PETERSBURG
MUNICIPAL POWER & LIGHT

Understanding Brownouts on Our Local Electric System

Because our community is served by locally generated hydroelectric power system, we are largely insulated from the lightning strikes, long transmission lines, and large grid switching events that cause voltage spikes (surges) in other parts of the country. Instead, the most common power disturbance Petersburg experiences are brief voltage sag, or "brownout." These disturbances typically occur during periods of high demand or large equipment startups; bird strikes and line contact with trees are also very common here. Low-voltage events are a normal characteristic of small, isolated hydro systems and are far less damaging than high-voltage surges.

Power Surges and Brownouts FAQ

Do surge protectors help with brownouts?

No. Surge protectors are designed to protect against high-voltage events and do not prevent or correct low-voltage conditions like brownouts.

Why do we sometimes experience brownouts instead of outages?

Our electric system is powered by local hydroelectric generation and operates as an islanded or isolated system. When demand briefly exceeds available generation or conditions add extra load to the system, voltage may dip slightly instead of power shutting off completely. This temporary reduction in voltage is known as a brownout.

What causes brownouts on our system?

Brownouts are typically caused by high electrical demand, large electric motors starting, large birds making contact with overhead power lines, and trees contacting overhead power lines—especially in snow or windy conditions—long or heavily loaded distribution feeders, and sudden load changes.

How do trees touching power lines cause brownouts?

In our wet Southeast Alaska climate, trees touching overhead lines can allow electricity to leak through the tree to ground rather than creating a direct short circuit. This creates a partial fault that adds load to the circuit and causes voltage to drop, resulting in dimming lights or slowed motors instead of an outage in some cases.

Why doesn't the power shut off when this happens?

Protective devices are installed on our system, but they are designed to operate during high-current faults. Tree contact often produces limited or intermittent current that stays below trip thresholds, allowing the circuit to remain energized at a reduced voltage. Depending on the duration and severity of contact this will result in a trip causing an outage.

Are brownouts harmful to household equipment?

Short brownouts are usually not harmful to electronics, but prolonged or repeated low-voltage conditions can increase heating and wear in motors such as refrigerators, freezers, pumps, and heat pumps.

What protection is available for homes during brownouts?

Customers may consider uninterruptible power supplies (UPS) for sensitive electronics, modern appliances with built-in motor protection. UPS systems with Automatic Voltage Regulation will provide "clean" power to the appliances that it powers while also offering immediate separation from the distribution system when occasional brownouts do occur.

Customer Summary

Brownouts on our system are most often caused by high demand, large equipment starting, or trees contacting overhead power lines in wet or windy conditions. Because our community is served by local hydroelectric generation and is not connected to a larger grid, voltage may temporarily dip without causing a full outage. Surge protectors are not helpful for brownouts and use of uninterruptible power supplies (UPS) are encouraged.