

## Case Study

### Johns Hopkins University School of Medicine

### The Preclinical Building – Baltimore, MD

#### Facility Description

##### *Characteristics:*

- 2 floors above ground
- 2 floors below ground
- Completed in 1981

##### *Existing Conditions:*

- 2 large power distribution transformers
- 32 year old transformers
- Extremely light electrical load
- Average loading of system as percentage of capacity = 14.9%
- Reasonable harmonics were identified

#### Challenge

1. The published efficiencies of the transformers were less than today's minimum operating efficiency standard (NEMA TP 1) required by law. Additionally, the transformers in the system were nearing the end of their lifecycle and their operating efficiency had been degraded over the years.
2. Harmonic current and voltage distortion was identified at the transformers. Long circuit lengths cause voltage distortion to increase at the loads due to increased circuit impedance. Since the transformers were located in the basement, PQI expected voltage distortion to be quite high at many of the loads, some as far as 11 floors from the source. High voltage distortion caused the loads to operate inefficiently.



#### Solution

PQI engineered a Power System Optimization Solution that involved the replacement of both transformers with ultra-efficient, harmonic mitigating transformers. These transformers were strategically designed, resized and reconfigured to achieve harmonic mitigation, regulation of voltage distortion, excitation loss reduction, improved power quality and energy savings throughout the facility.

#### Impact

- ✓ **1,587,332** = Annual kWh savings
- ✓ **\$158,733** = Total annual utility savings
- ✓ **21.3%** = Reduction in energy costs
- ✓ **3.1 Months** = Project Payback

The point at which the usage line splits from the model line represents the time of PQI's Solution installation.

