

CASE STUDY

Adobe Drives High Performance through Holistic Energy Management

Decade-long partnership with PG&E helps redefine energy efficiency for high tech enterprise

Founded in 1982, Adobe Systems Incorporated is one of the world's largest software companies. Their innovative tools and services enable people to make, manage, measure and monetize digital content across every channel and screen.

California's energy crisis in 2001 prompted a 10 percent voluntary reduction in energy consumption at Adobe's headquarters in San Jose, California. Since then, they have become a nationally recognized sustainable business. Working with their facilities management firm Cushman & Wakefield and Pacific Gas and Electric Company (PG&E), Adobe has used their three Adobe Towers as a "real world" proving ground for managing energy usage holistically and proactively.

Some 12 years and 140+ projects later, the facilities team's focus on continuous energy improvement has resulted in LEED Platinum certification and ENERGY STAR® scores of 100 for each of the three towers. Most projects had less than a four-year payback, and the overall average simple payback was 1.2 years. It's estimated that these various initiatives have contributed an approximate 81 percent return on investment.

For many companies, this kind of success would be more than enough. But Adobe believes that an eco-friendly operation isn't just the right thing to do, but good business as well. The company's latest projects involve transforming hard-walled office spaces into energy-saving, open-plan "smart floors" and using fuel cells and other technologies to generate energy on-site.

The software Adobe uses to monitor their headquarters' energy usage has a highly visual interface that gives engineers 3D views of Adobe's "smart floors" as well as real-time weather displays and other key energy usage metrics for all three Adobe towers.



Since 2001, PG&E has paid out over \$738,000 in incentives to support Adobe's numerous energy efficiency projects, which have saved more than 8 million kilowatt hours annually.

The Path to High Performance: Audit, React, and Anticipate

Adobe's latest efforts are emblematic of their holistic approach to energy management. Using an enterprise level monitoring system called Intelligent Building Information System (IBIS) that follows internationally recognized standards for measuring and verifying energy efficiency, Adobe closely audits their buildings' energy usage. With IBIS, Adobe is able to execute measures that not only conserve resources, but also give them the ability to react to changing conditions to further minimize energy costs, while maintaining employee comfort.

Finally, and where Adobe is most unique, the company builds on the ability of its IBIS system to audit and react by integrating proactive energy management practices. These practices use advances in weather forecasting, sensors and predictive algorithms to automatically and dynamically optimize the operating conditions of a building, minimizing energy consumption and maintaining a comfortable workplace throughout the day.



Adobe's renovated Smart Floors feature an open layout with extensive collaboration spaces and workstations grouped in "neighborhoods" to promote more efficient use of HVAC, lighting and plug loads.

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This approach dates back to 2001 when Adobe asked PG&E for an energy audit under its Retrocommissioning Program to meet the state's call for a 10 percent reduction in energy usage, and then subsequently, to take advantage of PG&E's Demand Response incentives for reducing energy use during peak periods.

Over the next five years, the facilities team carried out a series of lighting and HVAC upgrades, repairs and retrofits—often with support from PG&E energy efficiency rebate programs. Thousands of sensors (including motion, daylight and plug load occupancy), timers and variable air volume (VAV) boxes were installed; HVAC systems' set points, timing and hours of operation were optimized; thermal window film was installed; incandescent lamps were replaced with compact fluorescent light bulbs (CFLs), outdated T12 fluorescents with more efficient T8 and T5 fixtures, halogen corridor lamps with light-emitting diodes (LEDs) and so forth.

To give building engineers the information they need to react to changing conditions, these sensors and upgrades were incorporated into the IBIS web-based energy monitoring system. Over 30,000 monitored points in the three towers and a customized visual display allows them to hone in on building systems at any level and observe energy usage, carbon dioxide emissions, water use and indoor climate (including temperature, humidity and airflow)—in real time.

Not only does this system help engineers detect performance faults but it also gives them a head start on repairs and recalibration. For example, it automatically adjusts the exhaust fans in the buildings' garage according to carbon monoxide levels, and uses real-time weather conditions to refine the irrigation system's operation.

The net effect of these projects is that Adobe has significantly reduced its energy consumption, despite adding a third tower in 2003, hiring more employees and increasing their data center density. Yet even with all this success, Adobe continues to think creatively about how to use less energy. This set the stage for the next chapter in high-performance energy management.

Adobe's energy management and sustainable building practices are enviable. But it's important to remember that the company didn't get here overnight. Rather, their facilities team systematically searched for energy-savings measures, and Adobe allowed energy efficiency benefits to build on one another.

One of Adobe's early energy efficiency projects was changing high-ceiling lights from heat-producing incandescent flood lamps to more efficient and cooler operating fluorescent equivalent lamps.

Smart Floors Raise the Bar Again

In 2011, Adobe began to look at occupancy trends as a way to further improve their headquarters' energy efficiency. The company suspected occupancy rates in their individual, hard-walled office spaces were 25 percent less than what the energy systems were being scheduled to accommodate (typically 6 a.m. to 6 p.m.). To test these suspicions, occupancy data loggers were installed for a 2-week period. The results proved that occupancy rates averaged about 75 percent, thus pointing to the need for an occupancy-driven solution.

This effort used advanced technical, organizational and business techniques to design and implement an open floor plan that would lower operating costs, and increase floor capacity while improving employee comfort. Office walls were removed and desks placed in open layout "neighborhoods" to promote more efficient use of HVAC, lighting and plug loads. Software from Integrated Building Solutions was installed to manage, monitor and analyze the energy consumption of the open-air office, as well as to provide continuous commissioning (the systematic process of ensuring that a building's HVAC system operates to its maximum potential). The key operating principle: lighting and local HVAC would shut down if a neighborhood was unoccupied for more than 15 minutes.

The results have been dramatic. In the first week alone, gas and electricity savings reached nearly \$750. Today, energy use on this previously ENERGY STAR® rated floor has dropped by an additional 65 percent, even as the number of employees has increased from 80 to 135. Recent software upgrades have pushed the limits of energy management even further. IBIS automatically generates work orders when operations vary from predictions. It also monitors local weather forecasts, compares energy use with use on similar previous days and alerts operators if current usage varies from the predicted building operation plan.

Now that this Smart Floor concept has shown proven savings, Adobe is deploying this approach in their local and global facilities to further improve efficiency and reduce their overall greenhouse gas footprint.



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Fuel Cells Help Reduce Risk

As a long-time leader in energy efficiency, Adobe understands that a comprehensive energy management plan not only delivers operational efficiency but can also serve to reduce risk. In 2009 the company installed 12 co-generation hydrogen fuel cells at their headquarters. These natural-gas-powered generation resources help relieve stress on the power grid during high demand days while providing a reliable source of backup power in case of emergency. Although the company could have chosen to run the fuel cells on natural gas, Adobe instead uses biomethane gas, as it generates much lower quantities of carbon dioxide. These 100kW units deliver about 30 percent of the electricity used at Adobe's headquarters. The installation and the biogas that power these fuel cells were incentivized by PG&E rebates.



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Blueprint for High Performance

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NEXT STEPS

To learn how PG&E can help your business reduce energy consumption and costs, contact your PG&E Account Representative or call our Business Customer Service Center at 1-800-468-4743. More information is available at www.pge.com/hightech.

Original IBIS screenshots provided by Integrated Building Systems (slight alterations were made for layout purposes).
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