



## Powerful Solutions That Put You in Control

Ready to take a “byte” out of your data center energy use and become more cost-efficient? Data centers consume a significant amount of energy per square foot, even when the physical space they occupy is small. In addition to operating at very high energy intensities, data centers operate 24 hours per day, 365 days per year. The emergence of digital content, big data, e-commerce, and Internet traffic is also making data centers one of the fastest-growing consumers of electricity. This high load factor presents opportunities for ENERGY STAR<sup>®</sup> energy-efficiency servers, data storage equipment, improved airflow management, and Heating Ventilation and Cooling (HVAC) Optimization.

### Where your energy dollars are used.<sup>1</sup>

#### Data Centers Electricity Use with Multiple Distributed Unit System<sup>1</sup>

Computer Loads .....	38%
HVAC .....	54%
Uninterruptible Power Supplies Losses .....	6%
Lighting .....	2%

#### Data Centers Electricity Use with Central Air Handler System<sup>1</sup>

Computer Loads .....	63%
HVAC - Chilled Water Plant .....	14%
HVAC - Air Movement .....	9%
Uninterruptible Power Supplies Losses .....	13%
Lighting .....	1%

<sup>1</sup>Source: Electricity Consumption Distribution in Data Centers, Integral Group, 2012



## Make a Savings Plan

Data centers are the backbone of the modern economy — from the server rooms that power small- to medium-sized organizations to the enterprise data centers that support major corporations and the server farms that run cloud-computing services. Data centers may consume 10 to 50 times the electricity of standard office space<sup>2</sup> and typically operate 24-hours a day with a large, constant cooling load that is independent of the outdoor temperature. Knowing where and how you use energy can help identify ways to reduce energy usage and overhead. Our Account Managers can help you develop a plan. Start with an **Energy Audit** — an analysis of your current energy use to identify any available savings opportunities, customized to your data center. Our customers who implement Energy Audit recommendations typically benefit from reduced energy use and lower operating costs.

## Eliminate Energy Guzzlers

Consider participating in our **Express Solutions** or **Customized Solutions** programs, developed with

your industry in mind. Investments in new, energy-efficient computer equipment sensors, infrastructure improvements, and cooling system upgrades usually pay off in the long term — and many qualify for incentives right now.

## Demand Response

**Demand Response** rewards you for reducing energy usage when demand for electricity is highest — typically the summer months — and when rates are highest, too. If your business has the flexibility to shift energy usage, you could plug into serious savings. We offer several Demand Response programs so that you can choose the best options based on your business needs.

Sign up for **Critical Peak Pricing** and get rewarded for voluntarily reducing electricity consumption during CPP “event” hours, when energy conservation during peak hours is most needed. With **Automated Demand Response**, you can reduce energy use with a click, so it’s even easier for you to save both time and money.

<sup>2</sup> Based on Data Center and Servers, United States Department of Energy, Office of Energy Efficiency & Renewable Energy, 2017.

## Small Steps to Control Your Energy Expenses

When you use energy is as critical as how much you use. A few targeted equipment upgrades can have substantial impact on energy savings. The different ways to reduce energy require little or no financial investment by your company. Here's what you can do right now:

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### Highly Rated ENERGY STAR®

Computer equipment and servers can consume 38 to 63% of total energy in a building, depending whether the system is a multiple distributed unit or an air handler. Upgrading to newer ENERGY STAR-rated equipment can have a significant impact on your energy costs.<sup>1</sup>

- Order servers with power supplies that meet at least the minimum efficiency recommendations by ENERGY STAR and 80 PLUS. ENERGY STAR-rated servers are 30% more efficient than standard servers, on average.<sup>4</sup>
- When appropriate, limit power supply oversizing to ensure higher — and more efficient load factors.
- Install **Uninterruptible Power Supplies (UPS) system** to provide emergency power by supplying energy stored in batteries, super capacitors, or flywheels to a load when the input power source, typically mains power, fails to provide near-instantaneous protection from input power interruptions.
- Upgrade to **high-efficiency copiers**.

### Keep Your Cool

On average, 23 to 54% of energy consumption for data centers is for HVAC.<sup>1</sup> Take advantage of **HVAC** programs now to help reduce energy and costs over time. A centralized system offers many advantages over the traditional multiple distributed unit system, which evolved as an easy, drop-in computer room cooling appliance. Centralized systems use larger motors and fans, and yet may be more efficient. They are also optimized for variable volume operation with Variable Speed Drives (VSDs), also referred to as Variable Frequency Drives or (VFDs). Most data center loads do not vary appreciably over the course of the day, and the cooling system is typically oversized to cool such loads, leaving significant reserve capacity. A centralized air handling system can improve efficiency by taking advantage of surplus and redundant capacity to improve efficiency.<sup>3</sup>

- Perform routine maintenance on heating and AC filters, belts, coils, and bearings.
- Check that data center cooling meets the latest American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) standards for Datacom environments — many data centers can safely operate at higher temperatures than previously thought.
- Install **variable speed drives** to optimize fan and pump motor operation: variable speed motors on cooling system supply fans and chilled water pumps allow the cooling system to deliver cooling to match the load and provide high energy efficiency.
- Cooling load and redundant power requirements related to IT equipment can be reduced by over 10 to 20%, allowing more computing equipment density without additional support equipment such as UPS, cooling, generators, etc.

<sup>3</sup> Source: Data Processing and Electronic Office Areas, Chapter 17, ASHRAEHVAC Applications Handbook, 2003; Best Practices Guide for Energy-Efficient Data Center Design, United States Department of Energy, Energy Efficiency & Renewable Energy Information Center, 2010; <http://energy.gov/sites/prod/files/2013/10/f3/eedatacenterbestpractices.pdf>; Design Recommendations for High Performance Data Centers, Rocky Mountain Institute, 2003; Standard Performance Evaluation Corporation, 2008 Benchmarking Results; [http://www.spec.org/power\\_ssj2008/results/power\\_ssj2008.html](http://www.spec.org/power_ssj2008/results/power_ssj2008.html); Best Practices for Datacom Facility Energy Efficiency, ASHRAE Datacom Series, 2008.

<sup>4</sup> Best Practices Guide for Energy-Efficient Data Center Design, United States Department of Energy, Energy Efficiency & Renewable Energy Information Center, 2010.

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## Small Steps to Control Your Energy Expenses

### Keep Your Cool (continued)

- In new data center construction, downsizing the mechanical cooling equipment and/or electrical supply can significantly reduce initial building costs and lower the mechanical and electrical footprint.
- Install air- or water-side **economizers** to help cut data center cooling costs by over 60%<sup>3</sup> using standard, commonly available low-cost equipment. Depending on the climate, the steady 24-hour cooling load of a data center is well suited to take advantage of seasonal and nighttime temperature variations to cool the space.
- Uses of best-practices **air management**, such as strict hot aisle/cold aisle configuration, can double the computer server cooling capacity of a data center.
- Combined with an air-side economizer, air management can reduce data center cooling costs by over 60%.<sup>3</sup>
- Removing hot air immediately as it exits the equipment allows for higher capacity and efficiency than mixing the hot exhaust air with the cooling air being drawn into the equipment.
- For large data center facilities, a chilled water system served by a central plant is the most efficient approach to providing mechanical cooling.

### Power Down

Average utilization rates of servers are often below 20% but with occasional peaks of 85-90%.<sup>4</sup> Changing a data center operations model from “always on” to “always available” using power management strategies may result in primary IT electrical savings and potentially secondary energy savings by optimizing cooling and electrical power systems for part-load operation.

- Install **occupancy sensors** and **plug load occupancy sensors** to turn off lighting and non-essential equipment when the workplace is unoccupied and/or after work hours.
- Install **PC Power Management software** to reduce the power of networked computers to hibernate/sleep mode during after work hours and/or holidays.
- Inactive servers can use 50% or more of full computational power. Consolidation measures such as server virtualization can increase server utilization factors and therefore increase server computational efficiency.<sup>4</sup>
- Optimize system efficiency through **smart energy management systems (EMS)**.



## Power Tools for Long-Term Savings

### Finance for Free

We offer **On-Bill Financing** to help your business spread out the cost of qualifying energy efficiency upgrades over time, at no fee to you and with zero interest. Payments may even be offset by savings resulting from your efficiency investments. Some equipment may also qualify for financial incentives — making it even more attractive to upgrade.

### Set a Goal to Reduce Energy Usage

**Savings By Design** encourages high-performance, non-residential building design and construction, and offers a variety of solutions to building owners and design teams, such as providing financial incentives, detailed analysis, and design support. Through **Continuous Energy Improvement**, we'll provide you with an energy advisor and technical assistance to help you assess, plan, implement, evaluate, and modify your building's energy management practices.

### Green, Clean Solutions

Embracing innovative energy sources, like solar and self-generation, can reduce your carbon footprint — and your energy bill.

### Leave It to the Experts

If you'd like to put your efficiency plan in the hands of industry professionals, you can take advantage of programs such as the **Data Center Energy Efficiency Program**, which are delivered by third-party vendors, and offer energy audits, program management, technical services, and financial incentives.

“ SCE really took the reins in guiding us through the requirements of incentive eligibilities. This helped in the process of developing ROI projections, and made capital funding for the projects easier to justify. ”

— Kelly Sullivan  
Vice President of Global Data Operations  
CenturyLink

## MORE INFORMATION

To learn more about Energy Management Solutions and apply for incentives, visit [sce.com/datacenter](https://sce.com/datacenter) or call your **SCE Account Manager**.

Programs are funded by California utility ratepayers and administered by SCE under the auspices of the California Public Utilities Commission. Incentives and savings will vary by customer, and SCE does not make any representation herein concerning actual or potential savings amounts. Funds are limited and are available on a first-come, first-served basis until program(s) are discontinued, or until funds are depleted. Terms and conditions may apply.