



# John Hancock Center Reduces Electrical Losses by 17% on Drive Load & 9% on Lighting Load from Power Quality Improvements

Gexpro partnered with Prasan Kale, Director of Building Operations from Golub & Company using EP's waveform correction technology to improve the power quality of the John Hancock Building. They selected two systems with non-variable constant loads. A common area lighting load was selected on the 13th floor and the static air system on the 16th floor.

Energy consumption was measured and data was collected at both locations for 30 days prior to installation of device and 30 days after the install to capture accurate measurement and verification (M&V) of energy savings due only to the installation of EP devices. Andy Lynch from Gexpro developed this M&V process with assistance of Les Ballard from Gexpro and Darrin LeRoy from EP according to the **International Performance Measurement & Verification Protocol**, Volume 1 September 2010 by Efficiency Valuation Organization [www.evo-world.org](http://www.evo-world.org). The best applications of M&V Option B: Retrofit Isolation was applied to this energy conservation measure.

The blower fan is coupled with a 50 hp VFD. A VFD is a nonlinear load that adds distortion and noise to both current and voltage waveform. The lighting is powered by electronic ballasts and self-ballasted CFLs and is also a nonlinear load. These distortions in the waveform will decrease the lifetime of the load and increase electrical losses.

**The electrical losses on the 13th floor lighting system were reduced by 9.19 percent while the electrical losses on the 16th floor static air system were reduced by 17.02 percent!**

Fig.1 The voltage noise is at harmful levels.

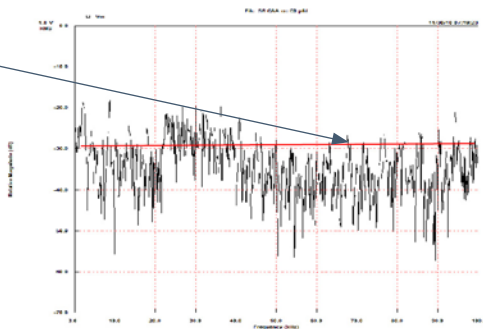


Fig.2 The noise is decreasing to harmless levels

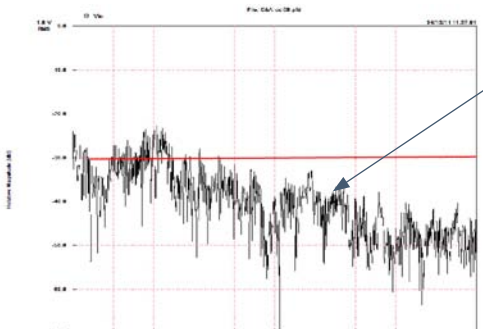


Figure 1 shows the voltage high frequency noise is averaged at approximately -35db with a peak of -19dB throughout the voltage spectrum from 3-100kHz. This level of noise indicates wasted energy in the system due to skin effect on the wire and losses from the motor. Figure 2 plots the voltage high frequency noise between phases A and B after adding the EP filter.

Installing EP in this facility improved the crest factor of the waveform and removed the high peak amplitude currents. EP units also reduced the imbalance on the voltage and current waveform while decreasing the current high frequency noise in the system.

This decreased electrical losses by 17.02 and 9.19 percent respectively!