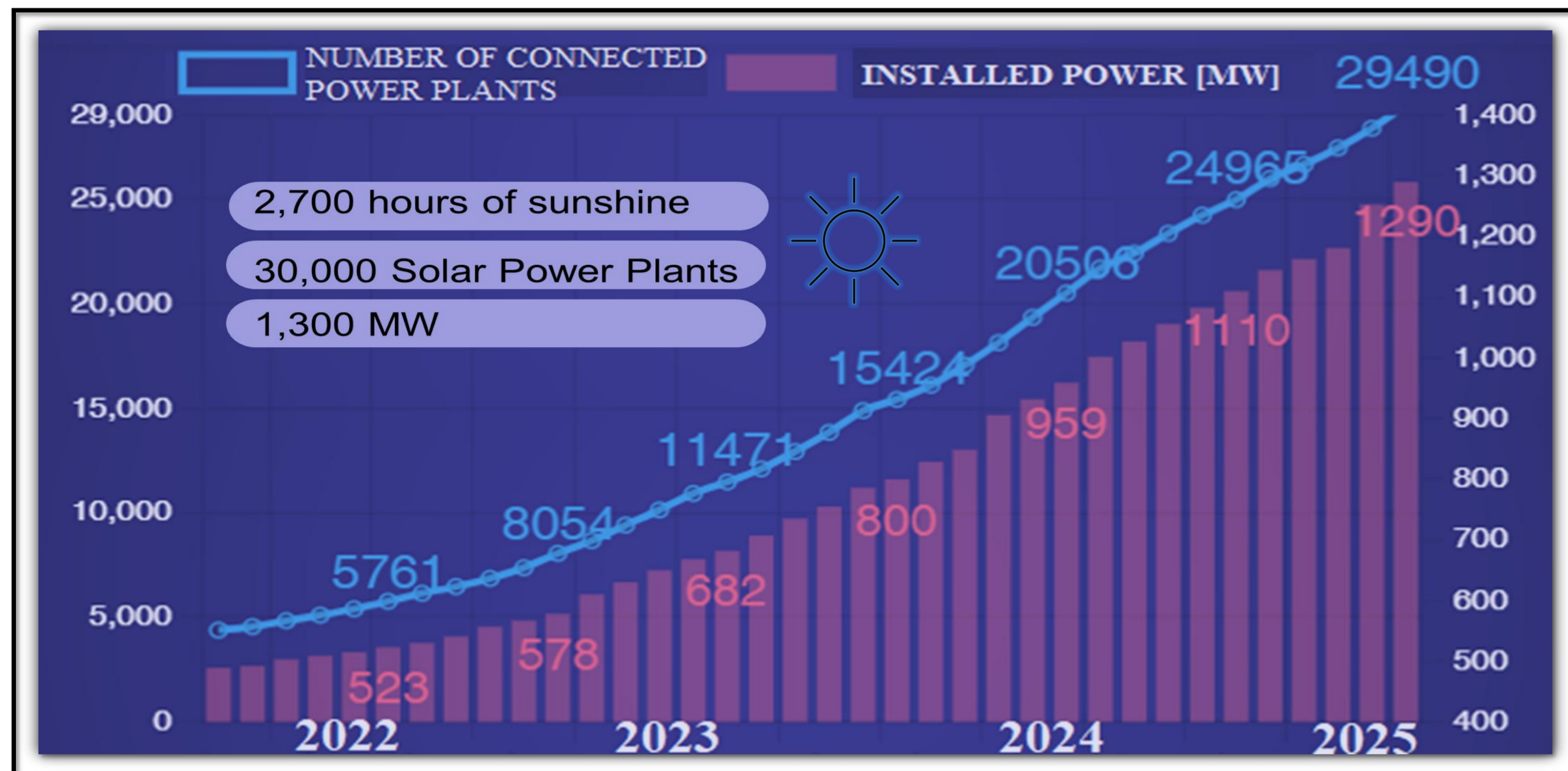
847 - Analysis of the impact of small solar power plants on voltage conditions in a distribution network with pronounced seasonal load

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Introduction



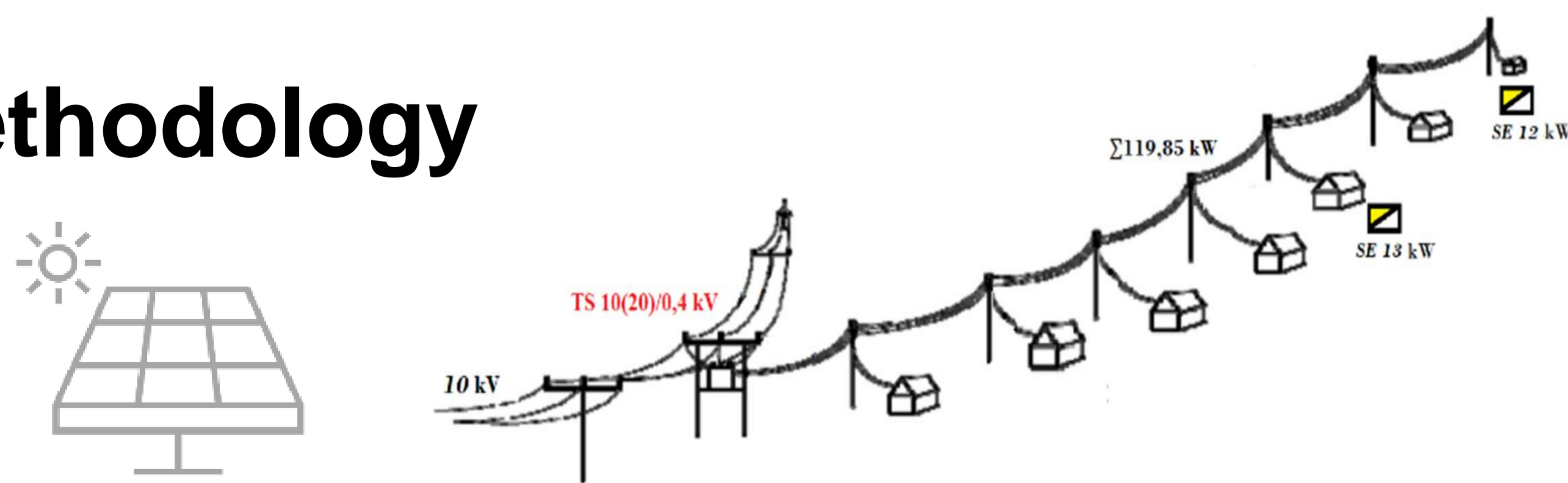
- Significant challenges for all DSOs
- Positive and negative impacts of small solar power plants

LABEL OF SOLAR POWER PLANT	MAXIMUM MEASURED VOLTAGE	NUMBER OF DAYS >253V	OBSERVED NUMBER OF DAYS
72338131	264.0	349	359
74862069	261.0	303	359
38260093	262.5	251	360
75018134	265.0	238	359
89255230	260.4	227	297
63337008	283.5	224	224
74859597	268.0	215	298
87759234	259.1	214	358
72734794	259.9	207	358
74862407	279.0	204	359

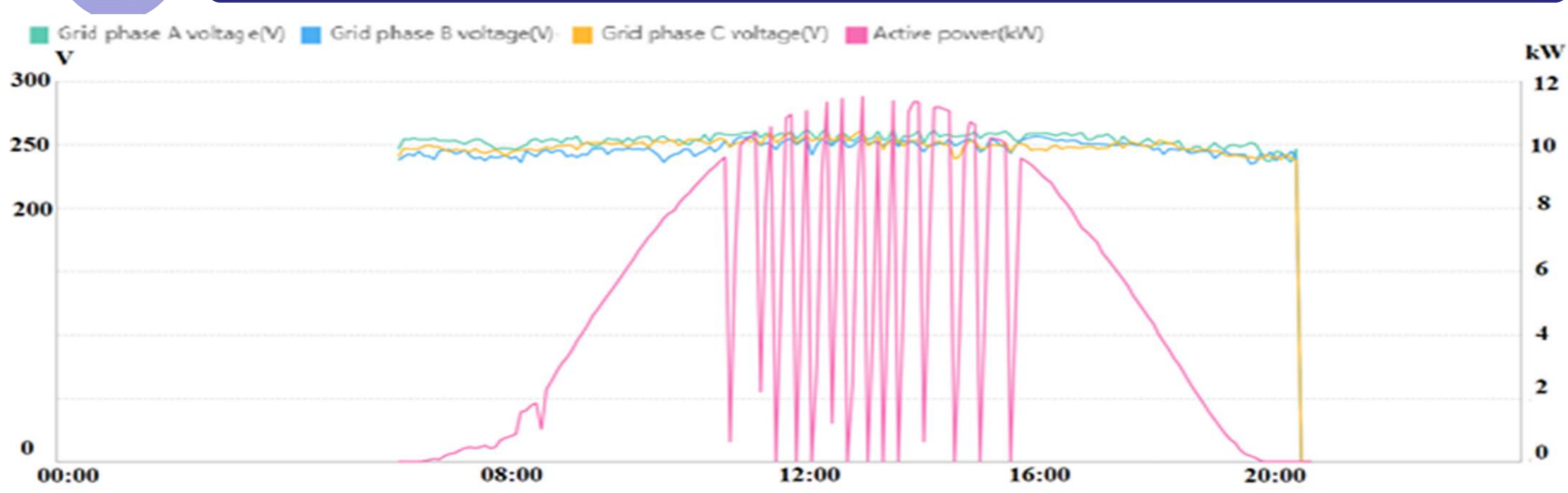
Overvoltage issues were recorded in about 30% of these power plants

2.500 Solar power plants are connected to the observed distribution network.

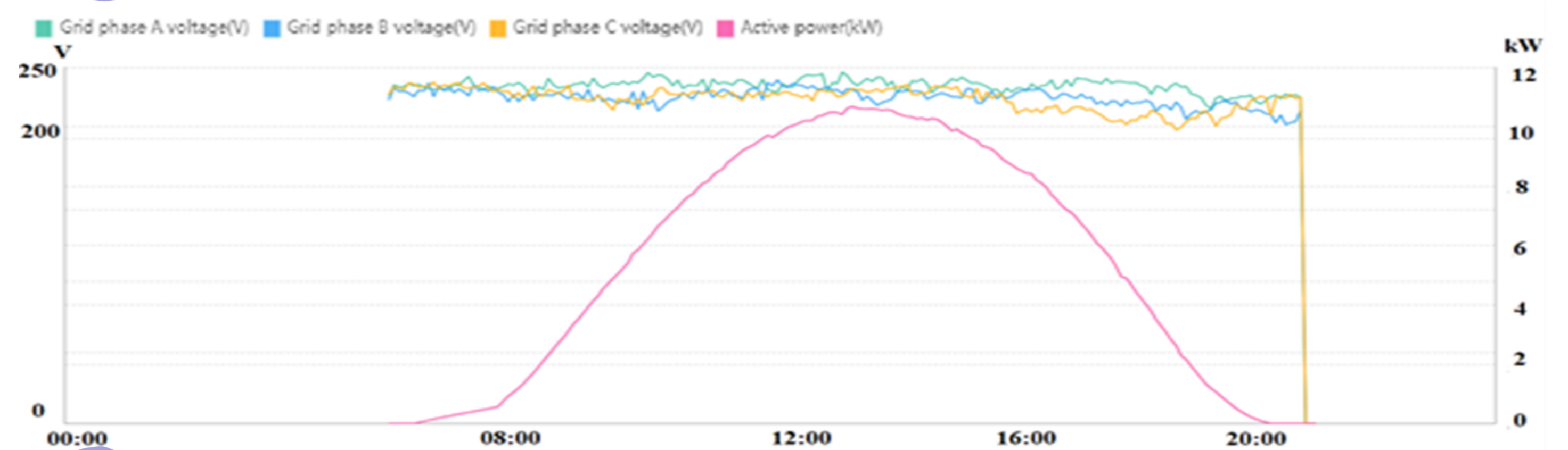
Methodology



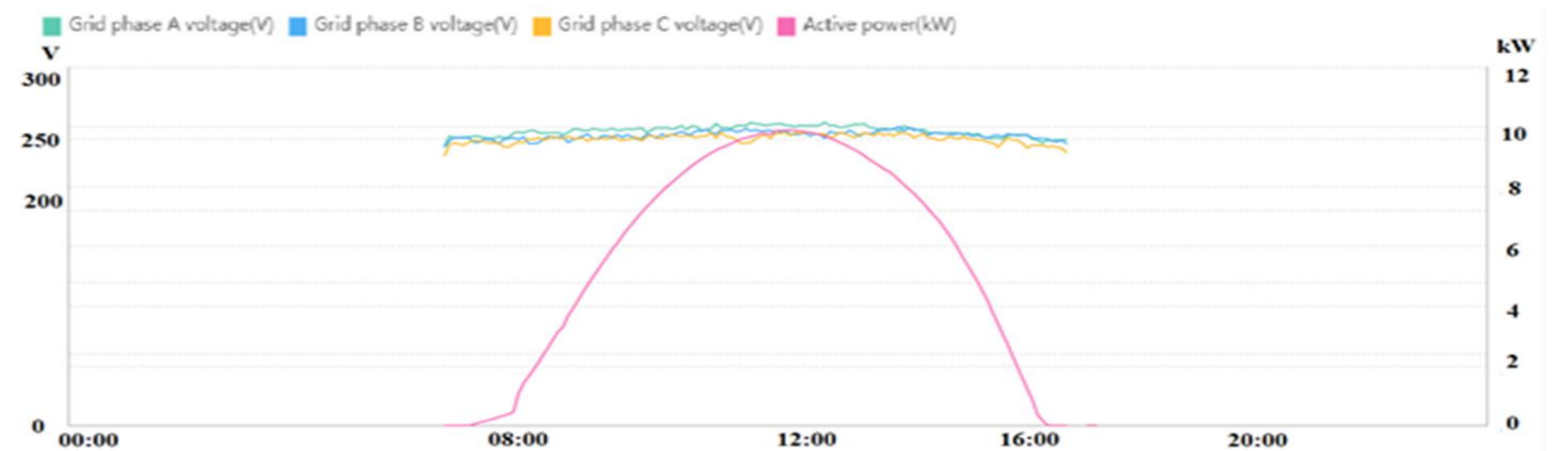
1 ➤ April 27, 2024



2 ➤ August 1, 2024



3 ➤ November 9, 2024



Conclusion

- Increasing Capacities of the Distribution Network
- Use of Transformers with Variable Voltage Ratios
- Changing the Tap Position of Transformers
- Distributed Energy Storage Systems
- Advanced Technologies - Load Management
- Installation of Autotransformers
- Application of Smart Voltage and Reactive Power Regulators in Real-Time

Generation of Reactive Power by PV Inverters

