

POWER QUALITY MONITORING

Introduction

Power quality monitoring is the process of gathering, analyzing, and interpreting raw measurement data into useful information. The process of gathering data is usually carried out by continuous measurement of voltage and current over an extended period. The process of analysis and interpretation has been traditionally performed manually, but recent advances in signal processing and artificial intelligence fields have made it possible to design and implement intelligent systems to automatically analyze and interpret raw data into useful information with minimum human intervention.

Power quality monitoring programs are often driven by the demand for improving the system wide power quality performance. Many industrial and commercial customers have equipment that is sensitive to power disturbances, and, therefore, it is more important to understand the quality of power being provided. Examples of these facilities include computer networking and telecommunication facilities, semiconductor and electronics manufacturing facilities, biotechnology and pharmaceutical laboratories, and financial data-processing centers. Hence, in the last decade many utility companies have implemented extensive power quality monitoring programs.

5.2 Monitoring Considerations

Before embarking on any power quality monitoring effort, one should clearly define the monitoring objectives. The monitoring objectives often determine the choice of monitoring equipment, triggering thresholds, methods for data acquisition and storage, and analysis and interpretation requirements. Several common objectives of power quality monitoring are summarized here.

5.2.1. Monitoring to characterize system performance

This is the most general requirement. A power producer may find this objective important if it

has the need to understand its system performance and then match that system performance with the needs of customers. System characterization is a *proactive* approach to power quality monitoring. By understanding the normal power quality performance of a system, a provider can quickly identify problems and can offer information to its customers to help them match their sensitive equipment's characteristics with realistic power quality characteristics.

5.2.2. Monitoring to characterize specific problems

Many power quality service departments or plant managers solve problems by performing short-term monitoring at specific customer sites or at difficult loads. This is a *reactive* mode of power quality monitoring, but it frequently identifies the cause of equipment incompatibility, which is the first step to a solution.

5.2.3. Monitoring as part of an enhanced power quality service

Many power producers are currently considering additional services to offer customers. One of these services would be to offer differentiated levels of power quality to match the needs of specific customers. A provider and customer can together achieve this goal by modifying the power system or by installing equipment within the customer's premises. In either case, monitoring becomes essential to establish the benchmarks for the differentiated service and to verify that the utility achieves contracted levels of power quality.

5.2.4. Monitoring as part of predictive or just-in-time maintenance

Power quality data gathered over time can be analyzed to provide information relating to specific equipment performance. For example, a repetitive arcing fault from an underground cable may signify impending cable failure, or repetitive capacitor-switching restrikes may signify impending failure on the capacitor-switching device. Equipment maintenance can be quickly ordered to avoid catastrophic failure, thus preventing major power quality disturbances which ultimately will impact overall power quality performance.

The monitoring program must be designed based on the appropriate objectives, and it must make the information available in a convenient form and in a timely manner (i.e., immediately). The most comprehensive monitoring approach will be a permanently installed monitoring system with automatic collection of information about steady-state power quality conditions and energy use as well as disturbances.

Source : <http://nprcet.org/e%20content/Misc/e-Learning/EEE/IV%20YEAR/EE1005%20-%20POWER%20QUALITY.pdf>