Wavecrest Case Studies – 2025

Power quality events are one of the most significant and costly impacts on electrical systems and products. Studies have shown poor power quality costs the European economy up to €150 billion annually and the U.S. economy up to $180 billion annually, according to studies by the Leonardo Power Quality Initiative and the Electric Power Research Institute (EPRI), respectively.

These losses come from equipment damage, downtime, warranty claims, callbacks, and more. Not to mention the intangible losses such as damaged reputation, strained customer and supplier relationships, and lawsuits.

Wavecrest addresses these problems with its patent-pending power quality protection design.

Wavecrest is a power quality protection device that is wired at the branch circuit level to protect equipment from dirty power. As of January 2026, there are 120v, 208v, 240v, and 277v units available for purchase, all with up to 30A of load condition.

Wavecrest will protect any sensitive electronics from:

- **Surge:** 120kA, 10% let-thru voltage
- **EMI Noise:** 80db @10kHz
- **Overvoltage:** 10% above rated voltage - shutoff
- **Undervoltage**: 15% below rated voltage - shutoff
- **Transients:** 8µs x 20µs
- **Harmonic Blocking** for protected loads

The following case studies are from 2025 and are a small sample size of Wavecrest uses. As you will see from the case studies below, power quality events can and will affect facilities of all types in different ways.

Case Studies

1. Transient Sag & Flickering LEDs – Catholic Health of Long Island
2. EMI Noise & Transient Surge - Residential Heat Pump and Hot Water Circulator
3. Transient Spike & Emergency Lights – Metropolitan Transportation Authority – NYC
4. On-Roof Solar & EMI Noise – Manhattan Beach, CA Restaurant
5. Transient Spikes & Gas Pump Point-of-Sale – Houston, TX
6. Overvoltage and High Bay LEDs – Tulsa Air and Space Museum
7. Noise & LED Controls – Livingston, NJ ‘Smart’ Home

1. Transient Sag & Flickering LEDs – Catholic Health of Long Island

Problem: After an LED retrofit in this medical office building, it was noticed that whenever the elevator ran or the AC came on, entire sections of lights were flickering. Turns out the building had some dirty power and the equipment startup was causing a short duration sag on the power line, which caused the LEDs to flicker.

Figure 1: Wavecrest installed on each lighting circuit

Why wasn't this noticeable with the old lights? Because the fluorescent gas inside the old tubes could maintain the electrical charge during the split-second sag in the power line. LEDs cannot. So, it was on the installer to solve the problem.

Solution: (10) Wavecrest 277v units across all lighting circuits in the building filtered the dirty power and solved the flickering issue while protecting the lights from further power quality problems. Important note: Wavecrest is not a UPS or voltage regulator. Wavecrest accomplished this with its transient sag protection that can "ride out" the quick dip in the power that causes the flicker. Any time there are large sections of lights flickering, this is usually the culprit and Wavecrest can help.

2. EMI Noise and Transient Surge in Residential Heat Pump & Hot Water Circulator

Problem: Power outages and dirty power from the home's backup generator were causing issues with the heat pump and hot water circulator.

The **heat pump** was not coming on during the outage despite the whole-house generator working properly. Somewhere along the power line was causing the controls to not operate properly. Possibly harmonics or EMI noise. Generators are known to produce power that can disrupt equipment that rely on electrical signals.

When the power returned from an outage, the **hot water circulator** power board was destroyed from some sort of PQ event. It's possible that it was an in-rush or transient overvoltage. Many power boards on modern equipment are susceptible to power quality events.

Figure 2: 240v & 120v units installed below the panel. Wavecrest can be mounted wherever is easiest for the installer.

Solution: One Wavecrest on each unit's circuit breaker filtered the dirty power and protected it against the onslaught of PQ events.

Heat Pumps: The Wavecrest patent-pending circuitry cleans up the generated power and allows the heat pump controls to work properly during the outage.

Hot Water Circulator: The Wavecrest patent-pending overvoltage protection prevents the equipment from seeing the spike, waiting for proper supplied voltage before energizing the equipment.

Here is a video link to the installation:
https://www.linkedin.com/feed/update/urn:li:activity:7285739573840642048/

3. Transient Spike and Emergency Lights – NYC Subway

Problem: The Metropolitan Transportation Authority of NYC had an issue with the lights in their emergency stairwells periodically burning out. They would lose 5-10 fixtures per month in each location. There are hundreds of locations across the city. What's more, it was also burning out the battery backup in the fixture. They suspect it was a transient voltage spike that was not being stopped by the TVSS installed at the panel.

Since these stairwells are only accessed when needed, the problem would not be noticed until someone needed to use the stairwell, creating a safety hazard and operational inefficiency.

The “stairwells” are really ladders that are only accessible through manholes in the street and on the sidewalk, so changing fixtures is very expensive from a labor standpoint. Since these fixtures were under warranty the manufacturer and ESCO were covering the labor and replacement equipment cost. This was a problem they were desperate to solve.

Figure 3: Wavecrest installed on 2 of the lighting circuits for the MTA

Solution: The customer decided to try a (35) unit pilot program in 3 of the most problematic areas in December 2025. Since the installation, there have been no more fixture failures where the Wavecrest was installed.

Whether it is transient spikes or a sustained overvoltage, Wavecrest will protect the lights from burnout. The transient spikes are absorbed through 5-stage surge suppression with only 10% let-thru voltage. Many surge suppression devices on the market have shockingly high let-thru voltage - up to 300%.

If it is, in fact, a sustained overvoltage causing the burnout, the Wavecrest will disconnect power, allowing the battery backup to come on, and not return power until proper voltage is sensed for 3 seconds.

The all-in-one power quality protection from Wavecrest lets you throw a wide net over the sometimes-mystifying issues of power quality.

4. On-Roof Solar & EMI Noise – Manhattan Beach, CA Restaurant

Figure 4: Flickering lights can legitimately hurt a business's bottom line.

Problem: High-end restaurant was experiencing periodic flickering in their LED lights. The main dining area would flicker at random in unison. We determined that it was most likely the on-roof solar creating EMI noise and causing the flicker.

Inverters produce a lot of noise when converting the PV electricity from DC to AC. This can be compounded by multiple solar arrays in an area feeding off each other. EMI noise can disrupt electronics and cause a headache for the customer. The restaurant owner was extremely motivated to solve the problem.

Solution: (5) total Wavecrest units on the lighting circuits in the restaurant solved the flickering problem. This was a vastly more affordable solution vs. hiring power quality engineers to deploy a study just to come back with the results that the customer does, indeed, have a power quality issue. Wavecrest can give you answers and solutions at the same time. And if it does not fix the issue, you've at least crossed off the list of power quality events it protects against as potential causes. That's why we encourage pilot installations!

Figure 5: (2) of the 120v units installed in the wine cellar, down the stairs from the electrical panel that was in the hallway. Note: iPhone cameras have a hard time capturing the voltage readouts.

5. Transient Spikes & Gas Pump Point-of-Sale – Houston, TX

Problem: Dirty power has been burning out credit card readers and pump screens at gas stations in Texas. These are very costly to replace, usually ~$1,400 each, and can lead to lost pump revenue. Texas has a variety of power quality issues. The customer and MIC both believe that this was a form of transient spike that the ICM SPD was not sufficiently protecting against.

Figure 6: Initial sample installation at a particularly problematic pump. We encourage customers to try Wavecrest on the most troublesome circuits they have!

Solution: Every pair of pumps was fed by a 20A branch circuit, so (1) Wavecrest was used to protect 2 pumps at a time. A straightforward 2:1 pump to Wavecrest ratio.

The Wavecrest pilot installation went extremely well and since the installation in October, there have been zero pump screens and card readers destroyed by dirty power. The customer is extremely pleased and is planning on rolling this out across all their gas stations!

6. Overvoltage and High Bay LEDs – Tulsa Air and Space Museum

Problem: The Tulsa Air and Space Museum had an overvoltage issue that was burning out their high bay lights. The museum is in an industrial area near the airport and was subject to overvoltage events.

Figure 7: Tulsa Air and Space Museum

Overvoltage is an extremely destructive power quality event. It can occur from a neutral wire disconnect, power outage/returning power, or lightning. It can either be sustained for a long period of time or a transient occurrence. It will almost always lead to equipment burning out and costly repairs and downtime.

As you can see from the picture, replacing these light fixtures is not as simple as screwing in a new light bulb in your pantry. It can be an expensive time-consuming headache for the owner, installer and manufacturer.

Contrary to popular belief, typical surge protection devices will NOT protect against this kind of power quality event.

Figure 8: 208v LEDs was a unique aspect of this job

Solution: (4) 208v Wavecrest units installed at the lighting circuits will filter the dirty power, protect the lights and end the nightmare of constant call backs.

Wavecrest accomplishes this with patent-pending overvoltage protection built into the power quality control. It senses the overvoltage, disconnects power to the protected branch circuit, and monitors the voltage until it is safe to reconnect. It waits for 3 seconds of correct voltage before reconnecting power automatically – no breakers or fuses. Not only does this protect the equipment on the branch circuit, but also the Wavecrest itself, ensuring that it can withstand years and years of power quality events.

This classic Win-Win-Win for the customer, manufacturer and installer.

7. Noise & LED Controls – Livingston, NJ 'Smart' Home

Problem: Large residence (30,000 sf) was having issues with their lighting controls. The lights in the foyer were randomly turning on. The contractor replaced every single driver multiple times and the issue persisted. Something either inside the house or from the power line was creating noise that was disrupting the driver operation.

Figure 9: One Wavecrest stopped the problem in the whole house!

This was a top of the line "smart" home equipped with all of the bells and whistles. Unfortunately, sometimes those bells and whistles can create a fair amount of EMI noise that affects the complicated controls system in the house. The problems that stem from this can be extremely confounding to contractors and manufacturers.

Solution: A single Wavecrest unit wired at the problematic lighting circuit filtered the dirty power and prevented the issue from occurring again. A lot cheaper and easier than changing every driver and checking every wire connection in the house!