Power quality: Who's responsible?

A team approach to keep your operations on track

Power quality is very important to anyone who relies on equipment and systems that are sensitive to electric disturbances. The impact of power quality disturbances can be substantial – even the smallest variation can have significant implications for your business in the form of lost time, productivity and revenue.

By developing a partnership approach to power quality issues, we can work together to keep your operations running smoothly.

We are here to help you:

- Learn about power disturbances and why they happen.
- Understand customer and utility power quality responsibilities.
- Evaluate and choose a power quality professional.

Power disturbances

Power disturbances can have their source in either the utility or customer wiring system and equipment. These disturbances can be classified into categories that can vary in effect, duration and intensity. Some types of equipment, especially if manufactured outside the U.S., can be very sensitive to the resulting voltage changes.

Disturbance type	Description	Symptoms
Interruption/ Power outage	Drop in voltage below 10% of nominal. • Momentary (0.5 cycles < time duration <= 3 seconds) • Temporary (3 seconds < time duration <= 1 minute) • Sustained (1 minute < time duration)	• System shutdown • Loss of computer/controller memory • Hardware/product loss or damage
Transient (surge)	A subcycle disturbance in the AC waveform that is evidenced by a sharp, brief discontinuity of the waveform	• Computer lock-up, processing errors, data loss • Burned circuit boards, electric insulation damage, equipment damage
Sag/swell	**Sag – Short-term** (less than one minute) decrease in voltage between 10 and 90% of nominal **Swell – Short-term** (less than one minute) increase in voltage greater than 110% of nominal	• Memory loss and data errors • Equipment shutdown, motors stopping or stalling and decreased motor life • Flickering lights
Noise	An unwanted high frequency electric signal that alters the normal voltage pattern (sine wave)	• Lock-up of sensitive equipment • Data loss and processing errors • Distorted audio and video reception
Harmonic distortion	Periodic deviation from the 60Hz sinusoidal voltage and/or current waveform.	• Electric equipment/wiring overheating • Decreased motor performance • Improper operation of breakers, relays or fuses
Under/overvoltage	Any long-term change (more than 1 minute) below or above normal voltage levels	• Dim or bright lights • Equipment shutdown, overheating of motors or lights • Reduced efficiency or life of equipment

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If you experience operational disruptions due to power quality events, you want to get the problem resolved as quickly as possible. **We are your first responder in power quality investigations to ensure that your incoming power meets mandated specifications.**

Who's responsible for power quality? We all are.

We Energies responsibilities:

- Deliver steady-state voltage within prescribed parameters.
- Limit overall harmonic distortion and radio/TV interference at the point of service.
- Provide service within Public Service Commission of Wisconsin guidelines. See appendix for details.

Customer responsibilities:

- If your operations are sensitive to short-term power disturbances, purchase and install surge protection, voltage regulation, ride-through systems, etc., to limit the effect of these disturbances on your equipment.
- Ensure that internal voltage levels are compatible with the needs of your equipment and systems.
- Limit injection of harmonics and radio/TV interference into the utility distribution system.
- Limit excessive load swings that negatively affect power quality to your facility and/or other customers.

To resolve any power quality problem, contact us to begin the investigation. Our team will determine the quality of the power entering your facility. Any problems that are our responsibility will be diagnosed and corrected at no charge to you. Our team also will work with you and your electrician or electric contractor to resolve other power quality issues you may have.

The partnership approach to power quality investigation

The partnership approach to power quality issues provides the best chance for successful problem resolution. It is simply information sharing, cooperation and ongoing dialogue between you, us and your electric contractor or on-site electrician. Each has a different perspective and knowledge of certain factors that may not be known by the others. For example:

- We may have temporarily switched your facility to an alternate feeder.
- You may have added new equipment that is highly sensitive to voltage fluctuations.
- Your electrician/electric contractor may have revised the grounding scheme for a line of machine tools.

This hypothetical scenario illustrates that the situation cannot be fully understood unless all parties share their knowledge. So get the dialogue started – and keep it going throughout the process.

We can guide you through the investigation and resolution process and offer feedback on findings and recommendations that a chosen power quality professional provides.

Choosing a power quality professional

If you are still experiencing problems after we have verified the quality of the incoming power, you may need the services of a qualified power quality professional. Among the types of power quality service providers are:

Electric contractors

Electricians working for your electric contractor can typically identify and resolve most of your power quality problems.

Independent electric testing firms

These services provide specialized staff and diagnostic equipment to analyze and make recommendations regarding the most complicated power quality problems. The testing firm recommendation is normally implemented by your electric contractor, consulting engineer or other electric professional.

Consulting engineers

Engineering firms are typically retained on an individual project basis, and may provide:

- New installation design or design/build (proactive power quality mitigation).
- Power quality investigation and resolution recommendations.
- Mitigation equipment installation and implementation project management.

Each of these service providers has a specific role in helping you ensure that your internal electric environment is compatible with your equipment and system needs. However, there is a wide range of capabilities among the firms in each category, and multiple approaches to diagnosing and resolving your power quality concerns. That's why it's important to know how to find the right provider.

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What to look for in your power quality service provider

Electric professionals are happy to discuss their relevant background and experience in providing power quality-related services. Specific topics you might consider in your search include:

- Depth and breadth of experience providing power quality diagnostic and mitigation services.
- Training and education in power quality matters.
- Investigation procedure – approach and expectations.
- Approach to monitoring. (How many devices? What is monitored? How long?)
- Professional licenses and membership in professional associations.
- Any exclusive ties to a particular solutions manufacturer.
- Approach to developing a business case for investing in a power quality solution.

Contact us

Please contact us whenever we can help you with power quality or any energy service issues. Call your We Energies representative, or contact our Business Care Center at businesscenter@we-energies.com or 800-714-7777, ext. 7700.

Appendix

The following summarizes certain key points related to power quality within the Public Service Commission of Wisconsin regulations that govern We Energies.

1. **PSC113.0702** requires the steady state service voltage to be "reasonably constant" within the following limits:
   a. Non-industrial services — within plus or minus 5% of nominal voltage
   b. Industrial services of 500 kW or less — within plus 5% and minus 10%
   c. Industrial services over 500 kW — within plus or minus 10%. In Michigan, steady state service voltage must be maintained within plus or minus 5% for all service types. The term "steady state service voltage" as used above means the rms voltage after all sags, swells and transients have decayed to a negligible value.
2. **PSC113.0703** states that momentaries, sags, surges and other short-term (and generally unavoidable) disturbances shall not be considered a violation of the rules. However, certain events may indicate a need for repairs or improvements to We Energies equipment (determined case-by-case).
3. **PSC113.0704** states that utilities shall make reasonable efforts to investigate voltage harmonics at the service entrance. If the source of the harmonics is another customer, the utility must notify that customer, who must then correct the problem. There is a similar provision in PSC113.0707 regarding radio and television interference.