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Installation of 400 kV, 100 MVAr Variable Shunt Reactor

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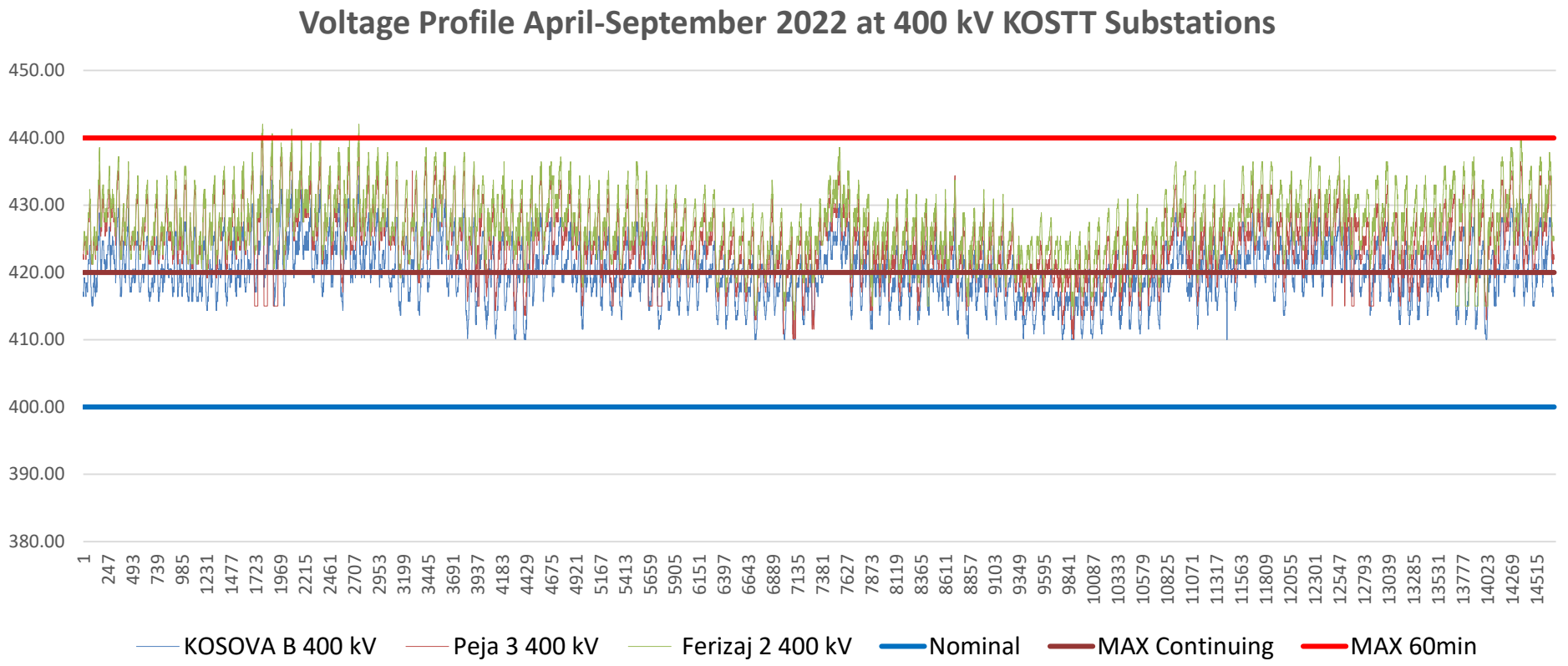
Overvoltage's in transmission network - Regional problem

- For several years power transmission system operators (TSOs) in South East Europe are experiencing with very high voltages.
- Although temporary issues have been observed in specific nodes and in specific operational regimes.
- Some of the major high voltage transmission substations experience difficulties in ensuring voltage compliance as per Grid Code Requirements.
- In all high voltage networks in the region there are substations where overvoltage occurs for more than 50% of the total hours in the year.
- In order to maintain reliability and operational security of transmission systems, it is imperious that system voltages are kept within limits.
- Kosovo Transmission Network is facing similar difficulties in ensuring voltage limits as per Grid Code Requirements.
- Operating with over-voltages causes stress and fast aging of HV equipment's, generation outage, increase of corona losses, faults in bus bars with very negative consequences on the Power System Stability.

Actual Voltage profile at 400 network in Kosovo Transmission Network

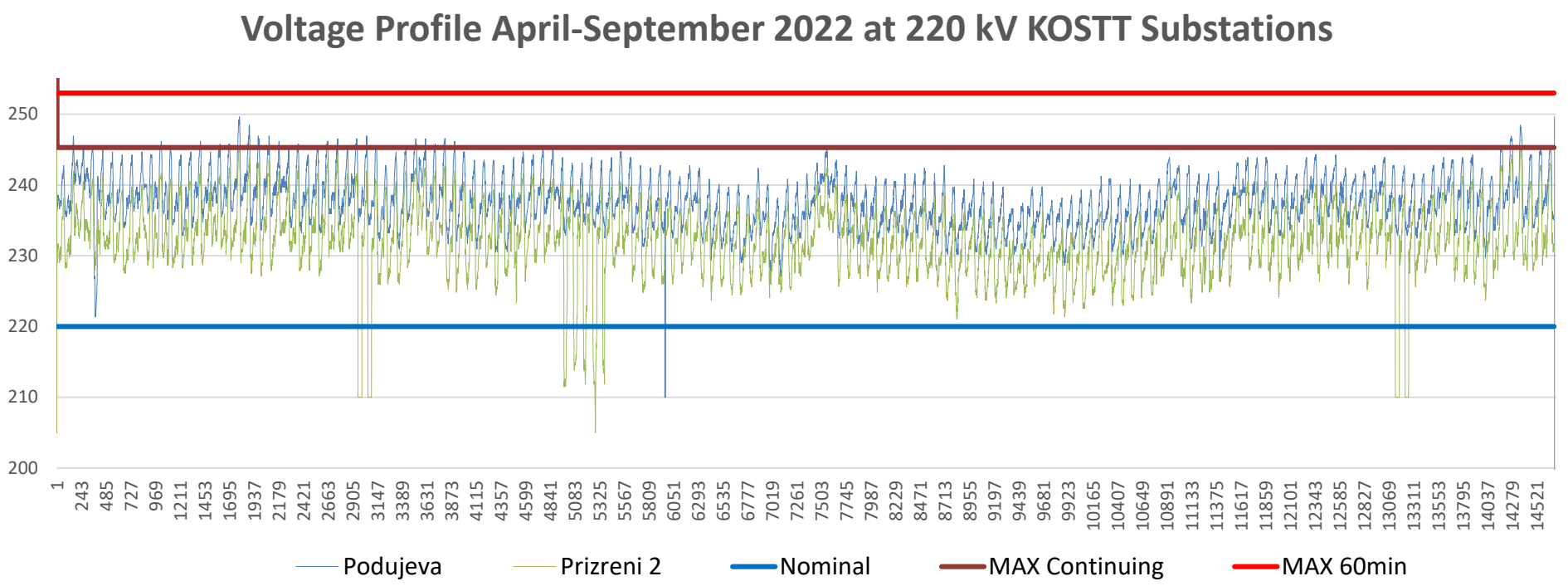


- High voltage profile occurs April-September
- Similar voltage profiles are in the region
- It is as a result of light load, very meshed 400 kV network with low level of loading.
- Not sufficient voltage control devices

SUBSTATION	SS FERIZAJ 2	SS PEJA 3	SS Kosova B
Max Voltage kV	442.0	439.9	435.1

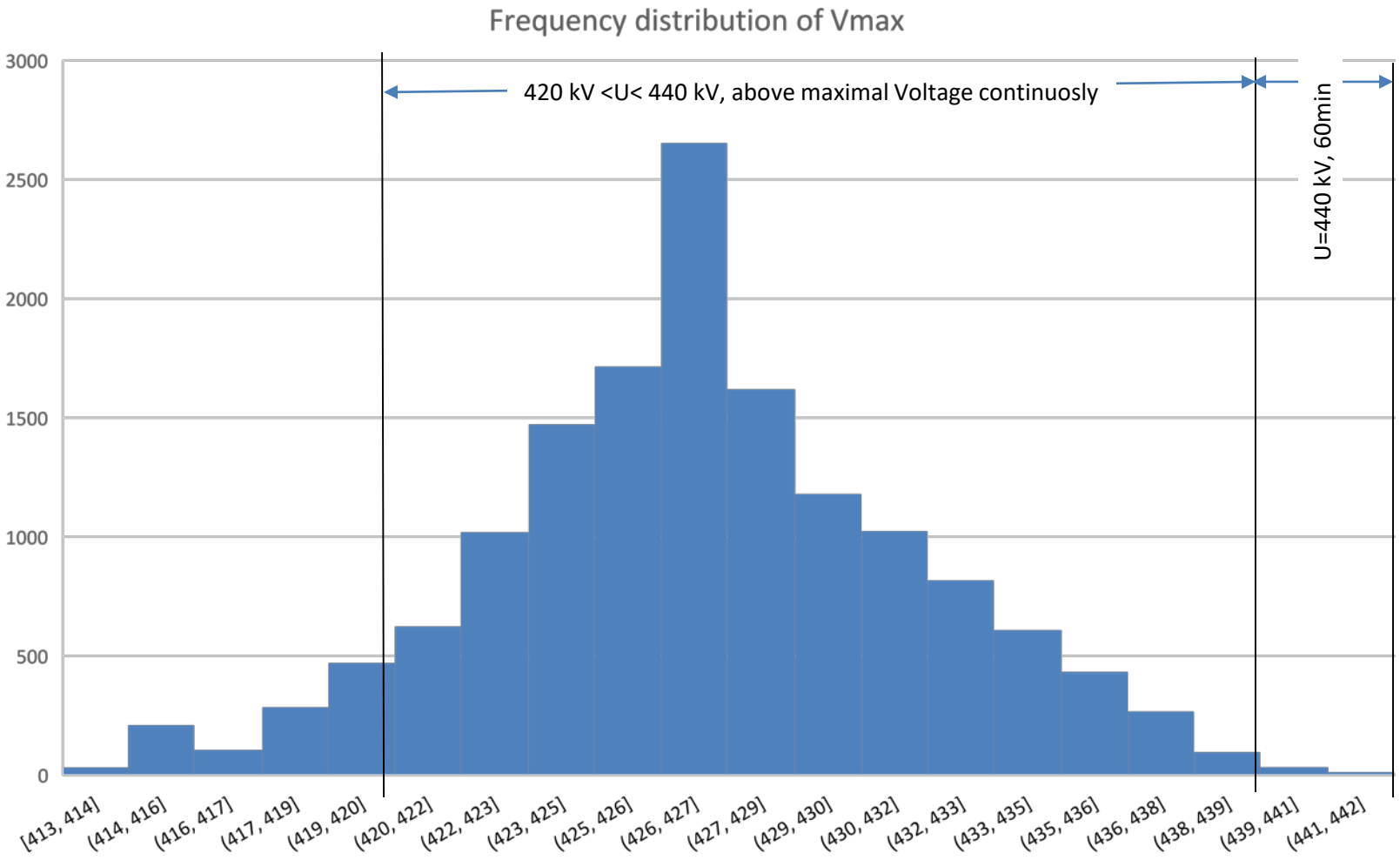
GRID CODE	Nominal	Max Continuing	Max. 60min
400 kV Bus Bars	400.0	420.0	440.0
220 kV Bus Bars	220.0	245.0	253.0

Actual Voltage profile at 220 kV network



SUBSTATION	SS Podujeva	SS Prizren 2	
Max Voltage kV	249.6	245.4	
GRID CODE	**Nominal**	**Max Continuing**	**Max. 60min**
400 kV Bus Bars	400.0	420.0	440.0
220 kV Bus Bars	220.0	245.0	253.0

Overvoltage frequency occurrences



PROJECT: 400 kV, 100 MVAr Variable Shunt Reactor in SS FERIZAJ 2, 400 kV

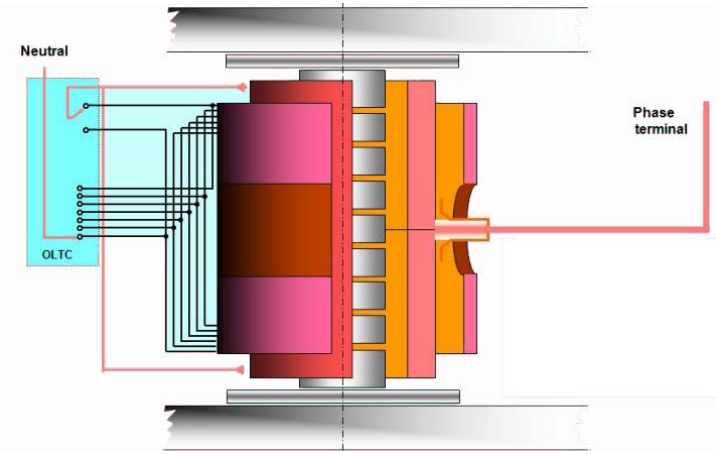
As e trigger for Project initiation is the “Regional Feasibility Study for Voltage Profile Improvement” WB17-REG-ENE-01, October 2020

Main recommendation of the study:

- Solving Overvoltage problem should be regional approach
- The study has shown most optimised location and capacity of reactor installations in 6 West Balkan Countries.
- Improvement of voltage control ancillary service, and grid code requirements for generators.

PROJECT: 400 kV, 100 MVAr Variable Shunt Reactor in SS FERIZAJ 2, 400 kV

- The project is presented in TNDP 2023-2032
- It is approved by the ERO
- Estimated cost of project: 4.8 mil
- Planned year of commissioning: 2024
- Technical specification is prepared



- The procurement process for design will be lunched in 2023
- Characteristics: 100MVar; with variability of 50%, connected at 400 kV side of SS. Ferizaj 2;

Thank You!

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