The ultimate guide to

Energy efficiency and savings

for commercial buildings

Introduction

U.S. commercial building energy expenditures are staggering. Today's businesses, government, and commercial sites spend $190 billion every year on energy-related costs. With the relentless increase in energy bills for commercial buildings, there's a pressing need for energy efficiency and savings.

The potential for building owners and managers to reduce commercial energy consumption is substantial—an average of 30% of the energy used in commercial buildings is wasted, according to the U.S. Environmental Protection Agency.

Energy savings solutions, such as building management systems (BMS) incorporating advanced analytics, can help you to achieve a significant reduction in cost. In fact, the Department of Energy (DOE) reports that companies can gain energy savings between 3 and 9% over a 2-year period by using analytics. With intelligent analytics from a controls and integration expert, you can achieve an average of 10 to 25% energy savings or more.

As a building owner or manager, you can significantly reduce your energy bills with the right energy efficiency and savings solutions highlighted in this guide.

Understanding energy use and cost savings opportunities

Before we take a look at energy cost-saving solutions that you can implement to meet annual building energy management goals, let's first look at why commercial energy costs have increased. Understanding the primary energy-use and waste factors will enable you to identify potential areas to target for cost savings.

The table below offers an overview of the primary high energy consumption concerns for commercial buildings, and cost savings opportunities for overcoming those obstacles.

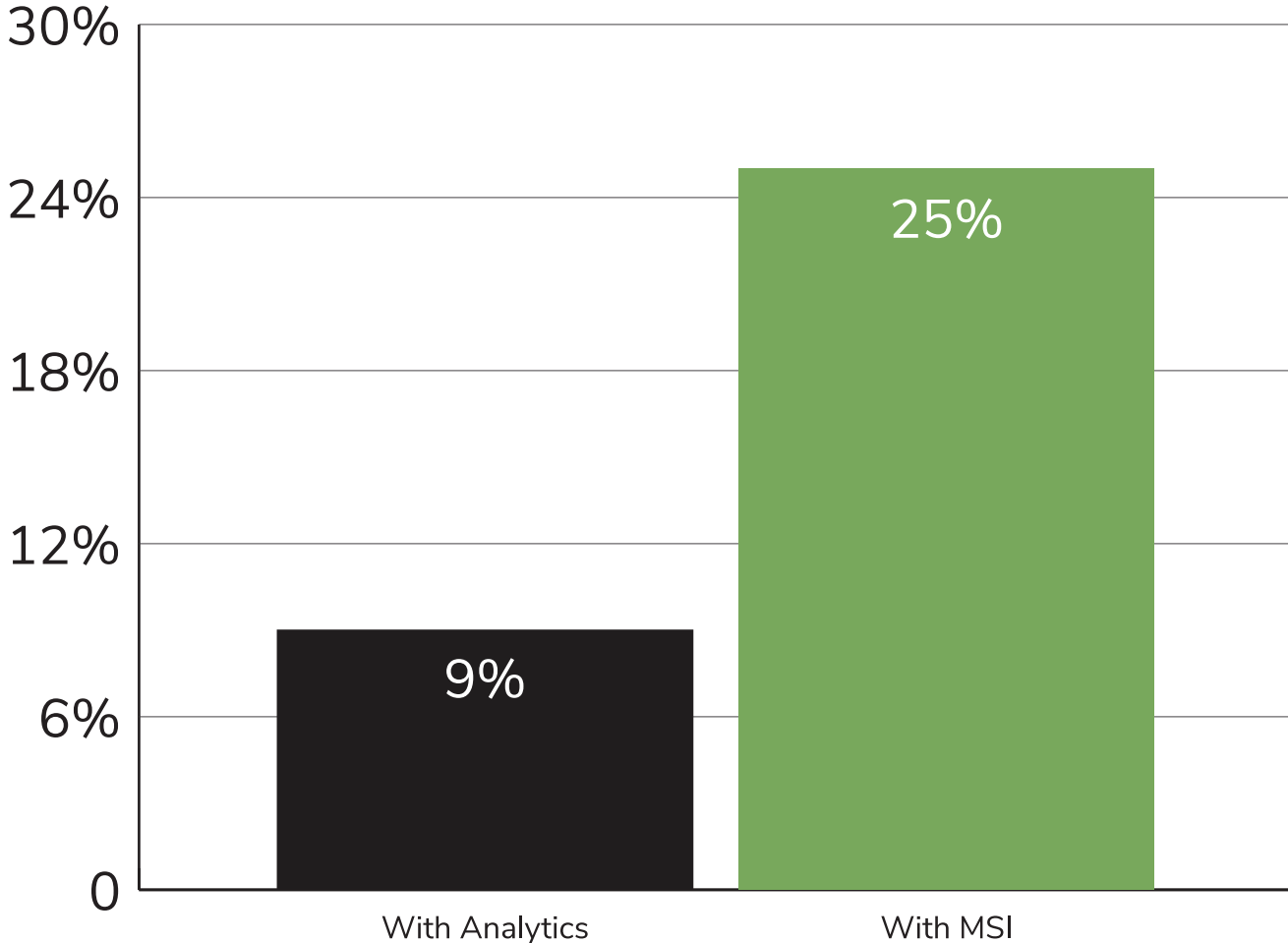| Smart energy efficiency management	
Energy use concern	**Cost savings opportunity**
Heating and cooling systems	HVAC systems are the predominant energy consumers within a commercial building. So, it's crucial that you augment your facilities with advanced analytics, monitoring, and controls. Your BMS can achieve energy savings and associated cost reductions in areas related to temperature, seasonality, occupancy, and data-driven maintenance.
Lighting	Lighting is another key energy consumer that benefits greatly from regulation using smart analytics and controls that offer full visibility through a mobile dashboard including information about lighting systems status. You can configure lighting controls on a schedule to automatically dim or shut off lights at specific times of the day or based on other factors, such as occupancy.
Energy-consuming equipment and devices	Go beyond fault detection and diagnostics with continuous and actionable analytics that help you to regulate high energy-consuming equipment and devices. Some equipment, such as large appliances or machinery, incur high and potentially excessive energy usage and are often areas where there is waste. Advanced analytics with monitoring and controls helps you to identify the precise operational issues leading to unnecessarily high energy consumption that could be addressed.
Lack of energy data	Achieving optimal energy consumption requires the collection and organization of essential data for evaluating and addressing energy efficiency over time. With the right analytics partner, you can put in place an analytics system to fulfill this role, enabling you to project future energy usage patterns, and develop goal-oriented energy efficiency and cost savings tactics.

Achieving energy-efficient smart commercial buildings

As the DOE reports, companies can achieve energy savings between 3 and 9% over a two-year timeframe with analytics. With intelligent analytics from a master systems integrator (MSI) and controls expert like Buildings IoT, you can achieve up to 10 to 25% energy savings.

By extracting insightful and actionable real-time, prioritized data for commercial and multi-site properties, building owners and operators have a new and powerful tool to address the sizable percentage of waste and inefficiencies that are occurring across their facilities.

As you strive toward exceeding energy efficiency and savings goals for your commercial buildings, you may need help from an experienced partner to develop a successful energy-savings strategy for a truly optimized, seamless system. There are several specific intelligent energy efficiency areas to focus on:

Energy cost savings with analytics

Comprehensive energy management and performance tracking

By working with an advanced analytics partner who can track historical data from your systems, you will soon have a baseline for a comprehensive energy efficiency plan. This plan will include actionable areas for maintenance and change management, streamlined reporting and monitoring, and an approach for controlling equipment and devices more efficiently.

The process begins with collecting and analyzing a range of in-depth systems and their data in a more structured and manageable way, and predicting energy demand and consumption based on historical and real-time usage.

Powerful data analytics tools working in conjunction with advanced machine learning (ML) can:

» Enable timely and accurate insights.

» Be used to plan an improved approach to maintenance.

» Identify beneficial device configuration changes that could be made.

» Target areas that could benefit from the use of automation to streamline systems.

Energy performance tracking requires a fine balance of intelligent analytics, remote monitoring, and automated device control to produce energy savings. It can be broken down by specific high energy-consuming systems, like HVAC and lighting, and other equipment and devices.

HVAC efficiency

Heating, ventilation, and air conditioning (HVAC) systems are in almost all cases the highest energy-consuming equipment, using an astonishing 40-60% of total commercial building consumption. Through advanced analytics solutions, commercial building owners and facility managers will discover major efficiency benefits for the HVAC system itself, as well as its interconnected BMS and related equipment. For the best energy management to maximize efficiency, analytics systems should enable:

Meaningful, simplified insights

Intelligent analytics related to your HVAC equipment like fan coil units, variable air volume (VAV) systems, etc. will help you to:

» Identify and address zone setpoints that are causing excessive heating or cooling demands. This may include unreasonably tight deadbands or infrequently occupied areas.

» Adjust equipment schedules based on demand to ensure occupant comfort while minimizing equipment runtime and energy consumption.

» Understand optimization opportunities for efficient system operation with an experienced controls partner who can deliver a complete solution.

Data-driven maintenance

The right partner will evaluate how your HVAC system is performing and manage automated temperature setpoints according to outside temperatures and other environmental influences. Through detailed analysis and proactive maintenance suggestions, you will:

» Improve system efficiency and prolong your HVAC's life to achieve maximum, long-term energy savings.

» Improve occupant comfort and reduce equipment downtime.

"Heating, ventilation, and air conditioning (HVAC) systems use an astonishing 40-60% of total building consumption."

Cogeneration

Cogeneration can powerfully reduce carbon emissions and ensure that the major load on your HVAC system is reduced, redirecting wasted heat and power production to heat your buildings' water.

Ventilation

Keeping your air vents clear and free of obstructive articles will help reduce your energy bills. As blocked ventilation causes 25% more energy to be consumed inside a building, maintaining clean and clear ventilation will help save energy and reduce your energy bill. You can also implement air quality monitoring sensors to help improve the energy efficiency of your ventilation system.

HVAC systems play a critical role in commercial building energy efficiency. When your HVAC system controls are automated and set up to consume less energy, you will experience greater energy efficiency and reap substantial cost savings benefits.

Lighting controls

Lighting is generally another high energy consumer. And while the simplest way to reduce energy consumption is by turning off lights during no-to-low occupancy periods, you can also consider natural light, energy-efficient windows, and skylights.

Often, the obvious cost savings opportunities, however, are not enough to substantially reduce your energy usage related to lighting so that's where lighting control technologies and advanced analytics come into play. An expert partner with energy management experience can:

> Consult on the best occupancy sensors you can install to automatically dim or turn off lights as rooms become unoccupied.

> Schedule lighting controls to automatically dim or shut off lights at specific times of the day—at the end of a typical workday for example.

> Implement demand-responsive lighting automation for dimming or turning off lights during high electricity pricing periods of the day.

Building automation is used to control the lighting systems throughout your buildings. And because artificial lighting consumes 35-75% of a site's overall energy usage, that makes lighting and these techniques significant for improving your energy efficiency and potential savings.

Broad-spectrum monitoring

Energy efficiency for commercial buildings is difficult to achieve when you have systems malfunctioning and equipment and devices consuming unnecessarily high levels of energy. And sometimes those systems—such as breakroom appliances and huddle room equipment—are not being reported by your BMS.

By gaining visibility into energy consumption and waste at a granular level—by ensuring all equipment is connected through your BMS and adding analytics into your building management system, you can employ simple cost-effective techniques such as:

» Putting your equipment into "sleep mode" when inactive to save substantially on energy bills.

» Powering down equipment at night when no one is using it.

» Reporting on equipment operation by system and validating work completed has actually fixed a problem.

» Monitoring and uncovering patterns within large datasets of your operational systems even down to the smaller end-points and most energy-consuming devices to help you to detect faults and excessive energy usage before they spiral into higher energy bills.

» Reducing operational costs related to equipment maintenance and emergency service calls.

» Understanding quickly about any equipment overheating or high consumption use devices within your building operation.

» Realizing the benefits of proactive maintenance to prevent breakdowns before they occur and lead to excessive energy use.

Gaining ground on energy efficiency for commercial buildings with intelligent analytics

An energy management partner can provide the advanced analytics, controls, and integration services you need to not only identify energy savings opportunities but help you realize those savings. In the case of analytics and automation backed by machine learning, achieving energy efficiency throughout your facility or portfolio could be done with minimal human intervention.

Working toward energy efficiency goals with a master systems integrator can also enable your systems to be viewed and managed from a single-pane-of-glass that's mobile and accessible 24 hours a day from any location.

By implementing an advanced analytics, cloud-based energy management platform, you can quickly achieve building savings and efficiency goals, and provide comprehensive visibility into the efficient operation of your building management systems. Take action now to save 25% or more in energy efficiency and savings for your commercial buildings, provide a significant return on your investment, and transform your business model for a bright future.

buildingsIOT

Smart buildings as they should be.