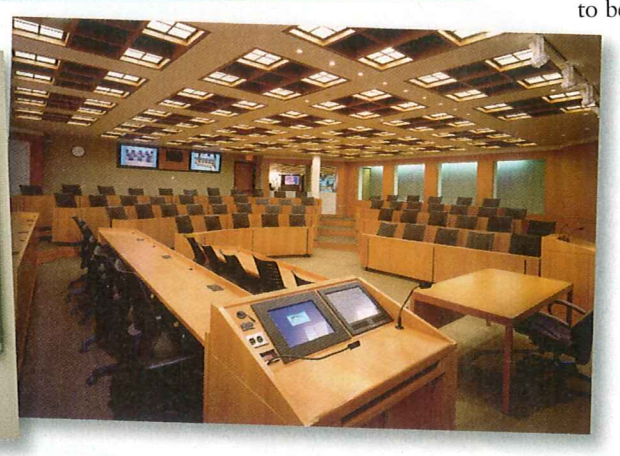

Green AV Design

No more talk. It's time to get serious about what exactly goes into a green AV system. The first in a two-part series. **BY BRIAN E. HUFF, CTS-D**

INQUIRING MINDS WANT TO KNOW WHAT A so-called green AV system would look like. More importantly, they want to know whether it would be more expensive to own and operate, more time-consuming to design, and more difficult to install.

First let's put the topic into perspective. The greenest AV system is no AV system at all. But that's true of almost all post-industrial products, including consumables, electronics, appliances, vehicles, buildings, and factories, and virtually any nonorganic technology designed to increase human comfort or convenience. Assuming we're not going to revert to a pre-industrial lifestyle, the question really is, "What is the most energy-efficient and environmentally responsible AV systems design strategy?" Energy efficiency and environmental friendliness are the primary areas of opportunity for the savvy AV designer. We'll focus here on energy efficiency and tackle environmentalism in the next issue.

For starters, let's take a typical 1,500-square-foot classroom. The room's supporting AV systems include two 500W video projectors; a 100W document camera; a lectern with a built-in PC, VGA interfaces, lighting, and touch panel that collectively consume 300W; and a full equipment rack that consumes 700W in its typical "on" state. That's about 2,100W each hour for as many hours a week as classes are in session and using the systems. For our purposes, we'll call that 40 hours a week for 40 weeks, 1,600 hours per year, or 3,360,000 watt-hours of annual usage.

Of course, we're shutting off the projectors and document camera during nonclass hours, but in a typical old-school design, the lectern and rack equipment are usually left on to ensure quick startup. So in addition to our 3.36 million watt-hours, we have 7.16 million watts (7,160 hours x 1,000W) of power consumed at night, on weekends, and during holidays. That brings us to about 10.52 million watts (10,520 kWh) per year, costing approximately $1,115 and producing about 38,000 pounds of CO_2.

Now imagine 20 classrooms on, say, a college campus, each with their own power outlets for connecting laptops, heating and cooling, and more. By some estimates it would take 800 trees to absorb and neutralize the CO_2 emitted by such a facility each year. It's pretty obvious that the least we could do is eliminate or drastically reduce the power consumed by AV systems when they're not in use.

Ideally, every piece of AV equipment in a room could be turned off completely when it's not needed, including wall-wart power supplies, equipment standby circuits, and other so-called vampire loads. For convenience, we'll call this total off state 0EU for zero energy usage.

However, if the AV systems are being monitored and controlled via a network-enabled software system, such as Crestron RoomView or AMX Media Manager, the AV control system processor will need to be left on to allow remote wake-up and continuous polling of a room's status. All other equipment could be set to 0EU assuming that power receptacles can be activated from the control system and 0EU devices include high-reliability, "last state" boot-up memory.

Devices such as Tripp Lite's PDUMV15NET; SurgeX's iControl, SX1120, and SX1115 IP; and Middle Atlantic's new PD-915R-M provide AC receptacle power monitoring to track voltage, current, wattage, kWh, and run-time over any Ethernet data network. They can either be managed independently or programmed to respond to Ethernet calls from the AV control system.

Any equipment not in the rack would either have to have an outboard power controller or be left in some sort of on or standby state. You might wonder if this is worthwhile. Even the best video projector standby circuits consume about 25W to maintain high-reliability, bi-directional RS-232 control, and around 5W for less reliable, one-way IR control. Assuming that high reliability is a requirement, each projector would need individual, remote-controlled power receptacles and be designed and programmed to reliably return to last-state operation on boot-up. Other devices such as document cameras, VGA interfaces, mixers, switchers, and routers that are not installed in the rack would need to be similarly configured.

All this new power-up architecture requires a fair amount of thought and care during system design, not to mention comprehensive field testing to confirm that a system will power up from a 0EU state—time after time. Those of us who have been around the pro AV business for more than a few years know there is a significant share of equipment that doesn't behave consistently on startup. In order for this green architecture to work, designers will need to start selecting equipment that is known for it's startup reliability, last-state memory, and tolerance for repeated full on/off cycles.

So, is an environmentally responsible AV system more time-consuming to design and difficult to install and program? Yes, but it's also a competitive advantage and may become an industry requirement.

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