

Powering ROI— How to Rein in Surging Utility Costs

BY CHRIS BISHOP

The world is becoming more energy-conscious by the day. For worship facilities, energy costs are a major line item of the budget as organizations add to their load with new audio, video, and lighting systems. The good news is that some of these operating and associated costs can be reduced or outright avoided with the right power control solution.

There are certainly several different solutions to reduce power consumption. Turn off the lights and other equipment and replace incandescent lighting with LED fixtures. Sounds simple enough, right? Maybe you've made these changes in your own church by upgrading the lighting systems and "turning off" the AVL Systems through the use of "standby" or vampire power modes and dimming lighting fixtures to zero or fading them to black.

However, your utility costs might tell a much different

— and a shockingly costlier — story than you had planned. That's because all that AV equipment and those new LED lighting fixtures are not actually turning off when you are powering them in a standby power mode or dimming to zero although they appear to be off. Need proof? Touch the heat sink on the back of a performance spotlight after it's long been "turned off". My guess is it will feel hot to the touch because the internal electrical components are still fully energized. The power was never truly turned off as the drivers, processors, motherboards and other internal components for the lighting and AV gear are still energized and awaiting the next command at a moment's notice. Because the end-loads are still energized and being hit with AC line voltage, they're still generating heat and this heat can cost in more ways than one. It can add to the bottom line of a utility bill, up the HVAC load, and

shorten the life expectancy of AVL gear by naturally degrading the electrical components internally and significantly shortening the fixtures overall lifespan which leads to an increase in maintenance costs and earlier replacement times than necessary.

Energy costs and associated operating or maintenance costs related to AVL fixtures weren't always such an expensive line item on the budget as it is today. It's only in the last decade that houses of worship of all sizes have invested more capital into AV gear. Rather than a simple loudspeaker system and two or three wired microphones, it's not uncommon for facilities to now plan and raise money for years simply to upgrade their entire AVL outfit that may include wireless microphones, powered PA systems, video walls, projectors, mixing boards, and LED lighting. This can lead to an increase in energy consumption rather quickly as more circuits are added — and then left on in a standby power mode. For example, a church that designates 12 circuits for audio, eight circuits for a video wall, and 20 circuits for performance LED lighting fixtures, control and processors is leaving 40 circuits powered at a full electrical draw or a slightly lower standby draw nearly 100% of the time.

Facilities not only have more circuits but they're sitting idle for much of their life. Personally, through discussions with everyone from AV Designers to Facility Managers to Pastors, that on average, AV gear in churches is typically only used approximately 5% of

the week. This typically includes a Wednesday evening service, Saturday afternoon services and then the traditional Sunday morning services. The other 95% of the week, it's quietly sucking energy, called vampire (standby) power.

Let's take a look at an example: A medium size



worship facility that has 200 devices among their audio, video, and lighting setup that's in disuse 95% of the time is a great yearly savings opportunity when a power control solution is installed.

In Kansas City, Missouri, electricity costs around 10.75 cents/kWh, with a hypothetical 20W/hour average standby draw per AVL fixture. Energy cost savings per year can be calculated using a simple equation:

Energy Cost Savings
Per Year = (Standby energy consumption) X (Standby Hours/Week) X (52 week) X (kWh cost) / (1000)
 $(20 \times 200) \times (159 \text{ hrs.}) \times (52) \times (\$0.10751) / 1000$

The approximate energy cost savings per year comes to about \$3,555.57 thanks to being able to completely power down an AVL system. In some places like Chicago, where the average cost of

electricity per kilowatt hour is 4.03 cents, churches will save less. But in Hawaii, electricity can cost upwards of seven times as much at 30.6 cents/kWh, allowing them to save more.

The other factor contributing to higher utility costs is heat. Even standby or vampire power draws put

off heat, and with more AVL equipment, the temperature of a facility will be higher. This in turn will tell the HVAC system to kick on more frequently. You can put a price on that heat as well by simply calculating the BTUs per a watt:

$1 \text{ watt} = 3.412 \text{ BTU/hr}$
(British Thermal Unit per hour)
 $12,000 \text{ BTU} = 1 \text{ Ton of air conditioning (HVAC)}$

A 2,000 square foot building requires approximately 5 tons of HVAC. A facility with 80,000W of AVL equipment and with an average fixture efficiency of 10% draw in standby mode is still consuming 8,000 watts of energy. That comes out to 27,297 BTU/hr or 2.25 tons of air conditioning.

While that equipment is constantly pulling energy and racking up a hefty utility bill on multiple levels,

it's also taking a toll on each electrical component internally due to constantly generating heat from still being powered when left in a constant standby mode. This leads to devices often requiring much more frequent maintenance and may ultimately lead to a shortened lifespan and replacement sooner than intended. Therefore, if a power control system is not being considered when a facility is making an investment at the front end for new AV gear, the potential for additional utility costs, maintenance, or in worst cases, early replacement needs to be taken into consideration to understand the full cost of that investment.

As the example earlier lays out, churches can significantly reduce energy costs by removing their AVL systems from the grid. How? Well, one option is simply to unplug everything. But in most cases, that's not feasible for gear such as a large video wall or projector mounted in the ceiling. Another option churches resort to is using the standard circuit breakers as the on-off switch to power down their equipment at the source. But that option isn't recommended and — in the U.S. — is against National Electrical Code.

The best solution is a power control system designed to power and protect AVL at the circuit level. These power control systems open the electrical circuit and kill power to each connected device downstream, eliminating the taxing costs of standby power. Solutions that offer remotely operated circuit breakers with built-in system

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automation also provide greater benefits beyond monetary. When a power control solution offers fully automated system startups and shutdowns, it decreases the human errors. Likewise, automated sequencing ensures that equipment is turned on in the right order, avoiding damaging end-loads. For example, speakers and amplifiers are susceptible to damaging “pops” if not turned on in the proper order. An automated solution utilizing an astronomical clock does the heavy lifting without personnel involvement, ensuring proper sweep-offs and startups. This is especially beneficial for facilities that use volunteer-run crews or have smaller tech teams by helping to decrease time demands and freeing up technical directors, facility managers, and volunteers.

If you’re looking at adding a new power control system but are worried about project costs, new compact and pre-wired solutions can offer some budgetary respite and may not require electricians. These options decrease project costs by leveraging already established circuits motorized circuit breakers that don’t require a secondary relay panel. That saves on a relay panel as well as the conduit, wiring, and electrical contractor’s labor. In fact, churches have the power to save anywhere from \$1,200 to \$2,400 on labor alone.

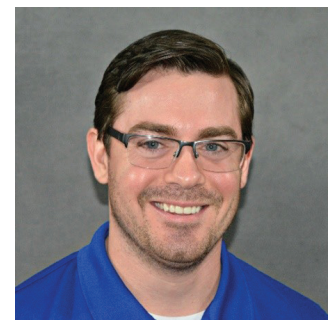
If you’re looking at adding a new power control system, you have several options including differing sizes, configurations, and control features. Power control systems can range from motorized circuit breakers for new build

facilities that reduce the need for secondary relay panels by adding control inside of the circuit breaker which is required regardless by code. Or, if budgets are tight and an existing electrical system is in place, then a relay-based system that either hangs on the wall or is rack-based can offer budgetary respite and may not even require electricians in some cases. But either way, there are cost savings to be had at both the integration and operations level.

If your facility already has a power control system, observe that it’s being properly used. We repeatedly hear from churches that have made the investment in power management only to have forgotten to train new crew and volunteers on how to use it. Properly training new members can literally save an organization

thousands of dollars every year.

Power control systems offer a multitude of benefits including a very true Return on Investment unlike majority of Audio, Video and Lighting gear. Lowering energy costs as well as maintenance costs, prolonging the longevity of an investment and reaping the monetary rewards of a greater ROI are all benefits of a well-designed power control solution. **T**



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