

Applications and Properties of Voltage Quality Monitoring Systems

Y.S. Beyer MSci

Nederlandse Mededingingsautoriteit (NMa)

Workshop on “Voltage Quality Monitoring”, Brussels, 1 October 2012

- Distinction between:
 - Driving applications
 - Spin-off applications
- GGP focuses on regulatory applications of VQM
- Main regulatory applications:
 - Compliance monitoring
 - System performance monitoring
 - Benchmarking

- Comparing VQ indices for individual connection points with:
 - Legal requirements
 - Regulatory requirements
 - Licensing obligations
- Requirements on VQ exist in most European countries

Recommendation:

- NRAs should have the possibility to perform independent verification of compliance if needed

- Comparing the performance of the system as a whole with predefined objectives
- Acquiring knowledge of the average performance
- Monitoring of VQ trends
- Provides input to network operator for network development planning
- Provides input for further development of VQ regulation

- Comparing network performance between different regions, network operators or countries
- Requirements:
 - Harmonised measurement
 - Same set of VQ indices
- A set of standard VQ indices is proposed in the GGP for benchmarking between different European countries

- Recommendations:
 - Consider all possible applications when setting up a VQM program
 - Design should be flexible in order to allow use for possible future applications, at a small extra cost and with small adjustments
 - Setup of VQM program should be done in close cooperation between all involved parties

Properties of VQM systems: EHV and HV networks

- Measure permanently at all measuring locations
- Measure VQ at all HV/MV substations
 - Place measurement instruments on MV side of transformer
- Measure VQ at all EHV and HV customer connection points
 - Gives information on the VQ to which these customers are exposed
 - Main interest of most customers is:
 - Voltage dips
 - Emissions from other customers (harmonics, flicker, etc)

Properties of VQM systems: MV networks

- Measure at a selection of MV/LV substations
 - Measurement should be on the LV side of the transformer
- Measure at the majority of MV customers
 - Measurement should be at the point of connection
- Exact number of measurement locations is expected to vary between countries due to specific network structure

Properties of VQM systems: LV networks

- Measure at a random selection of LV customers throughout the country for a statistically relevant sample
- Monitoring permanently or for a period of 1 week
 - Permanent monitoring:
 - Will give a better overall view of the VQ at each location
 - Portable instruments:
 - Tends to be cheaper in CAPEX
 - Allows more locations to be measured
- In the future, smart meters might become part of VQM
 - Detect only a limited set of VQ disturbances
 - Risk of problems with data management

Conclusions & recommendations

- Main regulatory applications for VQM:
 - Compliance monitoring
 - System performance monitoring
 - Benchmarking
- Recommendations for properties of VQM:
 - a. Measure at all EHV/MV and HV/MV substations
 - b. Measure at all EHV and HV customers
 - c. Measure at a statistically relevant selection of MV/LV substations
 - d. Measure at all or a majority of MV customers
 - e. Measure at a statistically relevant selection of LV customers



Thank you for your attention!

www.energy-regulators.eu

www.ecrb.eu