

# Case Study: Lakewood Church

ALERTON®

**Houston's Lakewood Church is America's largest non-denominational church, with multiple services that pack in tens of thousands of worshipers each week and are broadcast to millions of viewers in every U.S. market and in 150 countries.** Its prolific leader, Joel Osteen, is the best-selling author of *Your Best Life Now*. The non-denominational church is the former Compaq Center, home to the Houston Rockets' basketball team. An ambitious renovation in 2005 transformed the arena into a sanctuary, completely overhauling the interior to accommodate an elaborate pulpit, colossal LED display screens and seating for 16,000 parishioners at a time.

The burgeoning Lakewood Church increased its congregation five-fold in the years just prior to the renovation. What began in a converted feed store 40 years earlier now required exponentially more space for evangelical, administrative and community services. Fifteen months after it began, the renovation was completed for \$95M, \$75M of which was construction costs. The entire job included 50,000 square feet of new carpet, a power system that could have lit up a 37-story office high-rise, and an additional 209,000 square feet to house classrooms and a broadcasting suite.

To upgrade its heating, ventilating and air conditioning (HVAC) system, Lakewood Church chose OpenTech, Alerton's Houston dealer.

**The primary need in renovating Lakewood Church's HVAC controls was to keep visitors and employees comfortable in every corner of the multi-**



*The central plant for Lakewood Church: Envision for BACtalk provides quick, comprehensive views so you can check the status of the system status at a glance.*



*Houston's Lakewood Church—the largest in the United States; an Alerton system keeps all 16,000 parishioners cool in the sanctuary.*

**use facility, at any hour.** These areas included the vast sanctuary, a day care center, classrooms and administrative offices. On weeknights, a room may play host to 300 people, go unused the next day, and then have only 40 guests for the same gathering the following week. The Alerton system needed to offer flexible scheduling and programming to accommodate the numerous events that take place in the building.

Lakewood Church wanted to upgrade its existing 30-year-old air-handling units (AHUs) instead of replacing them. For one thing, they were built-up units—making them much larger than prefabricated AHUs. They were also located in a tight spot, which virtually eliminated the option of moving them. Most importantly, the AHUs ran on a single duct system that had constant speed fans with inlet vane controls. This meant the maintenance staff needed a way to moderate airflow and control energy costs.

Finally, the church's existing system used pneumatic controls, which resulted in significant time and manpower spent checking and adjusting everything manually. The updated system would need to automate as many controls as possible to enable the staff to concentrate their time on more important tasks.

**OpenTech installed an Alerton building automation system (BAS) that updated controls throughout the church building.** In total, the Lakewood Church project included global controllers,



An air handling unit for Lakewood Church: Envision for BACTalk efficiently controls the airflow and air quality inside the megachurch, keeping parishioners cool and free from airborne irritants.

VisualLogic® (VLC) field controllers, variable air volume (VAV) controllers, chillers, cooling towers, air-handling units and variable frequency drives (VFDs). Operator workstations run Envision for BACTalk® software to monitor the BACTalk system, Alerton's native BACnet solution, which controls the entire facility.

To effectively cool the 606,500 square feet in the completed building, OpenTech installed the controls that updated the AHUs—four 100,000-cfm units and four 60,000-cfm units—with VFDs. Lakewood Church built its own chiller plant for cooling, so OpenTech created an interface between BACTalk and the new chillers so that the facilities staff has absolute control over airflow. Combined with using start-up delays on the AHUs—so that they don't all turn on at once—it means the church can use the required one million cfm of air conditioning and still reduce its energy use.

Additionally, the installation of Direct Digital Controls (DDC) automates monitoring and control tasks, enabling the staff to easily make changes to setpoints in any zone throughout the building. The facilities manager no longer needs to send a technician to check and adjust the status of any device.

OpenTech also installed WEBtalk™, Alerton's Web-based solution, which uses standard Web browser technology to provide staff with access to their building system and data from anywhere they have access to the Internet.

**I** chose OpenTech because they knew our interests and would do well for us. They're very comfortable with Alerton products, so we knew we'd be taken care of: All we had to do was make a phone call.

Greg Jenkins,  
Facility Manager  
Lakewood Church

The sanctuary features two 30-foot rock waterfalls whose flow can be anywhere between a gentle trickle and Niagara Falls. With the additional moisture in the environment, sensors communicating with Alerton's BACTalk system easily compensate for the excess humidity while still providing efficient and cost effective cooling. The AHUs also use 100% outside air to maintain air quality in the 16,000-seat sanctuary.

The HVAC portion of the Lakewood Church installation included a significant amount of third-party integration. OpenTech created interfaces with Trane chillers using an Alerton BACTalk control module (BCM). This enabled the staff to view equipment status instead of just the standard on/off mode, and to monitor and control the switchgear and exhaust fans.

**Lakewood Church now enjoys a system with greater functionality for its HVAC needs, including flexible scheduling for heating and cooling its myriad multi-use zones and, most importantly, the ability to track and maximize its energy use.** With VFDs on the upgraded AHUs, Lakewood Church

has the ability to better moderate its cooling functions to save energy and reduce costs. DDC controls enable the facilities staff to view the entire system from any workstation and then tweak any setting. With Alerton's WEBtalk solution, the facilities manager can remotely view and adjust the church's system, saving travel time and labor costs.

## Project Scope

- 2 operator workstations
- 1 WEBtalk Web server
- 2 BACTalk Control Modules (BCMs)
- 153 field controllers to control air-handling units, fan-coil units and the central plant
- 1 VLX in the central plant for chillers, towers, pumping and boilers
- 3 water-cooled chillers with 2 cooling towers
- 134 VAV terminal boxes
- 4, 100,000-cfm and 4, 60,000-cfm air-handling units
- 7 variable frequency drives (VFDs)