

## DIMMABLE & ADDRESSABLE ADVANCED LIGHTING CONTROL

335 COMMERCE DRIVE, FORT WASHINGTON, PA

335 Commerce Drive is a three (3) story commercial office building, built in 2004, and has 76,692 gross square feet (GSF) with approximately 227 occupants. It is owned and managed by Liberty Property Trust (LPT).

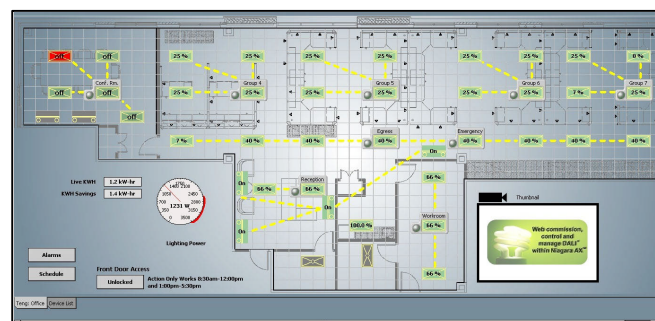


In 2009, the Pennsylvania Energy Company (PECO), a division of Exelon, was awarded a 250 million Smart Grid Grant from the U.S. Department of Energy. LPT participated in this grant as a commercial building demand response partner/customer. As LPT's contribution to this Smart Grid / Demand Response pilot project, ten (10) typical LPT office buildings will be upgraded to permit the building's mechanical and lighting systems to be controlled in a real-time manner in response to demand-load sharing commands received from PECO. In conjunction with these upgrades, LPT desired to implement solutions which will reduce overall building electrical consumption, thereby contributing to the corporate goal of 30% energy use reduction by 2012. 335 Commerce Drive is one of 10 buildings that will be upgraded to permit LPT to evaluate how enterprise building commands will be orchestrated via the Internet.

The implementation of the aforementioned strategies at 335 Commerce Drive was challenging, because it is a fully occupied building. Moreover, Teng also had to develop new tenant user interface standards for LPT to allow tenants to control aspects of the lighting. Even more, 335 Commerce Drive will serve as the template for future PECO building upgrade projects.

Teng's approach to building automation is to deploy open standard based products and networking protocols whenever possible. As a result, Teng chose elitedali as the "Best of Class" solution to deliver dimmable and addressable lighting control. With elitedali, open standards based lighting control is possible by using the following components:

- Digital Addressable Lighting Interface (DALI) Ballast (addressable and dimmable T8 ballast)
- LonMark certified light input and control devices
- Tridium Niagara AX Jace Controllers
- Web Browser based User Interface



Sample screenshot of User Interface

335 Commerce's system incorporated:

- 1250 DALI Ballast
- 164 DALI Multi-sensors (light level and occupancy sensor)
- 92 LON Occupancy Sensors, Scene Controllers and Relays

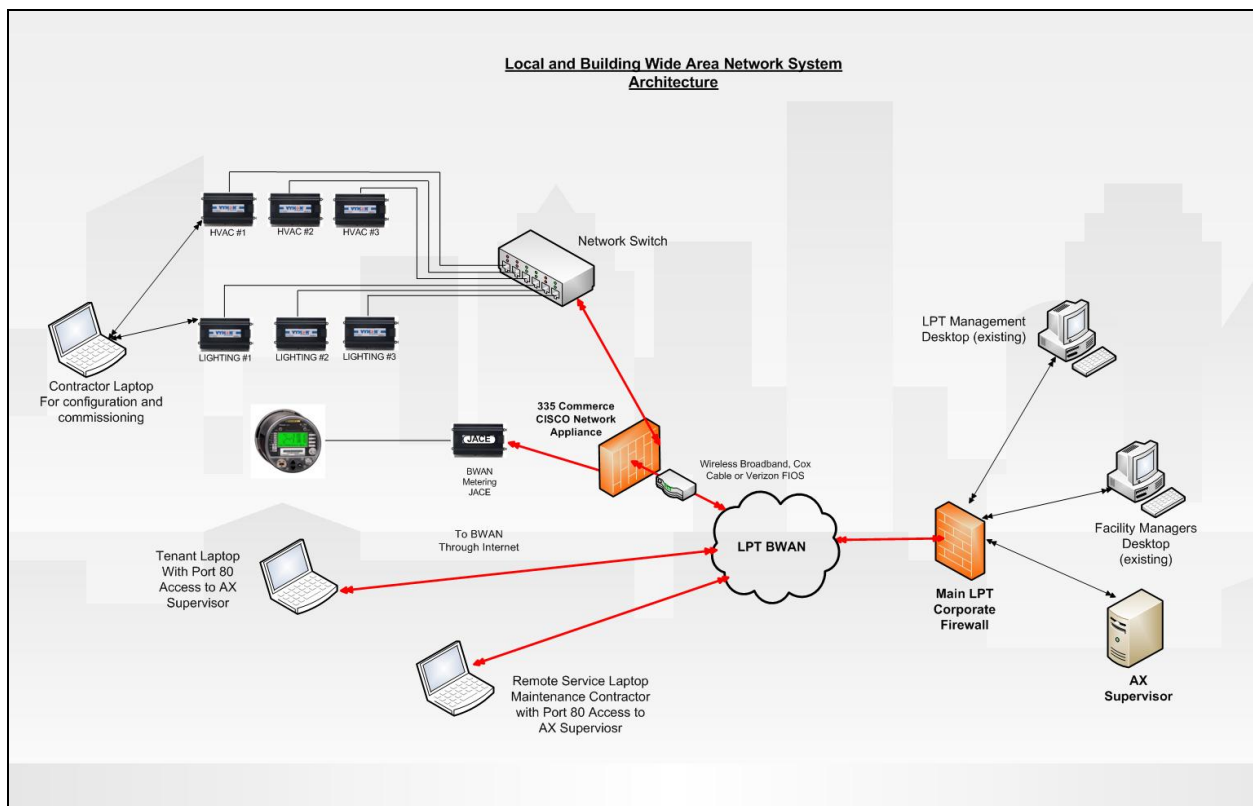
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The elitedali system allows the light level in each office or room to be fine-tuned to deliver the minimum illumination level acceptable to the tenants. All perimeter offices have closed loop, sustained light level dimming capability (a.k.a. Daylight Harvesting) through the installed Multi-sensor and DALI ballasts. Further, all spaces have occupancy based lighting control with large interior areas utilizing preset dimming levels as opposed to turning off lights in unoccupied areas. Three (3) demand response dimming scenes are available for PECO based on the level of demand reduction required.

Several of the benefits to the installation include:

- Expected to reduce the building's lighting energy usage by up to 50%.
- This energy reduction equates to approximately \$50,000 in savings per year.
- Greenhouse gas emissions saved is equivalent to saving an average of 33,543 gallons of gasoline in a year.
- The estimated return on investment for this project is 4.2 years.



Teng Solutions is an energy and smart building division of Teng & Associates, Inc., an ENR top 50 engineering/architecture firm. Teng provides engineering and system integration services to design and install energy and smart building solutions to reduce energy consumption and lower operating and maintenance costs for our clients. We achieve this through the application, integration and installation of leading edge, open standards based, smart building technologies on our customer's enterprise networks.