

# Energy Services BULLETIN

Vol. 26, No. 2, February 2007



## In this issue

- ▣ [Energy Services Bulletin home page](#)
- ▣ [Marshall, Schwan lighting project puts custom in customer service](#)
- ▣ [Mor-Gran-Sou partners with Boy Scouts to change lights and the world](#)
- ▣ [Western's IR cameras help utilities, customers maintain efficiency](#)
- ▣ **Technology Spotlight: Energy efficiency in new and existing computer data centers**
- ▣ [Energy shorts](#)
- ▣ [Calendar of events](#)



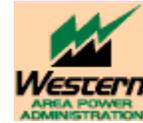
*This column features helpful information, innovative equipment, systems and applications utilities around the nation can use to save energy and improve service.*

## Energy efficiency in new and existing computer data centers

Computer data centers use a lot of electricity in a small space. Up to 75 percent of the energy consumed feeds servers and other information technology equipment. The next largest use is for air conditioning. A comprehensive energy conservation program will seek to both reduce the load of IT equipment and improve cooling efficiency—without compromising reliability. The following resources outline potential energy conservation measures and provide additional information.

### Low-cost/no-cost measures

- Increase the cooling setpoint temperature to 75 degrees Fahrenheit.
- Provide the lowest possible level of humidity consistent with manufacturer recommendations. Increase humidity control deadbands to 10 percent or more. Raise water temperature to 50 to 55 degrees F for chilled water systems. A coil bypass for direct expansion systems can reduce dehumidification.
- When using engine heaters to keep generators ready for rapid starts, reduce the engine heater setpoint to 70 degrees F (120 degrees F is typical).
- Clean air filters regularly.
- Keep the outdoor condenser surfaces of air-cooled DX units clean.
- Fully commission and periodically re-commission the



Vol. 26, No. 2  
February 2007

## Resources

- [Chiller Plant Optimization](#)
- ["Proceedings of the 2006 ACEEE Summer Study on Energy Efficiency in Building"](#)
- ["Vendors feel heat to cool hardware"](#)
- ["IT Energy Costs: The Quiet Budget Killer"](#)
- ["New Power Technologies Will Reduce IT Operating Costs Significantly"](#)
- [Western's Power Line](#)

## Submit a story idea

## Equipment loan program

## Technical questions

HVAC system, including adjusting dampers, belts, fans, pumps, drives, thermostat and relative humidity settings and controls. Adjust head pressure regulation devices of air- and water-cooled DX units.

### Selecting and sizing IT equipment

- Avoid oversizing IT equipment. Operate your uninterruptible power supply, batteries and power distribution systems in their most effective load range.
- Select energy efficient power supplies and processors.
- Select servers that use low-power chips with multi-core processors. Select processors to match the required workload, rather than buying the fastest-performing chip for every use.
- Select equipment and/or software with power management strategies to throttle down the processor during low-load periods.
- Replace AC power supplies with efficient DC power supplies to shift thermal load outside the server.
- Use higher back-pressure, ducted server fans with automated dampers at the server blade rears and at fan entrances.

### Air management

The following measures minimize mixing conditioned cooling air supplied to IT equipment with hot air released from equipment:

- Use “High Delta-T Cooling” to blow conditioned air directly on equipment, rather than mixing conditioned air with room air to cool the room.
- Locate racks and cable mazes so they do not block airflow.
- Place equipment so that devices that emit a lot of heat have greater airflow or zoned air conditioning around them.
- Use “hot aisle/cold aisle layout,” orienting racks so that cold inlet sides face each other and hot discharge sides also face each other.
- Use high overhead plenums or ductwork to efficiently collect and return hot air to the air handler.
- Seal cable or other openings in under-floor distribution systems.
- Block unused spaces in and between equipment racks to direct air flow only to racks that are in use.

- Enclose computer equipment in water-cooled cabinets to efficiently cool the cabinet mini-environment and capture return air at less expense than cooling the entire room.

### **Air conditioning, central plant and heat recovery**

- Install air-side or water-side economizers to take advantage of cool outdoor air for air conditioning.
- Select efficient water-cooled chillers in a central chilled water plant.
- Use water-side economy cooling for chilled water.
- Upsize duct/plenum and piping infrastructure used to supply cooling.
- Use medium-temperature chilled water in cooling loops (50 to 55 degrees).
- Use aggressive chilled and condenser water temperature resets to maximize chiller plant efficiency ([Chiller Plant Optimization](#)).
- Use a variable-flow evaporator design and staging controls to operate chillers near their design temperature differential.
- Monitor chiller-plant efficiency to maintain high efficiency.
- For air-cooled DX units, use evaporative pre-cooling.
- Oversize cooling coils so the surface temperature is higher, reducing humidification energy.
- Recover waste heat for building space heating, domestic water heating, absorption or adsorption chillers or on-site electricity generation.

### **Energy-efficient motors and drives**

- Use energy-efficient motors in rack blowers and air-conditioning compressors and fans.
- Install variable-speed motor drives on chillers, pumps for chilled and condenser water and cooling tower fans.

### **Design, operations and maintenance process**

- Involve all IT, facilities and management personnel in the design process to achieve solutions that save energy and meet reliability, performance, cost control and other requirements. Use life-cycle costing as a decision-making tool.
- Introduce energy optimization at the earliest possible phase of the design process to minimize construction

and operating costs.

- Institute an energy management and monitoring program.
- Ensure that facility operations staff receives site-specific training on identifying and properly operating energy-efficiency features.

## References

- Greenberg, Steve, Evan Mills, Bill Tschudi, Peter Rumsey, and Bruce Myatt, "Best Practices for Data Centers: Results from Benchmarking 22 Data Centers, ["Proceedings of the 2006 ACEEE Summer Study on Energy Efficiency in Building"](#)
- Mears, Jennifer and Deni Connor, "[Vendors feel heat to cool hardware.](#)" *Network World*, January 30, 2006.
- Perkins, Bart, "[IT Energy Costs: The Quiet Budget Killer.](#)" *Computerworld*, May 8, 2006.
- Sheridan, Gene, "[New Power Technologies Will Reduce IT Operating Costs Significantly.](#)" *Electronic Design*, March 2, 2006.

For further references, contact the [Power Line](#) at 800-769-3756.

[Previous page](#) | [Next page](#)